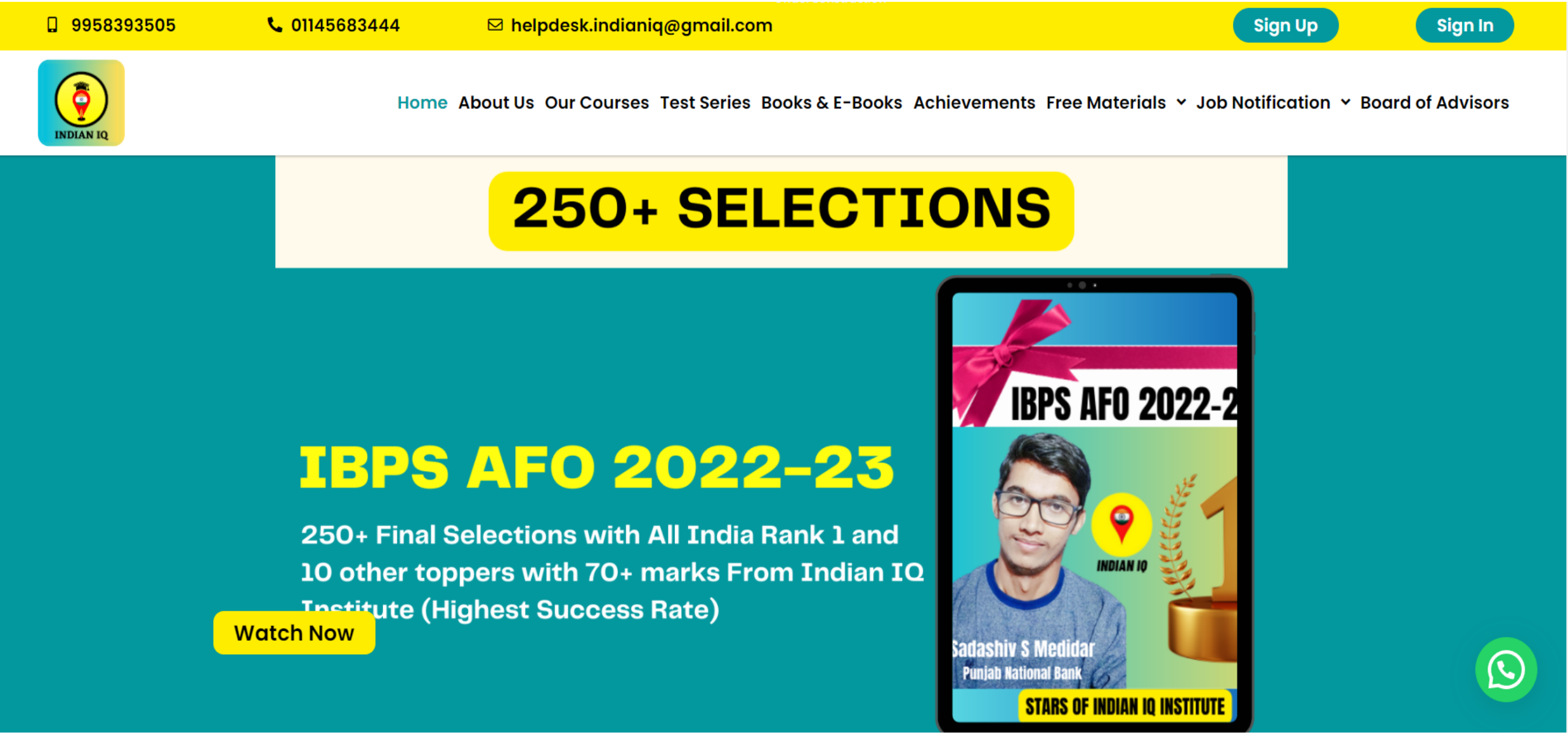
GLIMPSES TO THE INDIAN IQ COURSES FACILITIES

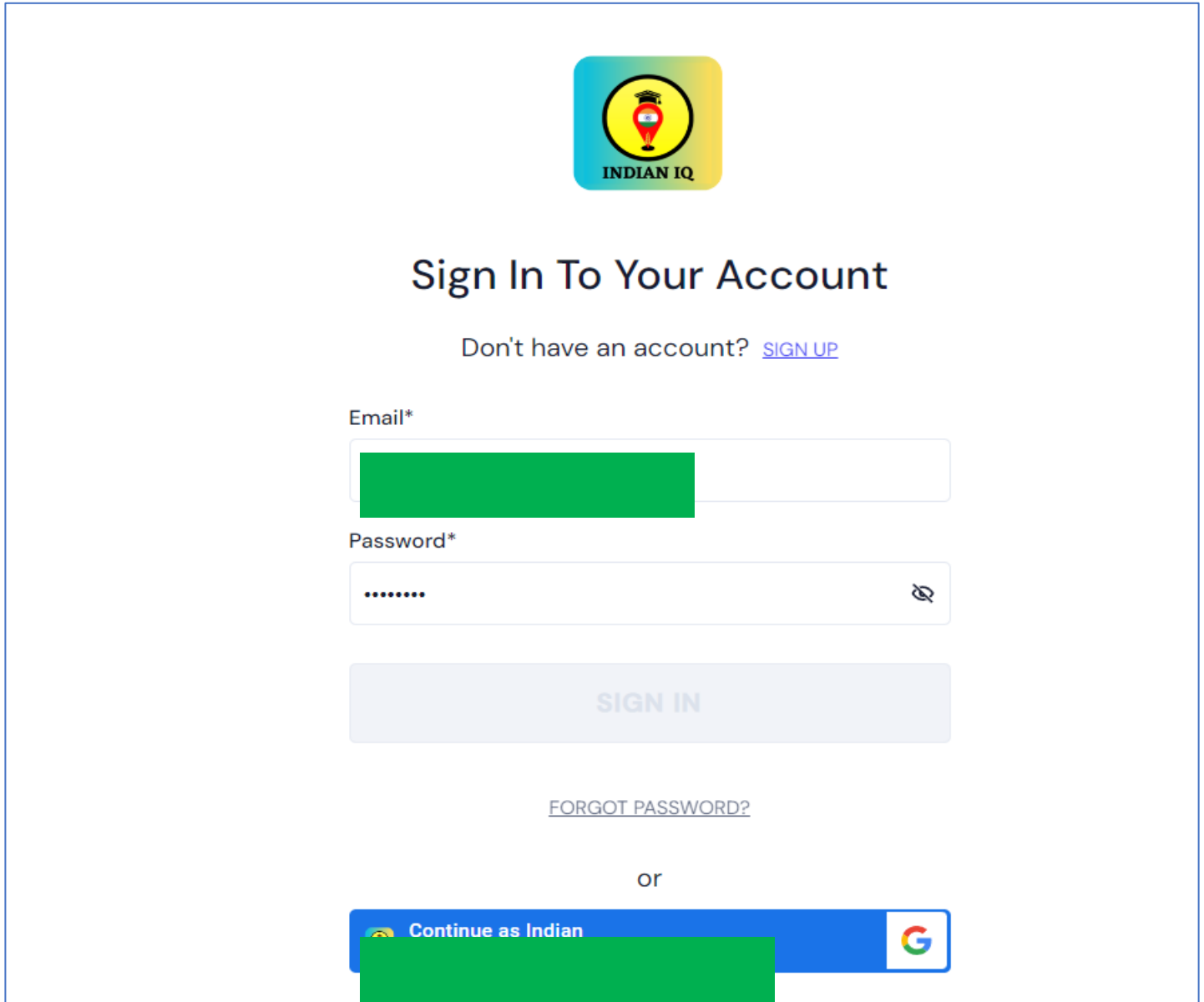
Because selection of each one of you matters to us!

“Online coaching with care better than offline”

Glimpses of the Indian IQ course: Course Portal



Glimpses of the Indian IQ course: Easy login with email id (Smartphone/Laptop/Desktop/Tablets)

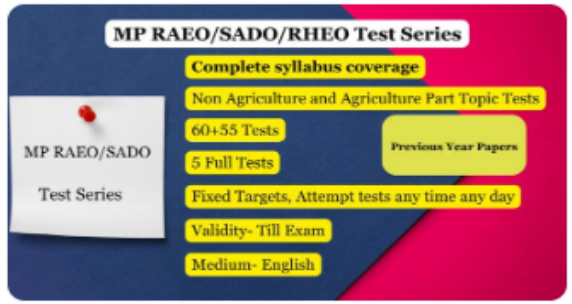


Glimpses of the Indian IQ course: Personalized “My Enrolment” section

STORE / MY ENROLLMENTS

All 06

FILTER BY TYPE

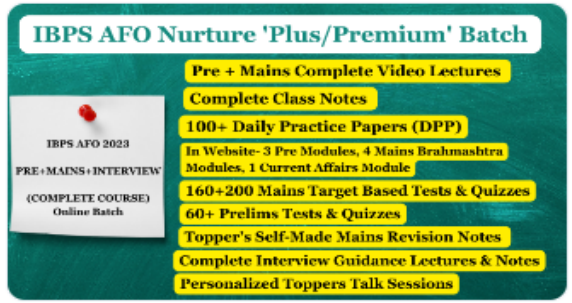


Courses

MP RAEO Target Based Test Series 2023

101 Lessons

0% Completed



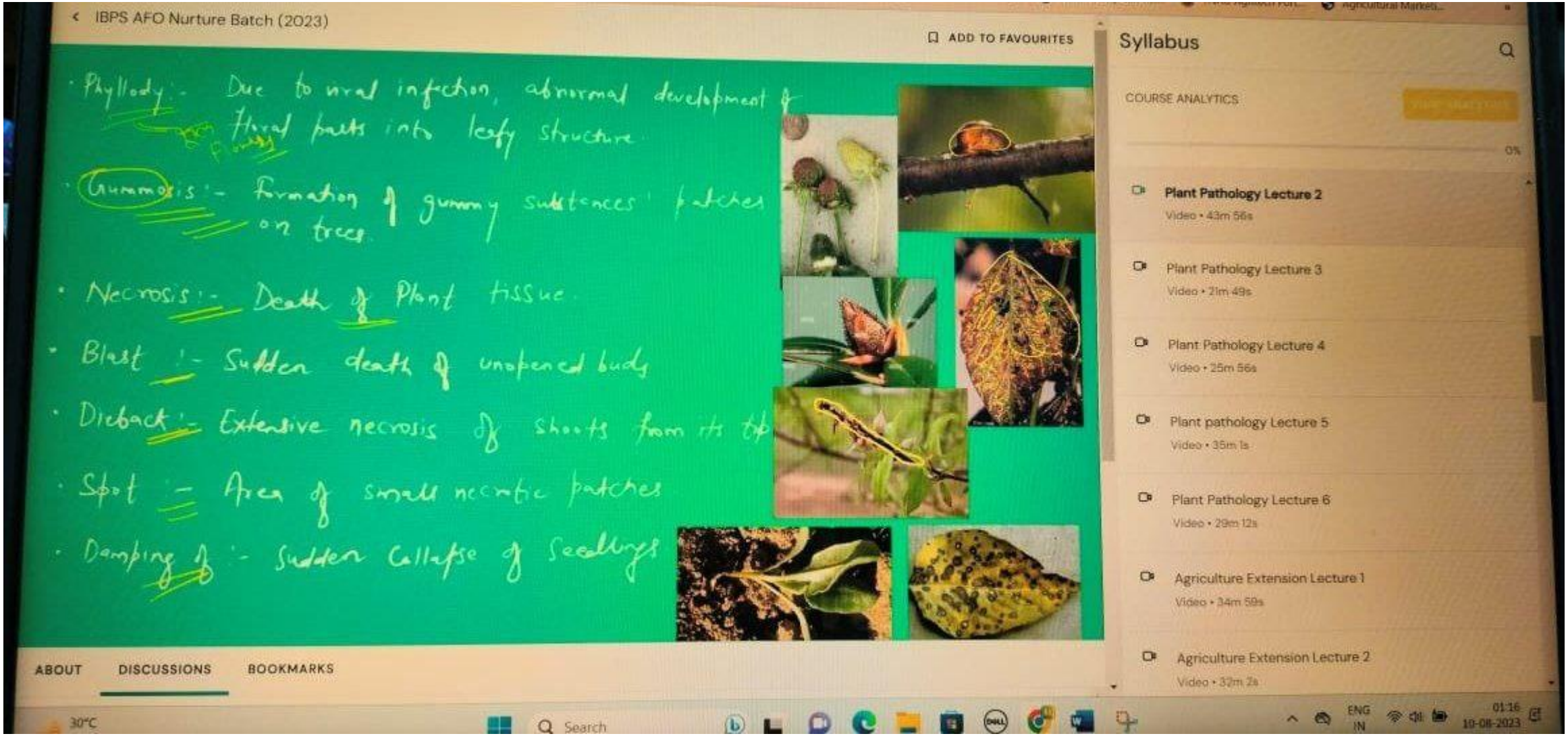
Courses

IBPS AFO Nurture Batch (2023)

205 Lessons

0% Completed

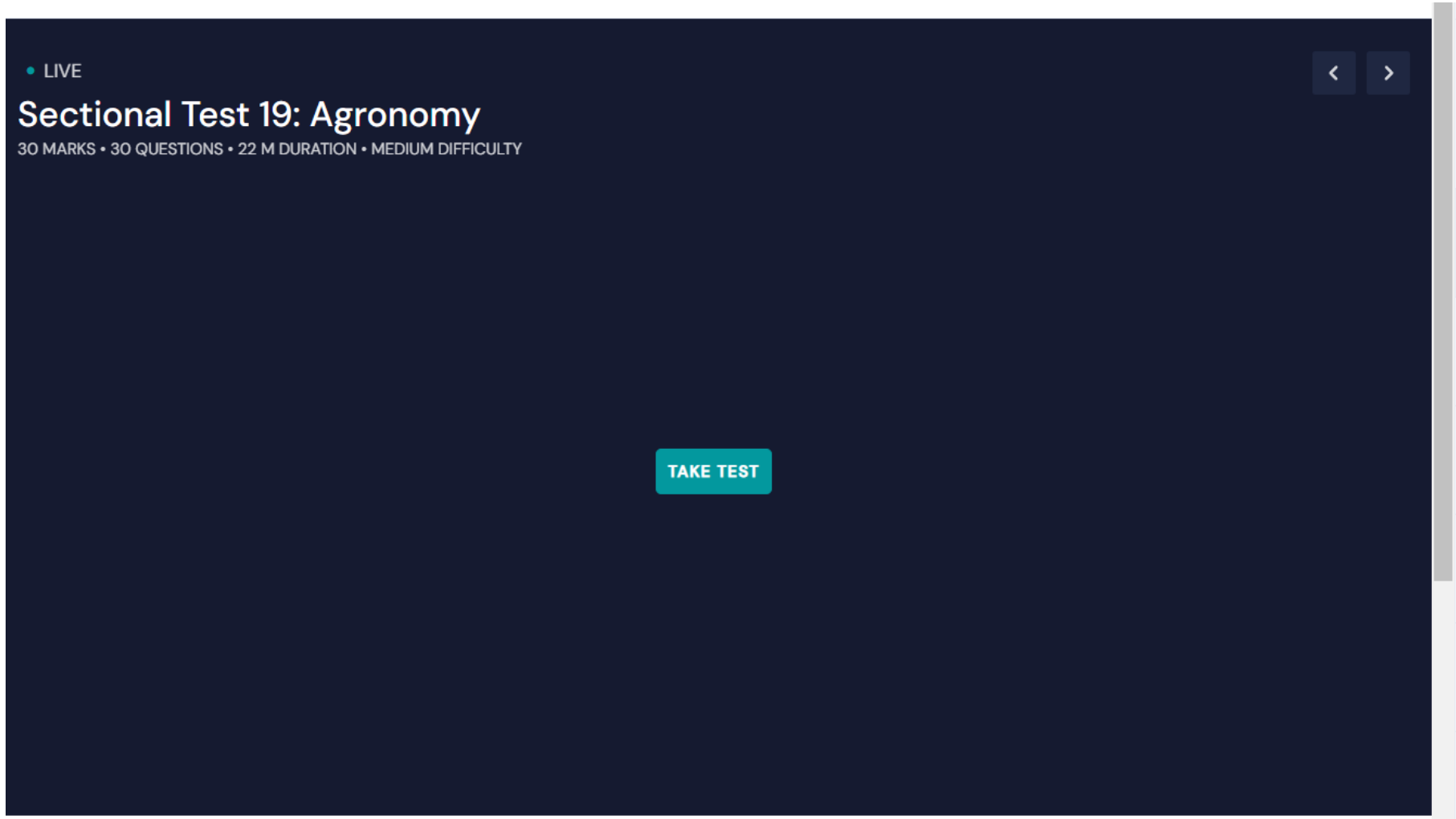
Glimpses of the Indian IQ course: Video lectures

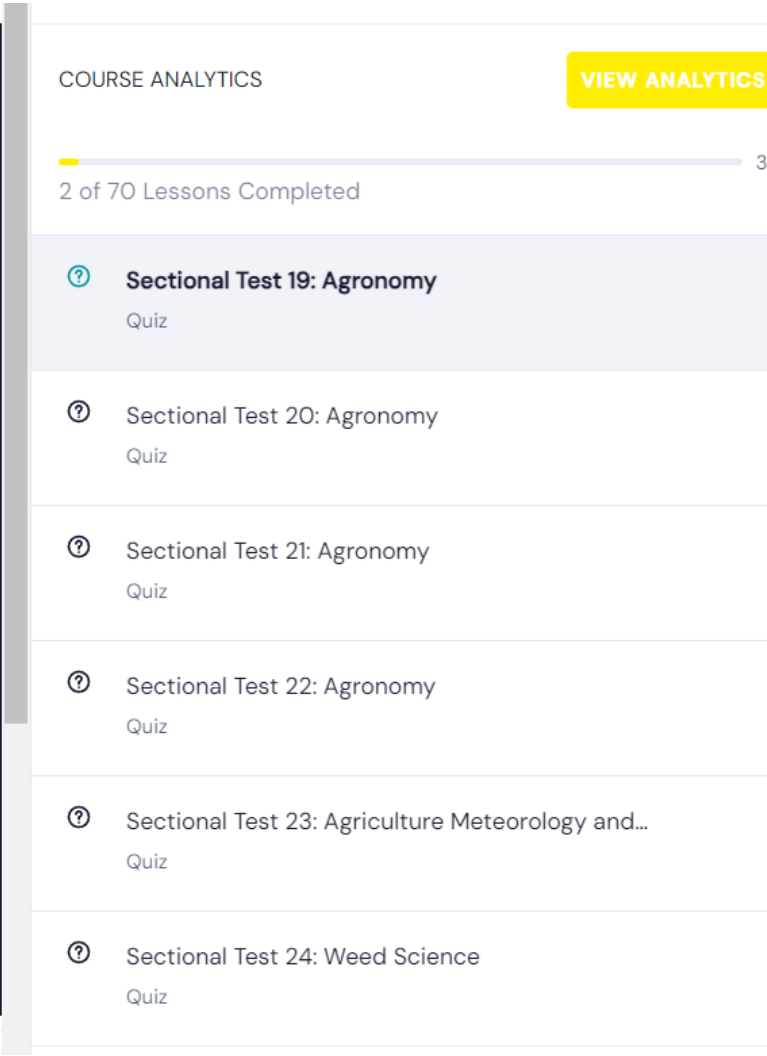


Glimpses of the Indian IQ course: Online Modules

13. **Felling:** Felling comprise of removal of trees either singly or in small groups scattered all over the forest.
14. **Afforestation:** Establishing a forest by artificial means on an area on which not forest vegetation has existed for a long time in the past.
15. **Reforestation:** Re-establishing a forest, by artificial means on an area which previously bore forest vegetation, and which may have been felled or otherwise cleared in the recent past.
16. **Age crop:** The age of a regular crop corresponding to its crop diameters.
17. **Age classification:** The division of a crop according to difference in age **OR** the allotment of woods to age classes.
18. **Alpine:** Zone of vegetation where winter is server, slow fall heavy, the mean annual temperature is 450F and the mean January temperature below 300F. In India Himalayan at the altitude above 10,000 ft.
19. **Basal area:** The area of the cross section of a stem at breast height, when applied to a crop, the sum of basal areas of all the stems or the total basal areas per unit area.
20. **Bole:** The main stem of a tree.
21. **Breast height:** Almost universally adopted as the standard height for measuring the girth,

Glimpses of the Indian IQ course: Target Based Test





Glimpses of the Indian IQ course: Exact Exam Level Tests on Exact Actual Exam Like Dashboard

Sectional Test 19: Agronomy

0 0 : 21 : 42

helpdesk.indianiq

SECTION 1

Q. 3 of 30 Marks : 1.0, -0.25

Which of the following plant completes its life cycle in two seasons which means that during first season, they complete its vegetative growth and during second season they completes its reproductive growth?

A Sorghum

B Sugarcane

C Maize

D Cotton

E Soybean

1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24 25
26 27 28 29 30

ANSWERED NOT ANSWERED
MARKED FOR REVIEW NOT VISITED
ANSWERED & MARKED FOR REVIEW

ALL QUESTION INSTRUCTION

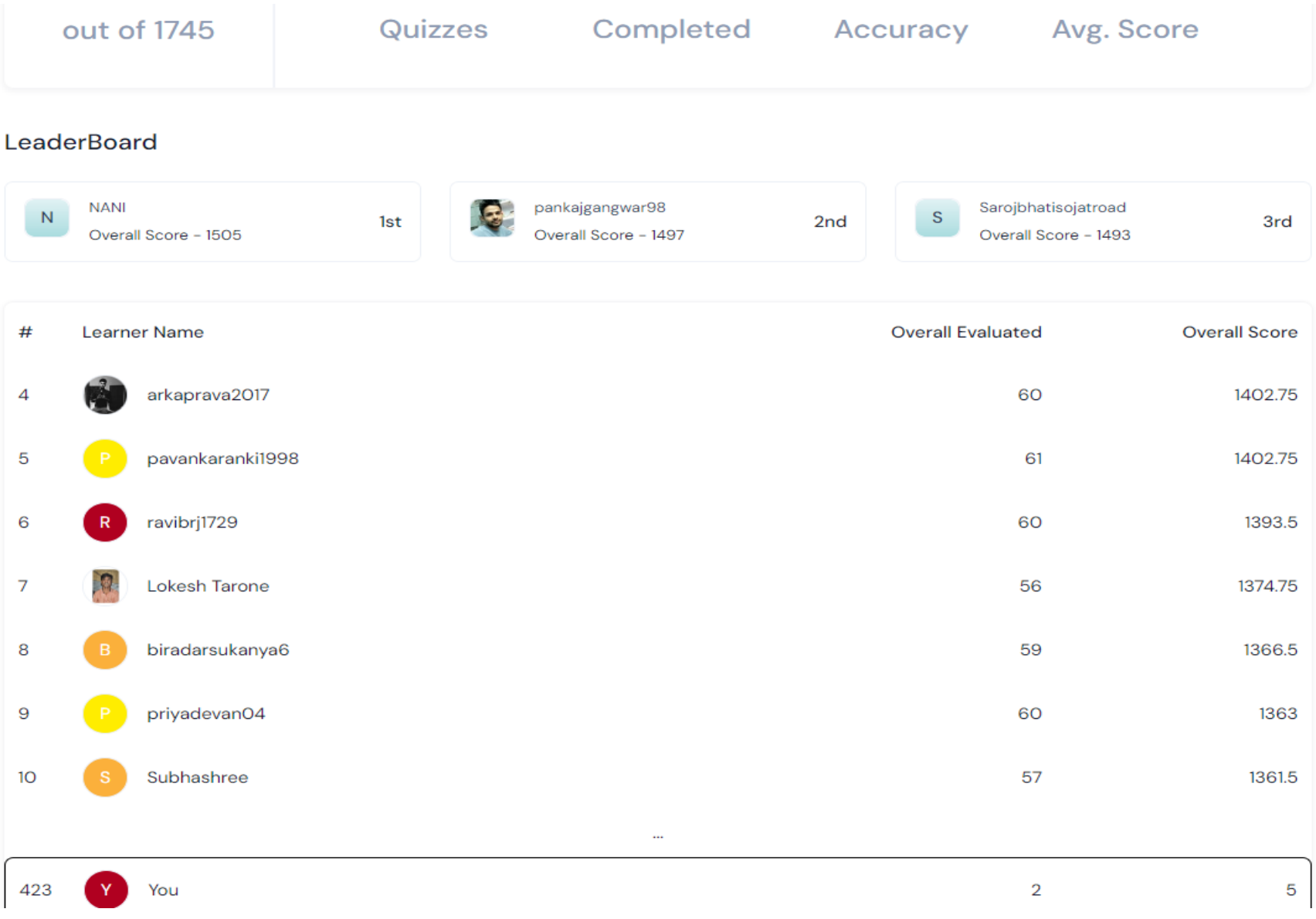
MARK FOR REVIEW CLEAR

3 OF 30

NEXT

SUBMIT

Glimpses of the Indian IQ course: Know your overall rank in course every day and how your studies going on



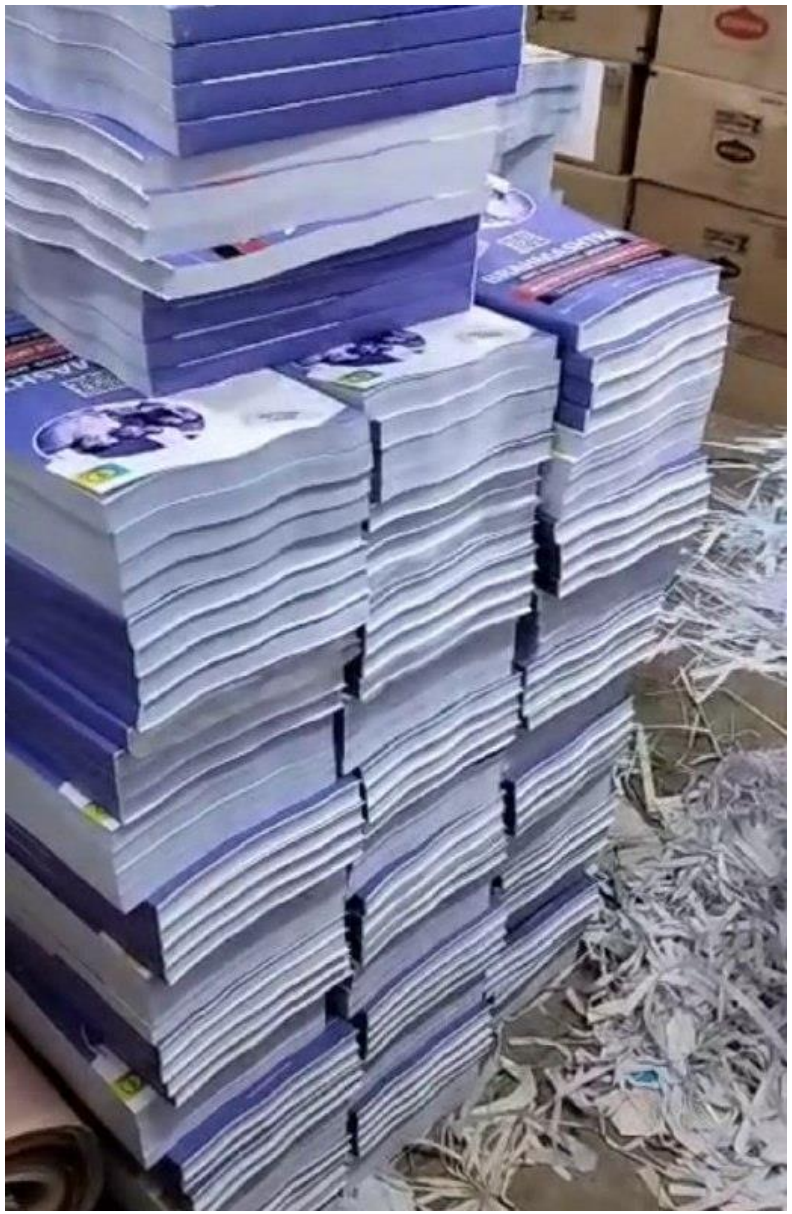
out of 1745	Quizzes	Completed	Accuracy	Avg. Score

LeaderBoard

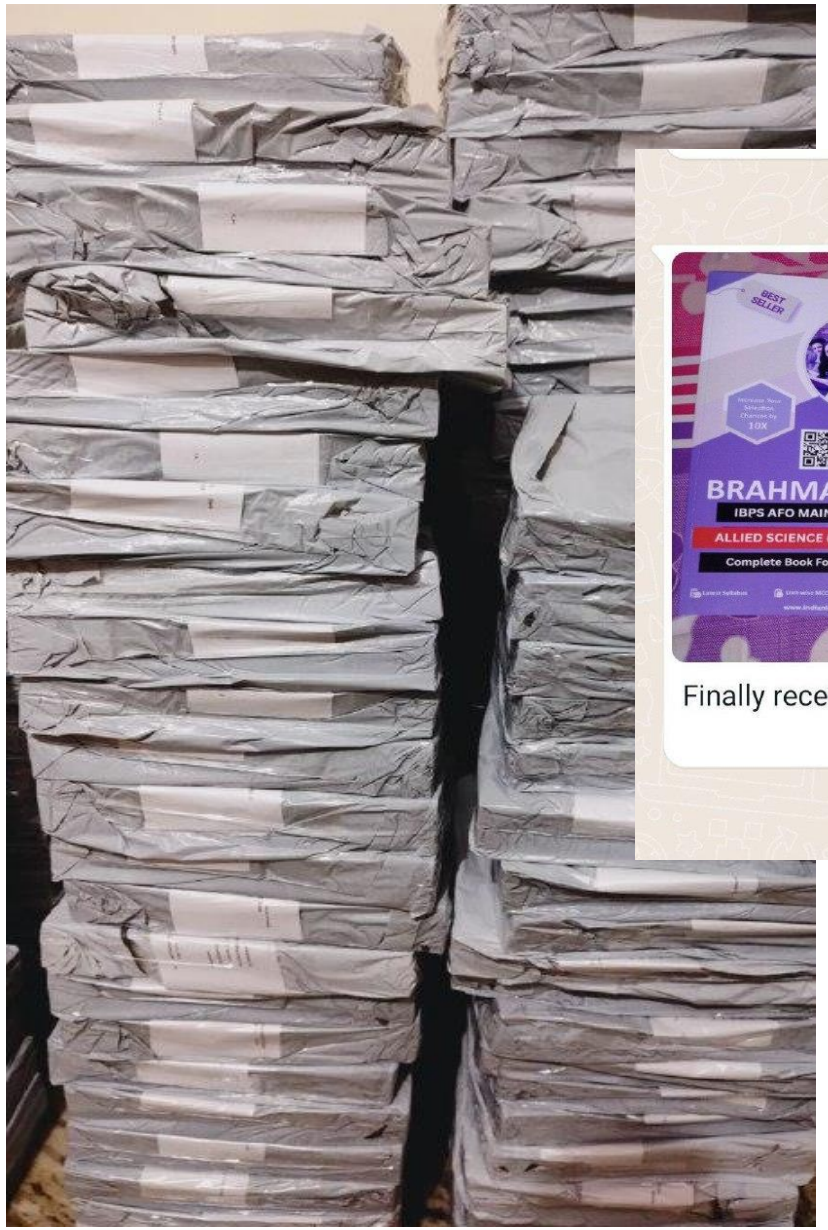
N NANI Overall Score - 1505	pankajgangwar98 Overall Score - 1497	S Sarojbhatisojatroad Overall Score - 1493
1st	2nd	3rd

#	Learner Name	Overall Evaluated	Overall Score
4	arkaprava2017	60	1402.75
5	pavankaranki1998	61	1402.75
6	ravibrj1729	60	1393.5
7	Lokesh Tarone	56	1374.75
8	biradarsukanya6	59	1366.5
9	priyadevan04	60	1363
10	Subhashree	57	1361.5
...			
423	You	2	5

Glimpses of the Indian IQ course: Delivery of Books to your doorstep

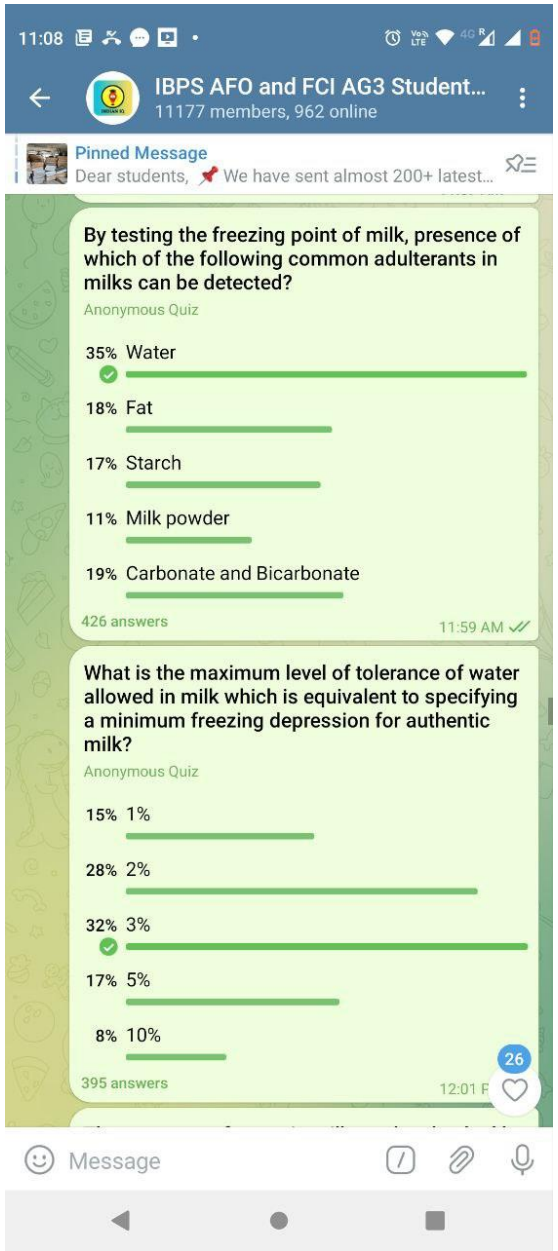


Glimpses of the Indian IQ course: Delivery of Books to your doorstep

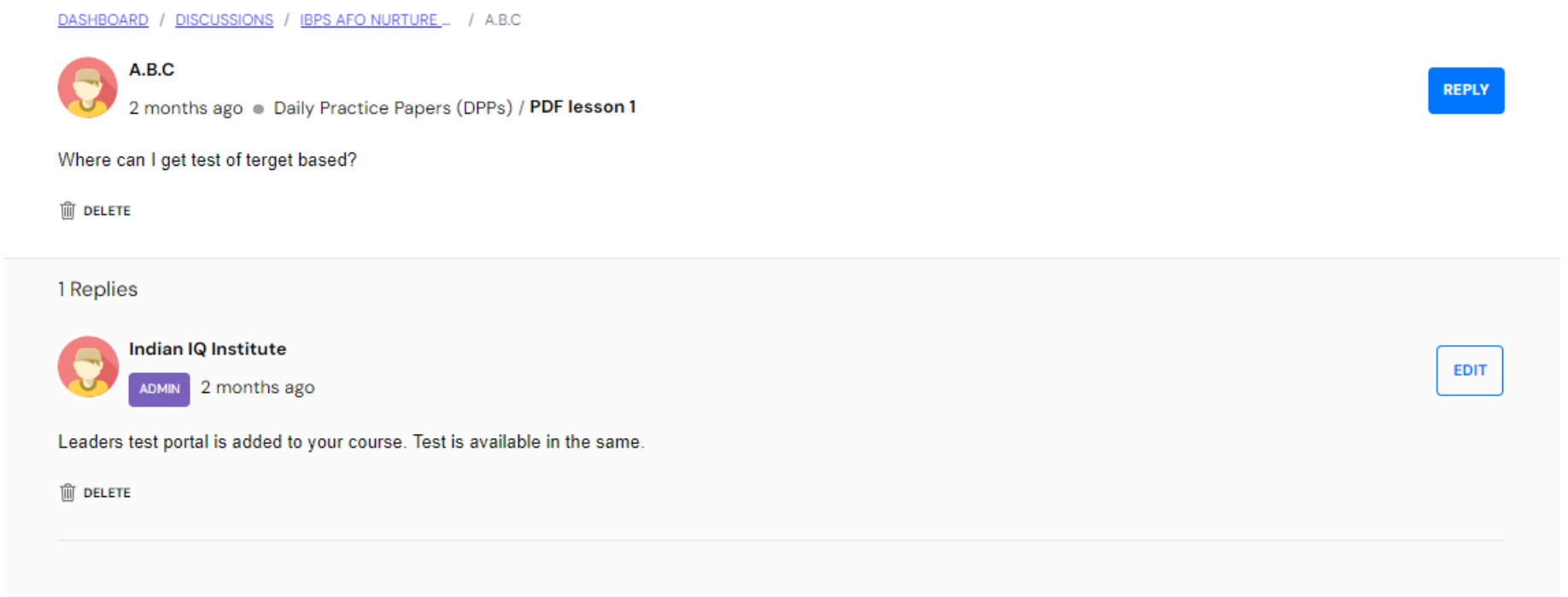


Glimpses of the Indian IQ course: Topper's Talk Sessions and Daily Counselling

Glimpses of the Indian IQ course: Separate Telegram Group for batch students for Notices and Daily Quiz Group



Glimpses of the Indian IQ course: Doubt and Discussion on portal



DEMO- IBPS AFO Course 2023

"You have no other choice"

"You need to win at any cost"

INDIAN IQ

Seed Technology

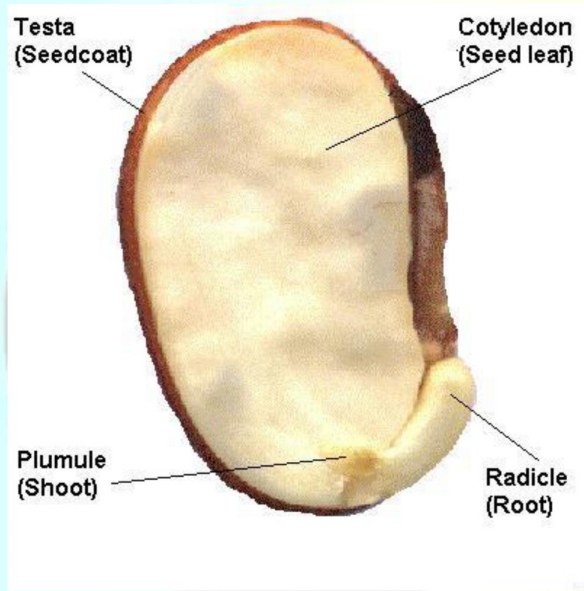
www.indianiq.com

SEED TECHNOLOGY

A seed is a fertilized ovule containing the plant embryo, enclosed in seed coat.

About seed-

A seed (in some plants, referred to as a kernel) is a small embryonic plant enclosed in a covering called the seed coat, usually with some stored food. It is the product of the ripened ovule of gymnosperm and angiosperm plants which occurs after fertilization and some growth within the mother plant. The formation of the seed completes the process of reproduction in seed plants (started with the development of flowers and pollination), with the embryo developed from the zygote and the seed coat from the integuments of the ovule.

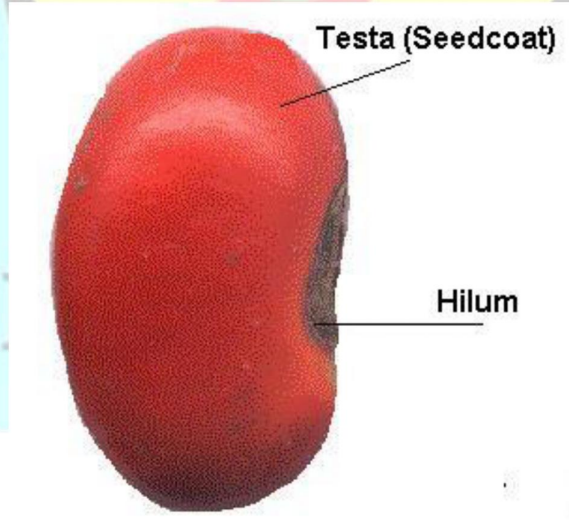


A typical seed includes three basic parts: (1) an embryo, (2) a supply of nutrients for the embryo, and (3) a seed coat.

- The embryo is an immature plant from which a new plant will grow under proper conditions. The embryo has one cotyledon or seed leaf in monocotyledons, two cotyledons in almost all dicotyledons and two or more in gymnosperms.
- The radicle is the embryonic root.
- The plumule is the embryonic shoot. The embryonic stem above the point of attachment of the cotyledon(s) is the epicotyl. The embryonic stem below the point of attachment is the hypocotyl.
- Within the seed, there usually is a store of nutrients for the seedling that will grow from the embryo. The form of the stored nutrition varies depending on the kind of plant.

- In angiosperms, the stored food begins as a tissue called the endosperm, which is derived from the parent plant via double fertilization. The usually triploid endosperm is rich in oil or starch and protein.
- In gymnosperms, such as conifers, the food storage tissue is part of the female gametophyte, a haploid tissue. In some species, the embryo is embedded in the endosperm or female gametophyte, which the seedling will use upon germination.
- In others, the endosperm is absorbed by the embryo as the latter grows within the developing seed, and the cotyledons of the embryo become filled with this stored food. At maturity, seeds of these species have no endosperm and are termed exalbuminous seeds.
- Some exalbuminous seeds are bean, pea, oak, walnut, squash, sunflower, and radish. Seeds with an endosperm at maturity are termed albuminous seeds. Most monocots (e.g. grasses and palms) and many dicots (e.g. brazil nut and castor bean) have albuminous seeds. All gymnosperm seeds are albuminous.

The seed coat (or testa) develops from the tissue, the integument, originally surrounding the ovule. The seed coat in the mature seed can be a paper-thin layer (e.g. peanut) or something more substantial (e.g. thick and hard in honey locust and coconut). The seed coat helps protect the embryo from mechanical injury and from drying out.



Type of seeds-

Monocot seeds- Cereals and grasses which contains single cotyledons.

Dicot seeds- Pulses which contain two cotyledons.

Positive Photoblastic seeds- Good germination in presence of light. Eg. Tobacco

Negative Photoblastic- Good germination in absence of light. Eg. Onion

Non- Photoblastic- Good germination in any condition. Eg. Most of the crops.

Note- ***662 nm wavelength (Red light) is best for seed germination. Above 730 nm germination stops.***

How Seed is formed?

Seed is formed by transfer of pollen grains from anther (male part) to stigma (female part). This process is called as pollination.

There are two types of pollination:

- Self-Pollination (Autogamy)
- Cross-Pollination (Allogamy)

The process by which pollen grains are transferred from anthers to stigma is referred as pollination. Pollination is of two types: viz. 1) Autogamy or self-pollination and 2) Allogamy or cross pollination.

I. **Autogamy**

Transfer of pollen grains from the anther to the stigma of same flower is known as autogamy or self-pollination. Autogamy is the closest form of inbreeding. Autogamy leads to homozygosity. Such species develop homozygous balance and do not exhibit significant inbreeding depression.

Mechanism promoting self-pollination

1. *Bisexuality*-Presence of male and female organs in the same flower is known as bisexuality. The presence of bisexual flowers is a must for self-pollination. All the self-pollinated plants have hermaphrodite flowers.

2. *Homogamy*-Maturation of anthers and stigma of a flower at the same time is called homogamy. As a rule, homogamy is essential for self-pollination.

3. *Cleistogamy*-When pollination and fertilization occur in unopened flower bud, it is known as cleistogamy. It ensures self-pollination and prevents cross pollination. Cleistogamy has been reported in some varieties of wheat, barley, oats and several other grass species.

4. *Chasmogamy*-Opening of flowers only after the completion of pollination is known as chasmogamy. This also promotes self-pollination and is found in crops like wheat, barley, rice and oats.

5. *Position of Anthers*-In some species, stigmas are surrounded by anthers in such a way that self-pollination is ensured. Such situation is found in tomato and brinjal. In some legumes, the stamens and stigma are enclosed by the petals in such a way that self-pollination is ensured. Examples are greengram, blackgram, soybean, chickpea and pea.

II. **Allogamy**

Transfer of pollen grains from the anther of one plant to the stigma of another plant is called allogamy or cross pollination. This is the common form of out-breeding. Allogamy leads to heterozygosity. Such species develop heterozygous balance and exhibit significant inbreeding depression on selfing.

Mechanism promoting cross-pollination

1. *Dicliny*- It refers to unisexual flowers. This is of two types: viz. i) monoecy and ii) dioecy. When male and female flowers are separate but present in the same plants, it is known as monoecy. In some crops, the male and female flowers are present in the same inflorescence such as in mango, castor and banana. In some cases, they are on separate inflorescence as in maize. Other examples are cucurbits, grapes, strawberry, cassava and rubber. When staminate and pistillate flowers are present on different plants, it is called dioecy. It includes papaya, date palm, spinach, hemp and asparagus.

2 *Dichogamy.*-(from the Greek dikho-apart and gamous-marriage) It refers to maturation of anthers and stigma of the same flowers at different times. Dichogamy promotes cross pollination even in the hermaphrodite species. Dichogamy is of two types: viz. i) protogyny and ii) protandry. When pistil matures before anthers, it is called protogyny such as in pearl millet. When anthers mature before pistil, it is known as protandry. It is found in maize, sugarbeet and several other species.

3 *Heterostyly*- When styles and filaments in a flower are of different lengths, it is called heterostyly. It promotes cross pollination, such as linseed.

4 *Herkogamy*- Hinderance to self-pollination due to some physical barriers such as presence of hyline membrane around the anther is known as herkogamy. Such membrane does not allow the dehiscence of pollen and prevents self-pollination such as in alfalfa.

5 *Self-Incompatibility*- The inability of fertile pollen to fertilise the same flower. It prevents self-pollination and promotes cross pollination. Self-incompatibility is found in several crop species like Brassica, Radish, Nicotiana, and many grass species. It is of two types sporophytic and gametophytic.

6 *Male Sterility*- In some species, the pollen grains are non-functional. Such condition is known as male sterility. It prevents self-pollination and promotes cross pollination. It is of three types: viz. genetic, cytoplasmic and cytoplasmic genetic. It is a useful tool in hybrid seed production.

Mode of pollination and reproduction	Examples of crop plants
A. Autogamous Species	
1. Seed Propagated	**Rice**, **Wheat,** Barley, Oats, Chickpea, Pea, Cowpea, Lentil, Green gram, Black gram, Soybean, Common bean, Moth bean, Linseed, Sesame, Khesari, Sun hemp, Chillies, Brinjal, Tomato, Okra, Peanut, etc.
2. Vegetatively Propagated	Potato
B. Allogamous Species	
1. Seed Propagated	**Maize, Pearl millet**, Rye, Alfalfa, Radish, Cabbage, Sunflower, Sugar beet, Castor, Red clover, White clover, Safflower, Spinach, Onion, Garlic, Turnip, Squash, Muskmelon, Watermelon, Cucumber, Pumpkin, Kenaf, Oilpalm, Carrot, Coconut, Papaya, etc.
2. Vegetatively propagated	Sugarcane, Coffee, Cocoa, Tea, Apple, Pears, Peaches, Cherries, grapes, Almond Strawberries, Pine apple, Banana, Cashew, Irish, Cassava, Taro, Rubber, etc.
C. Often Allogamous Species	Sorghum, Cotton, Triticale, **Pigeon pea**, Tobacco.

Sometimes two more terms are used they are

Geitonogamy is the type of self-pollinations where the transfer of pollen grains from the anther to the stigma takes place between different flowers in the same plant. Though it seems like cross-pollination and takes place with the help of pollinator, both the gametes have the same plant as their origin.

Xenogamy is the cross-pollination where the pollen grain transfer occurs across flowers of two different plants. In other words, the transfer of pollen from the anther of one plant to the stigma of another plant.

Important Terms:

Genetic purity- Seed should be free from other variety seed or other crop seeds.

Physical purity- Seed should be free from gravels, stone and broken seeds.

Seed Germination- Emergence and development of seedlings from the seed-embryo which is able to produce a normal plant under favourable condition.

Types of germination-

Hypogeal- The cotyledons remain under the soil. Eg. Cereals, Gram.

Epigeal- The cotyledons pushed above the soil surface. Eg, Tamarind, mustard, castor, sunflower, onion.

Essential factors for germination- Moisture, Temperature and Oxygen supply

Germination %= Number of seeds germinated X 100/Total number of seeds

Methods for testing Germination- Petridish method, Rolled towel method, Folder paper towel method, Sand method, Mechanical method, Gunny sacs method etc.

Seed Purity- Real percentage of desirable seed from a lot of seeds with various impurities. Purity %= Weight of pure seeds / Total weight of the working sample X 100

Real Value of seeds- Purity % X Germination % / 100

Viability test of seeds- Viability is the capacity of seed to germinate.

Potassium permanganate method- Qualitative method of testing viability.

Electrical conductance method- Seeds are soaked in distilled water and EC is tested.

Embryo culture method- Embryo is removed from cotyledons and it is placed on peat mass or agar medium. It takes 7-10 days for result.

Tetrazolium chloride test- Also known as Biochemical test. Seeds are soaked in 0.5 to 2% solution of tetrazolium chloride. The viable or living seeds take bright red colouration which becomes more intense in the embryo while the dead seeds remain in their original colour.

Grodex test- Grodex test is a germination indicator test based on triphenyl tetrazolium bromide powdered from.

Classes of Seed

The four generally recognized classes of seeds are: Breeder's seed, Foundation seed, Registered seed and Certified seed. The Association of Official Seed Certifying Agencies (AOSCA) has defined these seed classes as follows:

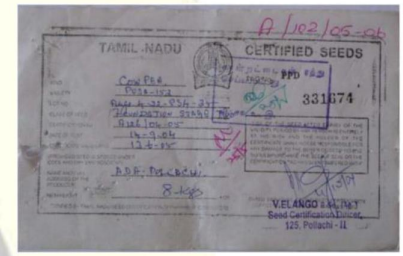
A. **Nucleus seed-**

These are initial seed of an improved variety, developed by plant breeder at research institute. Genetic and Physical purity is 100%, there is no need of certification and no tag color is assigned.

B. Breeder seed

It is the progeny of nucleus seed. The seed or vegetatively propagated material directly controlled by the originating or the sponsoring breeder or institution which is the basic seed for recurring increase of foundation seed. Genetic and Physical purity is 100%, Tag color is Golden yellow and tag size is 12x6 cm.

C. Foundation seed

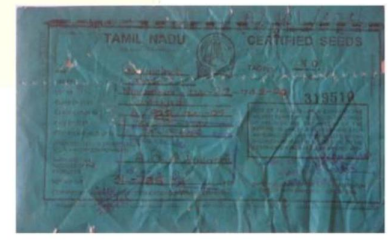


It is the progeny of breeder seed. The seed stock handled to maintain specific identity and genetic purity, which may be designated or distributed and produced under careful supervision of an agricultural experiment station, National Seed Corporation or at Government farm and Agriculture universities. This seed is the source of all other certified seed classes either directly or through registered seed. Genetic purity is 99.5% and Physical purity should be 98%. It is used fir production of registered and certified seeds. Tag colour is white and size is 15x7.5 cm.

D. **Registered Seeds**

The progeny of the foundation seed or registered seeds so handled as to maintain its genetic identity and purity and approved and certified by a certifying agency. Not used in India. It should be of quality suitable to produce certified seed. Tag colour is Purple and size is 15x7.5 cm.

E. Certified seed



It is the progeny of the foundation seed or certified seeds itself. Its production is so handled to maintain genetical identity and physical purity according to standards specified for the crop being certified. It should have the minimum genetical purity of 99% or more and physical purity of 98% is required. Certified seed may be the progeny of certified seed, provided this reproduction does not exceed two generations beyond foundation seed and provided that if certification agency determines the genetic and physical purity, if not be significantly altered. In case of highly self-pollinated crops certification of one further generation may be permitted. Tag colour is blue and size is 15 x 7.5 cm.

Other Types of seed

Orthodox seeds are capable of being dried to internal seed moisture of less than 12% water, stored at freezing temperatures, and surviving. Eg. Cereals and Pulses.

Recalcitrant seeds cannot be stored in a conventional freezer as they cannot survive after drying and/or freezing at -20°C. Eg. Mango, Coconut and most of the fruit crops.

Intermediate seeds tend to age faster than orthodox seeds and may have only a 5-year lifespan when stored at -20°C. They have greatest longevity when dried between 45 and 65% RH.

Truthful Labelled Seeds- It is the category of seed produced by cultivators, private seed companies and is sold under truthful labels.

- This type of seeds **does not come under the purview of the Department of Seed Certification**.
- Rather, field standard and seed standard should be maintained as per seed act and certified seed stage.
- Under the seed act, the seed producer and seed seller are responsible for the seed.
- Truthful labelling is compulsory for notified kind of varieties and it is tested for physical purity and germination.
- Tag colour- Opal green.
- **Notified Variety:** After a variety has been released for a zone by the Central Sub-Committee, the Director, HYV, Ministry of Agriculture and Irrigation, GOI notifies the concerned authorities of the states within that zone for seed multiplication and distribution of variety. This is known as notification of variety.

Difference between certified seed and truthful labelled seed

Certified seed	Truthful labelled seed
Certification is voluntary. Quality guaranteed by certification agency.	Truthful labelling is compulsory for notified kind of varieties. Quality guaranteed by producing agency
Applicable to notified kinds only	Applicable to both notified and released varieties

It should satisfy both minimum field and seed standards	Tested for physical purity and germination
Seed certification officer, seed inspectors can take samples for inspection	Seed inspectors alone can take samples for checking the seed quality.

Attributes of international seed analysis certificate

Orange certificate- Issued when the sample is drawn officially from the lot under the authority of a member station. The lot is sealed, labelled and tested for seed quality attributes from the same member station.

Green certificate- Issued when the sample is drawn officially from the lot under the authority of a member station and seed is tested for seed quality attributes from the member station of different country.

Blue certificate- Issued when testing is done by a member station in same country, sampling not done under the responsibility of member station.

Kind of certificate	Certificate relates to	Sampling	Testing	Issuance of certificate
1. Orange	Seed lot	done by a member station as per ISTA procedure	in the same country by the same station who has done sampl-ing.	by the station which had done testing.
2. Green	Seed lot	– do –	in another country by a member station.	by the station which had done testing.
3. Blue	Seed sample	sample submitted and not done under the responsibility of a memebr station.	by a member station in the same country.	by the station which has done testing.

Model of seed generation

Generation system of seed multiplication is nothing but the production of a particular class of seed from specific class of seed up to certified seed stage. The choice of a proper seed multiplication model is the key to further success of a seed programme.

This is basically depending upon,

i. The rate of genetic deterioration

ii. Seed multiplication ratio and

iii. Total seed demand

Moisture content in seed for storage- long term (6-8%), short term (10-13%), cereals (10-12%), pulses (8-10%), oil seeds- (6-8%).

Storage substances-

Rice- Oryzein, Wheat-Glutenin, Barley- Hordein, Maize- Zein, Soybean- Nodulin, Sunflower- Inulin, Pea-Legumin, Grain legumes- Phaseolin

Various policies related to seeds
National Seed Corporation established in- 1963
National Seed Act passed in 1966
International Seed Testing Association- 1924
First Seed Testing Lab, IARI- 1961
Indian Seed Act- 1966, Came into force- 1969
Seed Rules- 1968
PPV&FR Act 2021
National Seed Policy- 2002
New Seed Act formulated- 2004, came into force- 2005

Isolation distance:

It is the minimum separation required between two or more varieties of the same species for the purpose of keeping seed pure.

TYPE	**Distance**

	Foundation seed	Certified seed
SELF POLLINATED CROPS Rice, Wheat, Ragi, Groundnut, Green gram, Cowpea, Oat, Barley, Soybean	3mtr	3mtr
Black gram, Greengram, Field pea, Chickpea	20 m	10 m
Tomato	50 m	25 m
CROSS POLLINATED CROPS	**Foundation seed**	**Certified seed**
Maize and Mustard/Rapeseed	400 m	200 m
Pearl millet	1000 m	200 m
Sunflower,Safflower	400 m	200 m
Cabbage, Cauliflower	1600 m	1000 m
Onion	1000 m	400 m
OFTEN CROSS POLLINATED		
Pigeon pea	100 m	50 m
Cotton	50 m	30 m
Sorghum, Red gram, Brinjal	200 m	100 m
Okra, Chilli	400 m	200 m

Seed Replacement Rate:

Seed Replacement Rate is the rate at which the farmers replace the seeds instead of using their own seeds.

In terms of percentage:

Horticultural Crop SRR (%)

• Brinjal 63.4	• Melons 89.2
• Cabbage 100	• Okra 92.4
• Cauliflower 86.4	• Tomato 99.3
• Chilli 83.7	• Beans 62.2
• Gourds 73.5	• Onion 87.3
• Peas 93.5	

Field Crop SRR (%)	
Paddy	17
Bajra	8
Maize	6
Redgram	6.1
Blackgram	17.7
Greengram	11.7
Cowpea	14.2
Groundnut	5
Sunflower	50
Sesame	15

Seed Multiplication Ratio

SMR is number of seeds to be produced from a single seed when it is sown and harvested, which can be altered by adoption of proper seed and crop management techniques.

Wheat	1:20	Lucerne	1:25
Paddy	1:80 (Varieties)	Oats	1:15
	1:100 (Hybrids)	Bhendi	1:100

Maize	1:80 (Varieties)	Tomato	1:400
	1:100 (Hybrids)	Brinjal	1:450
Sorghum	1:100	Chillies	1:240
Bajra	1:200	Watermelon	1:100
Ragi	1:80	Pumpkin	1:160
Gram	1:10	Bittergourd	1:41
Blackgram	1:40	Bottlegourd	1:99
Greengram	1:40	Ridgegourd	1:83
Cowpea	1:40	Cucumber	1:200
Horsegram	1:40	French bean	1:9
Moth bean	1:40	Clusterbean	1:50
Red gram	1:100	Peas	1:19
Cole crops	1: 433	Onion	1:171
Potato	1:4	Radish	1:100
Groundnut	1:8	Carrot	1:83
Linseed	1:50	Mustard and rapeseed	1:100
Cotton	1:50	Soybean	1:16
Jute	1:100	Sunflower	1:50
Mestha	1:40	Sesame	1:250
Sunhemp	1:30	Safflower and castor	1:60
Berseem	1;10	Lucerne	1:25

Germination and purity standard for foundation and certified seeds of different crops.

	Percent of total seed (on weight basis)			
S. No.	**Crop**	**Pure seed (min.)**	**Moisture (max)**	**Germination (min)**
1	Hybrid maize (other than single cross)	98	12	90
2	Maize composites and open-pollinated varieties	98	12	90
3	Hybrid Jowar and varieties	98	12	80
4	Hybrid bajra*and open -pollinated varieties	98	12	75
4	Rice*	98	13	80
5	Wheat*	98	12	85
6	Barley	98	12	85
7	Cotton varieties and hybrids	98	10	60
8	Gram	98	9	85
9	Arhar	98	10	75
10	Urid	98	9	65
11	Mung	98	9	75
12	Rapeseeds and mustard	97	8	85
13	Sesamum (til)	97	9	80
14	Groundnut	96	9	70
15	Sunflower	98	9	60

16	Linseed	98	7	80
17	Soyabean	97	12	70
18	Peas	98	9	75
19	Cowpeas	98	9	75
20	Tomato	98	8	70
21	Cauliflower	98	7	65
22	Bhindi	99	10	65
23	Watermelon and other cucurbits	99	7	60
24	Onion	98	8	70
25	Carrot	95	8	60
26	Chillies	98	8	60
27	Radish	98	6	70
28	Brinjal	98	8	70

Dormancy of seeds-

- Temporary suspension of growth of any viable seeds with reduced metabolic activities. Dormancy is actually the resting stage, it delays germination.
- Due to unfavorable climatic conditions, presence of hard testa, immature embryo or due to presence of germination inhibitors dormancy may occur.

Types of dormancy-

Innate dormancy

It is the condition of seeds which is incapable of germination even if conditions suitable for seedling growth are supplied. This inability to germinate may be due in certain species to the embryo being immature at the time of dispersal.

Enforced dormancy

It is the condition of seeds which is incapable of germination due to an environmental restraint which includes, an adequate amount of moisture, oxygen, light and a suitable temperature.

Induced dormancy

This type of seed dormancy occurs when the seed has imbibed water, but has been placed under extremely unfavourable conditions for germination. Finally, seed fails to germinate even under more favourable conditions.

Germination inhibitors in crops-

S.No	Species	Location of inhibitor	Name of inhibitor
1	*Gossypium* spp.	Pericarp, testa	Absicic acid (ABA)
2	*Coriandrum sativum*	Pericarp	Coumarin
3	*Helianthus annus*	Pericarp, testa	Hydrocyanic acid
4	*Oryza sativa*	Hull	Probably ABA
5	*Triticum spp.*	Pericarp, testa	Catechin, catechin tannins, several unknowns
6	*Hordeum vulgare*	Hull	Coumarin, Phenolic acids. scopoletin
7	*Elaegnus angustfolia*	Pericarp, testa	Possibly coumarin
8	*Beta vulgaris*	Pericarp	Phenolic acids, Possibly ABA, high concentration of inorganic ions
9	*Avena sativa*	Hull	Unknown

Classification of seed dormancy-

Types	Reasons	Treatment
Physical dormancy	Impermiability of seed coat	Scarification
Physiological dormancy	Inhibitory mechanism of germination inside embryo	Soaking seeds in GA3, Ethrel, KNO3 (Strongest), Thiourea (Used for potato)

Combination of Physical and Physiological dormancy	Physical + Physiological	Scarification & Chemical
Morphological dormancy	Embryo not fully developed properly	Cold stratification
Morphological-Physiological dormancy	Underdeveloped embryo and physiological factors responsible for dormancy	Stratification + Chemical soaking

Dormancy Breaking Treatments-

1. Scarification (Acid/Mechanical)
2. Hot water treatment
3. Stratification (Cold/Warm)
4. Leaching of inhibitors (Metabolites)
5. High/Low Temperature treatment

Scarification- These treatments make a hard seed coat permeable to water or gases either by softening or cracking. This process is called scarification. The treatment can be either chemical or physical in nature. It weakens of soften the seed coat. Generally used for seeds of crops of Malvaceae and Leguminaecae family.

a) Acid scarification- Concentrated H2SO4 @ 100 ml/kg (2-3 minutes), Concentration may vary according to species as tree cops may take 2-4 hours.
b) Mechanical scarification- Rubbing seeds in sandpapers or by puncturing seed coat with needle, increases moisture absorption. Eg. Sand scarification where ratio of sand:seed is 2:1
c) Hot water treatment**-** Seed soaked in boiled water for 2-5 minutes. It is generally used for leguminous species. We need to be careful as In come crops like groundnut and Bengal gram, if soaked for more than 1 minutes, it may be injurious.

Stratification- It is used when caused of dormancy is internal (embryonic factor). *Cold stratification*- Seeds incubated at 0-5 degree Celsius over a moist substrate for 2-4 days to a few months. It is used for cole crops. *Warm stratification*- Some seeds required warm temperature to break dormancy. Eg. Rice and Oil palm.

Chemical methods- KNO3 (Strongest dormancy breaker), Thiourea (1%) used in potato.

Leaching of metabolites- To leach inhibitors, seeds are soaked in water for 3-4 days. In every 12 hours, water should be changed.

Temperature Treatment- *High temperature*- Early flowering winter annuals need high temperature to germinate. Eg. Blue bell (*Hyacinthoides nonscripta). Low temperature*- It is used for plants growing in cool temperature. They require a period of chilling. Eg. Apple seeds are store at 5 degree Celsius.

Seed Processing

The process of removal of dockage in a seed lot and preparation of seed for marketing is called seed processing. The price and quality of seed is inversely related to dockage, which should not exceed a maximum level permitted for different crops for seed certification.

Basic steps

Sequence of operations are based on characteristics of seed such as shape, size, weight, length, surface structure, colour and moisture content. Because each crop seed possesses individually seed structure. Therefore, sequence of operation will be applied proper equipments. However, It is also involved stages following as

- Drying
- Receiving
- Pre-cleaning
- Conditioning
- Cleaning
- Separating or Upgrading
- Treating (Drying)
- Weighting
- Bagging
- Storage or Shipping

Principle of seed processing:

The processing operation carried out based on the principle of physical differences found in a seed lot.

Process followed in Seed certification

- **An Administrative check on the origin of the propagating material**
- **Field Inspection**
- **Sample inspection**
- **Control plot testing:** Here the samples drawn from the source and final seed produced are grown side by side along with the standard samples of the variety in question. By comparison it can be determined whether the varietal purity and health of the produced seed are equal to the results based on field inspection.
- **Grow-out test:** Evaluation of the seeds for their genuineness to species or varieties or seed borne infection. Here the samples drawn from the lots are grown in the field along with the standard checks. Growing plants are observed for the varietal purity. Grow-out test helps in the elimination of the sub-standard seed lots.

Seed Treatment-

Benefits of Seed Treatment:

- Prevents spread of plant diseases.
- Protects seed from seed rot and seedling blights.
- Improves germination.
- Provides protection from storage insects.
- Controls soil insects.

Types of Seed Treatment

1. Seed Disinfection:

Seed disinfection refers to the eradication of fungal spores that have become established within the seed coat, or in more deep- seated tissues. For effective control, the fungicidal treatment must actually penetrate the seed in order to kill the fungus that is present.

2. Seed Disinfestations:

Seed disinfestations refer to the destruction of surface borne organisms that have contaminated the seed surface but not infected the seed surface. Chemical dips, soaks, fungicides applied as dust, slurry or liquid have been found successful.

3. Seed Protection:

The purpose of seed protection is to protect the seed and young seedling from organisms in the soil which might otherwise cause decay of the seed before germination.

Seed treatment can be done in one of the following types.

1. **Seed dressing:** This is the most common method of seed treatment. The seed is dressed with either a dry formulation or wet treated with a slurry or liquid formulation. Dressings can be applied at both farm and industries. Low-cost earthen pots can be used for mixing pesticides with seed or seed can be spread on a polythene sheet and required quantity of chemical can be sprinkled on seed lot and mixed mechanically by the farmers.
2. **Seed coating:** A special binder is used with a formulation to enhance adherence to the seed. Coating requires advanced treatment technology, by the industry.
3. **Seed pelleting:** The most sophisticated Seed Treatment Technology, resulting in changing physical shape of a seed to enhance palatability and handling. Pelleting requires specialized application machinery and techniques and is the most expensive application.

Phases of Seed Certification

Seed Certification is carried out **in six** broad phases listed as under:

- Receipt and scrutiny of application.
- Verification of seed source, class and other requirements of the seed used for raising the seed crop.
- Inspection of the seed crop in the field to verify its conformity to the prescribed field standards.
- Supervision at post-harvest stages including processing and packing.
- Drawing of samples and arranging for analysis to verify conformity to the seed standards; and
- Grant of certificate, issue of certification tags, labelling, sealing etc.

Validity Period of the Certificate

The validity period shall be **nine months** from the date of test at the time of initial certification. The validity period could be further extended for **six months** provided on retesting seed conforms to the prescribed standards in respect of physical purity, germination and insect damage for all seeds except vegetatively propagating material for which lot shall be re-examined for seed standards specified for

respective crop. A seed lot will be eligible for extension of the validity period as long as it conforms to the prescribed standards.

Seed Village

What is seed village?

- A village, wherein trained group of farmers are involved in production of seeds of various crops and cater to the needs of themselves, fellow farmers of the village and farmers of neighbouring villages in appropriate time and at affordable cost is called "a seed village".

Concept

- Organizing seed production in cluster (or) compact area.
- Replacing existing local varieties with new high yielding varieties.
- Increasing the seed production.
- To meet the local demand, timely supply and reasonable cost.
- Self sufficiency and self reliance of the village.
- Increasing the seed replacement rate.

Features

- Seed is available at the door steps of farms at an appropriate time
- Seed availability at affordable cost even lesser than market price
- Increased confidence among the farmers about the quality because of known source of production
- Producer and consumer are mutually benefited
- Facilitates fast spread of new cultivars of different kinds

Important Points

Biologically Seed is a matured Ovule.
Seed contains Embryo, Endosperm, Seed coat.
Embryo consists of Embryonic axis, Cotyledons. Embryonic root is called Radicle .
In monocots only one cotyledon which is reduced and modified to form Scutellum.
In maize the hypocotyls is modified to form Mesocotyl.
The base of hypocotyls sheathing the radical is termed as Coleorhizae.

In castor, the embryo acts as a Storage structure.
Endosperm is developed from Primary endosperm nucleus (PEN).
The ploidy of endosperm of angiosperm is 3n.
The intermediate of nuclear and cellular endoplasm development is Helobial endosperm.
Helobial type of endosperm development is prevalent in Monocotyledons.
Seeds with well developed endosperm are called Aluminous seeds.
The seeds which are having small amount of endosperm are called Exalbuminous seeds.
Examples of endospermic seeds of Monocots: Rice, Wheat, Dicots : Castor, Legumes: Fenugreek, Opium. Examples of non-endospermic seeds monocots: Orchids, water plantain, dicots; Grams, peas, beans.
In some of the plant species like coffee and pigweed Endosperm is absent and Perisperm acts as storage tissue.
All seeds bear scar like point is called Hilum .
The small hole at one end of the hilum is present in the seed coat of many species is called Micropyle.
In castor bean the axil is associated with micropyle is called Caruncle.
In dicots the ratio of embryo to endosperm is ore.
In monocots the ratio of embryo to endosperm is less.
Phytin is a rich source of Phosphorous.
During the seed development the moisture content drops to 10-15%.
Phtyin deposited as Myo- inosital hexa phosphoric acid.
The stage at which the seed reaches to its maximum dry weight, viability and vigour Physiological maturity.
Physiological maturity will occur 35-40 days after anthesis in sorghum.
At the time of physiological maturity the colour of the seed coat will be Pink.
The total soluble solids in sugarcane can be measured by Brix sugar hydrometer.
The value of brix reading for harvesting sugarcane crop is >17.
Harvest which coincide with the ripening process of the seed beyond physiological maturity Harvestable maturity.
Rice crop harvested at 15% seed moisture content instead of 21% moisture content results in a yield reduction by 20%.
The capacity of the seed to germinate and produce a normal seedling is called seed Viability.
The condition of active good health and robustness in seed is called Seed vigour.
During storage the vigour and viability of seed will be decreased.
Seed viability and vigour are maximum at the time of Physiological maturity.
If the seed moisture content increases storage life will be Decreases.
Tetrazolium test is used to measure Seed viability.
In tetrazolium test Dehydrogenase enzyme activity will be measured.
Tetrazolium test is conducted by using Tri phenyl tetrazolium chloride solution.
The colour of the formazan is Red.
In sulphuric acid test the living portion of the cut surface of the seed develops Deep rose colour.

In exhaustion test the seedlings with roots and shoots extending more than 2 inches are said to be vigorous.
Sulphur containing amino acids are Cysteine and Methionine.
The normal concentration of gases like O2, CO2 and N2 for good seed germination is 20% 30% ,80%.
Rice seeds can be germinated even under absence of Oxygen although the seeds are weak and abnormal.
The effect of temperature on germination can be expressed in terms of Cardinal temperature.
The optimum temperature for germination of seeds is in between 15-30ºC.
The low temperature pre-treatment before germination is usually called Stratification.
The greater promotion of light on germination occurs in Red region.
Seed index- Weight of 100 seeds, Test weight- Weight of 1000 seeds
First seed testing laboratory was established at IARI in 1961

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DAIRY TECHNOLOGY

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Dairy Technology

Dairy is a place where handling of milk and milk products is done and technology refers to the application of scientific knowledge for practical purposes.

S.No	Constituents	Buffalo	Cow	Goat	Liquid skimmed milk
1	Moisture (g)	81.00	87.50	86.80	92.10
2	Protein (g)	4.30	3.20	3.30	2.50
3	Fat (g)	6.50	4.10	4.50	0.10
4	Minerals (g)	0.80	0.80	0.80	0.70
5	Carbohydrates (g)	5.00	4.40	4.60	4.60
6	Energy calories (kcal)	117.00	67.00	72.00	29.00
7	Calcium (mg)	210.00	120.00	170.00	120.00
8	Phosphorus (mg)	130.00	90.00	120.00	90.00
9	Iron (mg)	0.20	0.20	0.30	0.20

Average milk composition of different species

Species	Water	Fat	Protein	Lactose	Ash
Friesian cow[1]	87.92	3.40	3.13	4.86	0.69
Sindhi cow[2]	86.07	4.90	3.42	4.91	0.70
Gir cow[2]	86.44	4.73	3.32	4.85	0.66
Tharparkar cow[2]	86.58	4.55	3.36	4.83	0.68
Sahiwal cow[2]	86.42	4.55	3.33	5.04	0.66
Crossbred cow[2]	86.54	4.50	3.37	4.92	0.67
Buffalo[3]	82.76	7.38	3.60	5.48	0.78
Goat[4]	87.10	4.25	3.52	4.27	0.86
Sheep[5]	81.00	7.90	5.80	4.50	0.80
Camel[6]	86.50	3.10	4.00	5.60	0.80

PFA Standards for different class of milk in India

Class of milk	Designations	State and Union Territories	Minimum percentage	
			Milk fat	Milk solids-not-fat (SNF)
Buffalo milk	Raw, pasteurized, boiled, flavoured and sterilized	Assam; Bihar; Chandigarh; Delhi; Gujarat; Maharashtra; Haryana; Meghalaya; Punjab; Sikkim; Uttar Pradesh; West Bengal; Andaman & Nicobar; Andhra Pradesh; Arunachal Pradesh; Dadra & Nagar Haveli; Goa; Daman & Diu; Kerala; Himachal Pradesh; Jammu & Kashmir; Karnataka.	6.0	9.0
	-do-	Kerala; Lakshadweep; Madhya Pradesh; Manipur; Mizoram; Nagaland; Orissa; Pondicherry; Rajasthan; Tripura; Tamil Nadu.	5.0	9.0
Cow milk	-do-	Chandigharh; Haryana; Punjab.	4.0	8.5
	-do-	Andaman & Nicobar; Andhra Pradesh; Arunachal Pradesh; Assam; Bihar; Dadra & Nagar Haveli; Delhi;Goa; Daman & Diu; Gujarat; Himachal Pradesh; Jammu & Kashmir; Karnataka; Kerala; Lakshadweep; Madhya Pradesh; Maharashtra; Manipur; Meghalaya; Nagaland; Pondicherry; Rajasthan; Sikkim; Tamil Nadu; Tripura; Uttar Pradesh; West Bengal.	3.5	8.5
	-do-	Mizoram; Orissa;	3.0	8.5
Goat or sheep milk	-do-	Chandigharh; Haryana; Kerala; Madhya Pradesh; Maharashtra; Punjab; Uttar Pradesh.	3.5	9.0
	-do-	Andaman & Nicobar; Andhra Pradesh; Arunachal Pradesh; Assam; Bihar; Dadra & Nagar Haveli; Delhi;Goa; Daman & Diu; Gujarat; Himanchal Pradesh; Jammu & Kashmir; Karnataka; Kerala; Lakshadweep; Manipur; Meghalaya; Mizoram; Nagaland; Orissa; Pondicherry; Rajasthan; Sikkim; Tamil Nadu; Tripura; West Bengal.	3.0	9.0
Mixed milk	-do-	All India	4.5	8.5

Standardized milk	Pasteurized, flavoured and sterilized	All India	4.5	8.5
Recombined milk	-do-	All India	3.0	8.5
Toned milk	-do-	All India	3.0	8.5
Double toned milk	-do-	All India	1.5	9.0
Skimmed milk	-do-	All India	Not more than 0.5	8.7
Full cream milk	Pasteurized, and sterilized	All India	6.0	9.0

Note- Buffalo milk is because buffaloes are more effective at converting beta-carotene — an antioxidant with a distinctive yellow colour — into vitamin A.

Important Points-

- Total Solid, SNF, Fat and Protein is highest in sheep and buffalo milk and water is highest in mare milk, lactose is highest in human milk.
- Fresh milk contains **84–87% water** in which all other constituents of milk are dissolved and in which are dispersed two different systems, namely fat globules enclosed within their protective membrane as an oil-in-water emulsion, and protein, containing casein molecules and insoluble salts in a colloidal suspension.
- Rank of India is 1st in total milk production and 2nd in cow milk production.
- Per year growth rate in milk production is approximately 5%
- The all-India per capita availability of milk is **427 grams per day** in 2020-21.
- National Dairy Development Board was established in 1965 in **Anand, Gujarat**.
- National Milk Day- **26 November**
- World Milk Day- **1st June**
- **Operation Flood and White Revolution** is related to Milk production.
- Milk is good source of calcium, protein, fat soluble vitamins (A,D,E&K), 22 minerals, phosphorus, potassium, zinc, magnesium, phosphorus, iron, sodium, copper, manganese etc. Vitamin C is absent in milk.

Physical Properties of Milk-

Colour and optical properties

Milk appears turbid and opaque owing to light scattering by fat globules and casein micelles. Optical properties are influenced by the manner of scattering of light by the molecules. Light scattering occurs when the wavelength of light matches the magnitude of the particle. Thus, smaller particles scatter light of shorter wavelengths and vice versa. Beta-carotene, the carotenoid precursor of vitamin A, is responsible for the creamy colour of cow milk. The greenish tinge in whey is due to the presence of riboflavin. Refractive index of milk is an optical property and ranges from 1.3440 to 1.3485 at 20ºC.

Flavour of milk

The natural sweet flavour of milk is due to the combined effect of its components. Off-flavours are very quickly developed in milk owing to several factors. The feed consumed by animals may lead to some undesirable flavours. Bacterial growth in milk causes fruity, barny, malty or acid flavours. Enzyme activities also may lead to unnatural flavours, rancidity due to lipase action being a classic example. **Oxidative reactions** may cause a cardboard flavour in milk. Processing of milk may produce cooked flavours.

Specific gravity and density

Milk is heavier than water. The specific gravity of cow milk varies **from 1.018 to 1.036** and of buffalo milk from **1.018 to 1.038**. Though specific gravity varies with temperature, (lower at higher temperature and vice versa), the rate of this variation is not uniform.

Viscosity

Viscosity of milk depends on the temperature and the amount and state of dispersion of the solid constituents, mainly casein and fat. Viscosity of the whole milk at 25°C is about 2.0 cP. Cooler temperatures increase viscosity due to the increased voluminosity of casein micelles whereas temperatures above 65°C increase viscosity due to the denaturation of whey proteins. An increase or decrease in pH of milk also causes an increase in casein micelle voluminosity.

Surface tension

The surface activity of milk is related to proteins, fat, phospholipids and fresh fatty acids present in it. Homogenization and heat sterilization increase the surface tension of milk. **Milk has a surface tension of 50 dyne/cm at 20°C.**

Freezing and boiling points of milk

The freezing points of cow and buffalo milk vary **from -0.512 to -0.572ºC** and from **-0.521 to -0.575ºC** respectively. Freezing point of milk is mainly used to determine added water. The boiling point of milk is **100.17ºC.**

Acidity and pH

Freshly drawn milk has a pH value in the range of **6.5 to 6.7** and contains **0.14 to 0.18% titratable acid** calculated as lactic acid. There is no developed acidity in freshly drawn milk, the slightly lower than the neutral pH being attributed to the presence of carbon dioxide, citrate, casein etc.

Heat stability of milk

Heat stability is defined as the length of time required to induce coagulation at a given temperature or the temperature required to induce coagulation in a given time. The stability of milk system at the high

processing temperatures to which milk is exposed for the manufacture of certain products is very important.

Composition of Milk

Factors that influence the chemical composition of milk are individuality of the animal, breed variation, seasonal changes, weather, age and health of the animal, managerial practices including nature and quality of feed, stage of lactation, the quarter of the udder of the animal from which milk is drawn, different fractions of milking etc.

Detection of Common Preservatives, Neutralizers and Adulterants in Milk

Boric acid and borates

When a strip of turmeric paper is dipped into adulterated milk sample that has been acidified, it turns into characteristic **red colour indicating the presence of boric acid** and or its salt.

Formalin or formaldehyde

Formalin is added in milk as a preservative, as it checks the rise in acidity. Acidified milk containing formalin or formaldehyde forms characteristic violet colour with ferric salts and other oxidizing agents. *There are mainly two tests namely Hehner and Lech tests that are commonly followed.*

Hehner test

To 10 ml of the milk sample, 0.5 ml of 10% ferric chloride solution is added. Thereafter, 5 ml of concentrated sulphuric acid is added carefully down the side of test tube to form a separate layer without mixing with milk. **Presence of a violet coloured ring at the junction of two liquids indicates the presence of formaldehyde.**

Lech test
To 5 ml of milk in a test tube is added equal volume of concentrated hydrochloric acid containing 1 ml of 10% ferric chloride solution. The contents are heated over a flame for 5 min and the tube rotated or shaken to break the curd. **Development of violet colour indicates the presence of formaldehyde.**

Hydrogen Peroxide

Hydrogen peroxide acts as an antimicrobial agent thereby, checking the development of acidity. Addition of 2 drops of 2% freshly prepared aqueous solution of paraphenyl diamine hydrochloride to the **adulterated milk sample gives intense blue colour, thus indicating the presence of hydrogen peroxide.**

Neutralizers

Chemicals such as carbonates or bicarbonates are added to milk in order to disguise developed acidity. **Presence of rose red colour indicates addition of sodium hydroxide, potassium hydroxide and/or calcium hydroxide while pink colour points to the addition of sodium bicarbonate, potassium carbonate or calcium carbonate.**

Detection of Common Adulterants

Sugar

Resorcinol produces **red colour** with sucrose in an acidic medium.

Starch

Iodine solution gives intense blue colour with starches. Three ml of well-mixed milk is boiled over a Bunsen burner. After cooling, one drop of 1% iodine solution is added and mixed well. The appearance of an intense blue or bluish violet colour indicates the presence of added starch.

Urea

There are two methods by which added urea can be detected in milk. To 5 ml of well mixed milk sample, 5 ml of para-dimethylamino benzaldehyde solution is added and mixed. **The development of an intense yellow colour indicates the presence of urea.**

In the second method, 5 ml of 24% TCA solution is added to 5 ml of well-mixed milk sample in a test tube. The contents are filtered through Whatman No. 42 filter paper, and 2% of NaOH solution and 0.5 ml of 2% sodium hypochlorite solution are added to one ml of the filtrate. After thorough mixing, 0.5 ml of 5% phenol solution is added. **The development of blue or bluish-green colour indicates the presence of urea.**

Pond water

Several unscrupulous milk vendors dilute the milk with unclean water waterways such as ponds. To detect its presence, a clean test tube is rinsed with 5 ml of milk sample and decanted. Along the side of test tube, **1-2 ml of 2% diphenylamine solution** is added. The appearance of **blue colour** indicates presence of pond water.

Synthetic Milk

In recent times raw milk has sometimes been adulterated with the so called 'synthetic milk' usually prepared out of vegetable oil emulsified with the help of commonly available commercial detergents and other compounds such as urea, glucose etc.

Fat Determination

Gerber method and Rose Gottlieb method.

Hansa Test

To detect presence of **buffalo milk in cow milk.**

Milk Adulteration and Lactometer

- ✓ Adulteration is an unwanted and inferior mixing process in food. The food-added material or material is referred to as adulterants. Water is the most common milk adulterant. A lactometer can detect water adulteration in a milk. The density of the milk decreases when water is added to the milk and this is detected via a lactometer. The less than 1.026 reading of the lactometer shows milk adulterating by water. Adulteration simply signifies mixed impurities and pure means unadulterated.

- ✓ The instrument is composed of a TEST-TUBE and a METER BULB and is very simple to use. To verify the purity of cow's milk a lactometer is used. Milk is poured into and allowed to be able to stand until cream is formed, so milk content is determined by the depth of the cream deposit in degrees. If it's pure, the lactometer floats and the lactometer sink when it is adulterated or impure. Lactometer is a medium for monitoring the pureness of milk samples.

Methods of pasteurization

- **In bottle pasteurization**

In this case bottles filled with raw milk and tightly sealed with special caps are held at **63 to 66 degrees Celsius for 30mi**n. Then the bottles passed through water space of decreasing temperature, which cool both the product and the bottle. One of the advantages is that it prevents the possibility of post-pasteurization contamination.

- **Batch/Holding pasteurization/Low temperature long time method**

In this case the milk is heated to **63 degrees Celsius for 30 min and promptly cooled to 5 degrees Celsius** or below and thus heating is done indirectly. The heat moves through a metal wall into the product for heating, and out of the product for cooling.

- **High temperature short time (HTST) pasteurization**

In this case large volumes of milk are handled and it gives a continuous flow of milk which is heated to **72 degrees Celsius for 15 sec and promptly cooled to 5 degrees Celsius or below.**

- **Vacuum pasteurization**

This refers to pasteurization of milk and their reduced pressure by direct steam. The equipment used is termed as 'Vacreator' and the process hence is known as **'Vacreation'.**

- **Ultra high temperature pasteurization**

This method consists of temperature-time combinations of **135 to 150 degree Celsius for no hold (a fraction of second)**. The success of this method depends on immediate aseptic packaging.

- **Uprization**

Uprization term means '**Ultra- pasteurization'** where in milk is heated with direct steam up to **150 degree Celsius** for a fraction of second and thus the process is continuous.

- **Flash pasteurization 'HTST'.**

The formulation of the standards of pasteurization includes following points.

1.	Bacterial destruction
2.	Cream line reduction
3.	Phosphatase inactivation

MILK

Milk is one of the most basic of all food. Milk constitutes a complete diet and even for adults, cow's milk includes many essential nutrients particularly calcium. SOURCE: Mankind from time immemorial has used the milk of animals. The milk of cow, buffalo and goat is generally used. In some countries milk of

sheep, mare and camel is also used.

Milk represents a major ingredient in our diet- poured over cereals, drunk in glasses, in tea and coffee- but it also enters the composition of many dishes especially desserts such as ice cream, custard, pancakes, rice puddings etc. it is particularly high in calcium, but it is also fairly in fat.

COMPOSITION:

Whole milk – that is, milk comes from the cow- is composed of water (88%), milk fat (3.25 %), other milk solids (protein, lactose and minerals)- 8.25%.

There are many types of milk consumed though mostly it is cow's milk, goat's milk and sheep's milk.

PROCESSING TECHNIQUES:

Processing

From the time it is milked from the animal to the time of sale, milk has to undergo processing to improve the keeping quality and to make it fit for consumption. The various stages are:

1. **Collection**

Milk is brought to the dairy in clean sterilized vessels, preferably stainless steel.

2. **Holding tanks**

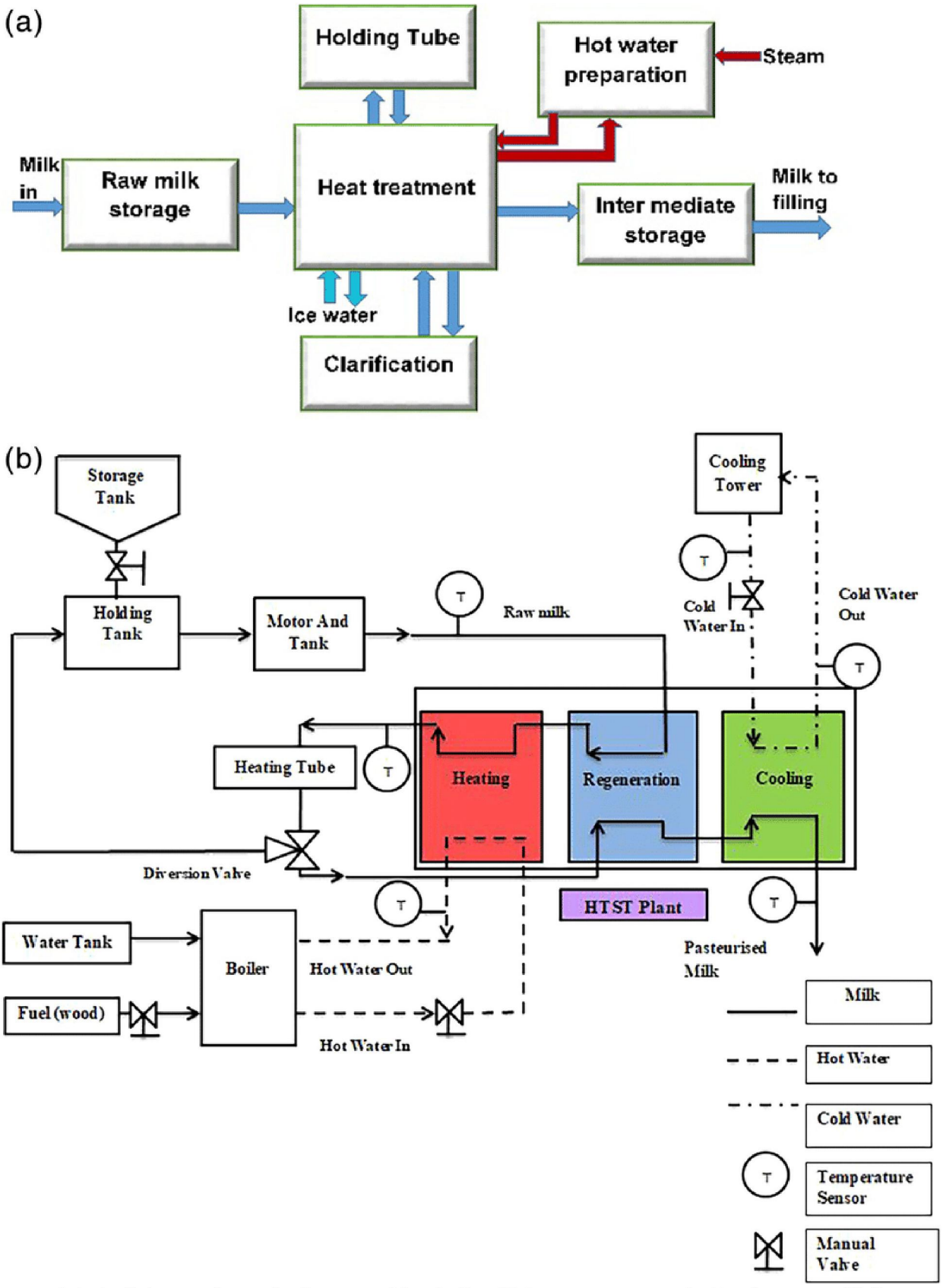
The milk is immediately transferred to holding tanks and is held at 10°C to keep it safe. Cooling is done either in a tank,
jacketed with pipes in which runs a brine solution. Else the milk is run over very cold water pipes.

3. **Filtration**

The milk is passed through a series screens and filters to remove sediment and floating particles.

4. **Pasteurization**

It is the process of heating milk to 63.7°C and holding it at that temperature for 30 minutes. This is known as the "Holder Process of Pasteurization". Nowadays, the **Flash Pasteurization** is more commonly used. It is also called the HTST or High Temperature Short Time method, where the milk is heated to 71.6°C for only 15 seconds. Pasteurization makes milk safe for human consumption by destroying pathogenic germs (pathogens). It also helps to increase the shelf life. Flavors of the milk remains unaffected at pasteurization temperature.


(a)
Holding Tube
Hot water preparation
Steam
Milk in
Raw milk storage
Heat treatment
Inter mediate storage
Milk to filling
Ice water
Clarification
(b)
Storage Tank
Holding Tank
Motor And Tank
Raw milk
Cooling Tower
Cold Water In
Cold Water Out
Heating Tube
Heating
Regeneration
Cooling
Diversion Valve
HTST Plant
Water Tank
Boiler
Hot Water Out
Fuel (wood)
Hot Water In
Pasteurised Milk
Milk
Hot Water
Cold Water
Temperature Sensor
Manual Valve

5. Homogenization

At temperature of 60°C, milk is passed under high pressure through small opening of a machine called homogenizer. The main purpose is to **subdivide the fat globules in milk and disperse them evenly** in the entire mass. Fat has a low density and tends to rise to the surface during heating.

6. Bottling

The bottles of selected and uniform size have to be sterilized by steam and hot water and then they are filled with milk, which are capped automatically. Nowadays milk is filled in plastic pouches and these are more economical, easily transported and save storage space. Plastic pouches are easily disposed and are safe to handle.

7. Sterilization

The sealed bottles are now heated for **30 to 40 minutes at temperatures ranging from 104-110°C in steam chambers called autoclaves and then allowed to cool**. Milk can also be sterilized before bottling. It is subjected to temperatures of 135-150°C for just 1 second. This is called the UHT or Ultra Heat Treatment. This process kills off all microorganisms and the very short holding temperature reduces the changes in colour and lined with aluminum foil. Milk is then distributed through various outlets.

Various types of milk:

1. **Untreated milk**: It retains its entire natural flavor. It is advised to boil for 15 minutes before using. It remains good in refrigerator for 24 hrs.

2. **Pasteurized milk**: To kill bacteria by heating milk or other liquids to moderately high temperatures for a short period of time. Milk must be heated to at least 145°F for not less than 30 minutes or at least 161°F for 15 seconds, and then rapidly cooled to 40°F or lower.

3. **Sterilized milk**: is homogenized milk, heated to about 112ºC under pressure for 15 mins in sealed bottle. The bottle is rapidly pulled to 80ºC and then allows reaching lower temperature.

4. **Skimmed milk**: this is the milk without any fat. Basically it is a fat buster, low calorie produce

5. **Fortified milk**: extra nutrients are added to make the milk more nutritive. Usually, vitamin B is used.

6. **Flavored milk**: flavor and color added. Treated with high temperature of 100ºC for about 15 mins, so that they may be kept later at room temperature.

TONNED MILK: toning is done to make buffalo milk resemble in appearance and flavor to cow's milk. It is done by dilution and addition of skimmed milk powder. 40 % of skimmed milk is added to 60 % of buffalo milk. The addition of skimmed milk powder makes up for the dilution of the nutrients, the fat content remains diluted and equal to that of cow's milk.

Concentrated milk:

Evaporated milk – unsweetened milk, evaporated under reduced pressure and reduced to 60% and canned.

Sweetened milk- same as above but sugar is added before processing. Sugar acts as preservatives also. Milk powder-This is the whole milk from which the water is removed by either spray drying or by drying processes

CULTURED DAIRY PRODUCTS:

Cultured dairy products such as yoghurt, butter milk, and sour cream are produced by adding specific bacterial cultures to fluid dairy products. The bacteria convert the lactose to lactic acid, giving the products their body, and tangy and unique flavor.

WHOLE MILK: It comes as pasteurized & has fat content of 3.9 %.

Cream

Cream is the butter fat content of whole cow's milk, separated from the water.

Cream is commercially separated from milk in a creamery, by means of a mechanical separator. The milk is first heated to between 32-49°C (90-120°F) before being run into the separator which operates like centrifugal machine, rotating at very high speed and forcing the milk, which is heavier, to the outside; while the cream, which is lighter, remains at the centre. The cream and the skimmed milk are drained out through separate outlets and by means of a control valve, the fat content is adjusted. The skimmed milk is then heated to 79.5°C (175°F) to kill off any harmful bacteria before being further processed into dried milk etc.

The principal difference between the various types of cream -single cream, double cream, whipping cream, clotted cream and soured cream - is the balance between water and butterfat. This will make them liquid or of a very thick consistency.

Other differences are in the way they have been made and their time for maturing which results in different tastes. Cream has a slight yellow or ivory color and is more viscous than milk. Cream is used in kitchen to give flavor and body to sauce, soups and desserts.

Single Cream: contains **not less than 18% butterfat**. It cannot be whipped due to their being too little butterfat.

Double cream: contains **not less than 45% butterfat**. It can be whipped but not too much as it will turn to butter. It can be used to enrich sauces, but may curdle if boiled along with acid ingredients.

Whipping Cream: containing **not less than 38% butterfat**. It is perfect for whipping as its name indicates. After whipping you will find a difference in texture and a change in volume. Sweetened or unsweetened cream can be used in desserts or can be used as an accompaniment, and is incorporated in mousses to lighten them.

Clotted Cream: contains **not less than 55% butterfat**. It is already very thick so it can be used as it is and not whipped. Soured Cream: These are single creams which contain about 20% butterfat, but have a souring culture in them, and they are matured.

Half and Half: is a mixture of milk and cream in equal quantities and contains about **10-12% butterfat**.

Manufactured Cream

1. Reconstituted Cream

2. It is made by emulsifying butter with skimmed milk or skimmed milk powder. This is not true cream, but a substance which resembles it in appearance.
3. Imitation or Synthetic Cream
4. It is made by the emulsification of vegetable fats with dried egg and gelatin, and then sugar and flavourings are added. It is a product which is frequently used in catering and baking trade, but which is very easily contaminated and liable to cause food-poisoning.

Cheese

Cheese is the curd of or the fresh or matured product obtained by enzyme activity and subsequent separation of whey by drainage, after coagulation of milk, cream, partly skimmed milk, butter milk or a combination of these bases.

The present word cheese is derived from the old English word "Cese" and "Chiese" from the Latin "Caseus". The equivalent words in German" Kase", and French "Fromage", in Spain it is called "Queso", and in Italy "Fromaggio".

The ingredients used for the manufacture of cheese making are Milk, starter, colour, added chemicals, coagulates, salt.

COMPONENTS OF CHEESE MAKING

Milk - The various cheese of the world first owe their character and taste to the type of milk used - double cream, toned, or skimmed milk. The character also greatly depends on the animal the milk came from - cow, goat, ewe, or water buffalo.

Starter - If left in a warm place, milk will sour by itself. This souring is due to the action of bacteria on the milk sugar, lactose, and its conversion to lactic acid or sour milk. To speed up the process of souring and to prevent the milk from becoming bitter and unpleasantly sour, a little warm sour milk from the previous day's milk is added to this batch. This speeds up or starts the process of coagulation, and is known as the starter or starter culture. In the case of pasteurized milk, all bacteria is killed, and hence the starter consists of a combination of cultures grown in the lab.

Rennet - Although the starter culture speeds up the process of souring milk, and would eventually cause it to curdle, it produces quite a sharp, acidic taste. The use of rennet, which is an enzyme from the inner lining of young hoofed animals like lambs and calves, significantly improves the product. Rennet also helps break down the curd into a smooth, even consistency, contributing to the texture and flavor.

TYPES OF CHEESE

1. Fresh Cheeses

Fresh cheeses are usually made by setting the curd with **starter and rennet and are high in moisture**. The young curd is placed in sacks or perforated containers and drained slowly without pressure for a few hours so that the curd retains much of the whey. Once sufficient whey has been drained off, the curds are either mixed or sprinkled with salt. They are now ready to be eaten. For some cheese, like from age fares, the rennet is not added. Such cheese are called 'lactic cheese'. Some fresh cheeses are allowed to mature and grow either a white or bluish grey mould.

Fresh cheeses are always mild and high in moisture and therefore low in fat. They have a slightly acidic or lactic taste. Most are used for cooking but some may be wrapped in leaves or dusted with paprika or fresh herbs for serving as a table cheese.

2. Soft Cheeses

The curd is ladled gently into perforated moulds and left to drain in an atmosphere of high humidity so that the curd does not lose too much whey. After a few hours, the cheeses are turned out of their moulds and left to mature for a few weeks. Their high moisture content, coupled with high humidity, attracts and encourages the growth of classic white pencillium mould, which helps to break down the curd and contribute the flavour and texture of the cheese. The result is a creamy, smooth, interior that looks as though it is almost ready to run.

3. Semi-hard Cheeses

To obtain a firmer cheese, the curd is cut up to release some of the whey before the curd is placed in the moulds. It is then often lightly pressed to speed up the draining. After a day or so, the cheese is turned out of its mould and washed in brine. This seals the rind before the cheese is placed in cellars or ripening rooms where moulds are encouraged to grow.

The lower moisture content means the fermentation process is slower, producing cheeses with a round, full bodied, rather than strong flavour. Their taste often seems to be embodied with the oils and esters of the wild mountain flowers of Europe. When young, semi- soft cheeses have a firm yet springy, school eraser texture, becoming elastic and supple.

4. Hard Cheeses

To make a hard cheese, the curd must be cut more finely - from small cubes to rice-sized pieces. - The smaller the pieces the more whey will be lost from the curd. The curds are then gently heated in a vat to force out more moisture before the whey is drained out. Salt is then added to the curd, which now resembles rubbery, lumpy cottage cheese. They may be cut again before being placed in large, perforated moulds that are frequently engraved with the unique symbol, logo, pattern or name to identify the finished cheese or its maker. This is then sealed and left to mature for weeks or even years. Hard block cheeses are pressed into shape and then matured in special plastic wrap that allows the cheese to age without the development of either mould or rind. The moisture that would normally be lost during maturation is also retained.

5. Blue Cheeses

Blue cheeses are neither pressed nor cooked. Most frequently the curd is crumbled, eliminating much of the whey, then scooped into stainless steel cylindrical moulds, each with a wooden disc on top. The curd remains in the moulds for one to two weeks and is churned frequently to let the weight of the curds to press out more of the whey. Once the cheeses can stand up on their own, they are removed from the moulds, rubbed with salt, and returned to the cellars.

The process of making cheese can be divided into three fundamental steps. The first is the precipitation of casein into curd. Bacteria that produce lactic acid are infused in to the warm milk to obtain an adequate acidity for the action of rennet and to crowd out less desirable organisms. Then , rennet is added , which causes the caseins to aggregate ,trapping fat globules and whey in the protein network.

The second stage is the concentration of curds .Any free whey is drained off. The curds are cut, pressed, cooked and salted to remove much of the rest.

The final stage is the ripening or ageing of the green curd. It transforms the initially produced bland and either crumbly or rubbery curds into a smooth substance with a pronounced and complex flavour. Ripening is mostly a matter of molecular breakdown caused by the enzymes of microbes , both the original starter bacteria and special ripening organisms.

Preparation of cheese

Preparation of milk

Milk is one of the prime ingredients for making cheese, it is a high protein dairy product made from the milk of animals like cows, sheep, goat, buffalo, yak etc.

Prior to manufacture process, milk needs to be prepared; this is done by pasteurizing the milk, homogenizing it and then clarifying it.

Addition of starter
This is done by two methods:

In ***sour milk cheese*** lactic acid bacteria thickens the milk
In ***sweet milk cheeses*** (most cheeses are of this kind), which are also called *rennet cheeses,* the cheese maker adds rennet- an enzyme taken from the stomach of suckling calves to separate solids in the milk from the fluid.

The rennet causes the milk protein to build up and the milk to curdle without the milk turning sour.

Formation of Coagulum
Addition of starter leads to coagulation of milk into a thick mass called 'young curd' and separation of whey.

Cutting
Firm curd is cut into smaller pieces by use of knives or chains.

Stirring/ Scalding
This process is also carried out for hard cheeses. It expels more whey and shrinks the curd.
This process also speeds up the bacterial metabolism.

Salting

Salt is added into the cheese by wet or dry method as per the recipe. Brining in some cheeses also leads to longevity in shelf life

Moulding or Vatting and Pressing

After salting cheese is put in moulds for it to acquire a particular shape. This can be done in plastic or wooden moulds.

The cheese is pressed which gives it a definite shape. In case of blue chesses pressing is not done.

Finishing

Cheese is de moulded and a rind or coating is given to the cheese. In some cases rind is dried by rubber ash, use of grape must and wrapping it in leaves. Such as Gorgonzola which is coated with plaster of Paris

Ripening/ Maturing
Mostly the harder cheeses are matured. They are matured in caves. A hard cheese can take anything from 8 weeks to a year to ripen and mature.

Famous Cheeses of the world English
Cheddar
Often called American cheese, but it is English and made in the Cheddar Gorge region in Somerset.

Stilton
Considered the "King of Cheeses" and is the best of all English blue cheeses and can take its place confidently alongside the world famous Roquefort in France and Gorgonzola from Italy.

Italian
Parmesan Another well-known flavourer of salad dressings and sauces. It is a hard ripe cheese with a piquant and sharp flavour.

Gorgonzola
Originally produced near Milan in a town called Gorgonzola, from full cream pasteurized cow milk. It has a sharp and spicy taste which is an excellent contrast to the creamy texture of the cheese.

Mascarpone
It is described as curd cheese. Serves as a very good alternative to double cream cheese in tiramisu.

Bel Paese
Another delicious cheese from Italy, which is soft and yellow, sweetish and very mild. Made from pasteurized milk.

Dolcelatte
It is a famous sweet cheese from Italy

Mozzarella
Mozzarella is one of the most famous Italian cheeses, it is used more to give finish to a dish rather than taste. It is a creamy cheese made from Buffalo milk.

Parmigiano - Reggiano
It is a hard cheese with orange rind. It has a strong and fruity aroma, but not over powering. Used in sauces, salads and over pasta and risotto.

Ricotta
Is a soft, moist yet firm cheese.

French Brie and Camembert
Most French cheeses are soft and the luxury end of the scale is two dessert cheeses Brie and Camembert-both almost sauce soft. But an odour of ammonia will tell you when they are past their prime.

Roquefort

Comes from the region of Rouergue of France.
It looks like marble, for its noble paleness is patterned with blue veins and patches. It is made from sheep's milk that is full cream and unpasteurized. Is used for blue cheese dressing for salads.

Reblochon
It has a creamy and supple texture. It has a yellow orange rind with a white mold. The elastic smooth creamy dough has a pleasantly mild taste somewhat reminiscent of hazelnut.

Boursin
Boursin is a soft fresh cheese it comes from Normandy region in France. This is a moist and creamy cheese, it melts in the mouth.

Neufchatel
Comes from Normandy region in France.
It is a soft white cheese with a grainy texture.
It has a slight taste of mushroom and is salty and sharp.

Greece Feta
This is a goat cheese from Greece made from goats or sheep's milk and is an integral part of Greek cuisine.

Swiss Emmenthal
Emmenthal cheese is equated with Swiss cheese all over the world. It is made of raw cow milk and with the addition of rennet. It is a mild cheese with a nutty aroma.

Gruyere
Another delicious cheese from Switzerland, which also has holes though, they are much smaller.

Edam
Named after the small port of Edam, north of Amsterdam, it is a pressed, semi soft cheese of Holland.

Gouda
It accounts for more than 60% cheese in Holland. Gauda is firm, smooth and supple cheese; it has a sweet and fruity flavour. Also had as a breakfast cheese.

CHEESES OF THE WORLD

CHEESE	TYPE	COUNTRY	MILK
Cottage	Fresh	Universal	Cow, goat, buffalo
Cream	Fresh	Universal	Full cream milk of cow, goat, buffalo
Mozzarella	Fresh	Italy	Cow, buffalo
Ricotta	Fresh	Italy	Cow
Feta	Fresh	Greece	Ewe, cow, goat
Quark	Fresh	Germany, Austria	Cow
Barbery	Soft	France	Cow
Bel Paese	Soft cream	Italy	Cow
Brie	Soft	France	Cow
Camembert	Soft	France	Cow
Bonchester	Soft	Scotland	Jersey Cow
Munster	Soft, with orange red rind	France	Cow

Stracchino	Soft	Italy	Cow, buffalo
Appenzeller	Semi hard with pale yellow or burnt orange rind	Switzerland	Cow
Caerphilly	Semi-hard with buttermilk flavor	Britain	Cow
Cantal	Semi-hard	France	Cow
Cheddar	Semi-hard	Britain	Cow
Cheshire	Semi-hard	Britain	Cow
Chevre	Semi-hard	France	Goat
Danbo	Semi-hard, caraway flavored, square cheese	Denmark	Cow
CHEESE	TYPE	COUNTRY	MILK
Derby	Semi-hard	Britain	Cow
Edam	Semi-hard with yellow or red wax rind	Netherlands	Cow
Emmenthal	Semi-hard	Switzerland	Cow
Esrom	Semi-hard, with red rind	Denmark	Cow
Gloucester, Double Gloucester	Semi-hard, full cream	Britain	Gloucestershire cow
Gouda	Semi-hard, with yellow or red rind	Netherlands	Cow
Gruyere	Semi-hard, with pea size holes	Switzerland	Cow
Havarti	Semi-hard	Denmark	Cow
Jarlsberg	Semi-hard, with yellow coating	Norway	Cow
Lancashire	Semi-hard	Britain	Cow
Leicester	Semi-hard	Britain	Cow

BUTTER

Butter is fatty substance obtained from churned cream, containing 80% fat, 20% water and whey (milk solids lift from separating process).

- Butter hardens at low temperature and melts when heated.
- **The smoking temperature of butter is 127ºC.**
- Color varies form creamy white to golden yellow. It is the milk protein in the whey that makes butter spoil quickly.
- Most of the butter is made from cow's milk but other are some butter made from the milk of buffalo, yak, goat and sheep is also available.

Processing / manufacturing of butter-

1. **HOLDING:** Cream is pasteurized for 2-4 seconds at 95º C and then the temperature is lowered to 4-5º C and that is kept for several hours to ensure uniform hardening of fat particles.

2. **RIPENING:** When the end product is going to be Lactic butter, only then this step is carried out, in which bacterial culture is added. In this case, the holding temperature will be 15-18º C for 3-4 hours before being cooled to 4-5º C. This gives butter a good flavor and the stage is omitted while making sweet cream butter.

3. **CHURNING:** It is carried out in big stainless-steel containers holding about 100 gallons of cream and the internal churners pass through the cream. This breaks the layer of fat solids which are released and are combined to form a large group of butter fat. After about 30 minutes of churning the butter gets separated from butter milk and floats to the surface.

4. **WASHING AND SALTING:** The butter grains are now washed with ice cold water to remove any butter milk left on the surface of each grain, in order to maximize the keeping quality.

Salting is carried in two ways:

- By adding fine grains of dairy salt.
- By dipping butter grains into brine solution (salt + vinegar) for 10-15 minutes and allowing the butter grains to absorb it.

Types of butter :

There are two types of butter-

1.	Sweet cream butter
2.	Lactic butter.

Butter can be made from any kind of milk. In India, butter is made from buffalo milk. Sweet cream butter : it is also known as fresh cream butter and is made from unripened cream. It can be salted or unsalted. It is soft, creamy texture and a creamy buttery taste.

Lactic butter : This type of butter specially made in Denmark, Holland and france. The cream is mostly pasteurized, inoculated with a culture that ripens the butter, then pasteurized once more to arrest the ripening process.

Note: Unsalted butter /sweet butter- it has mild aroma and slightly sweet flavor, used for making sweet pastries and cakes.

Salted butter –butter was originally salted to preserve it for the winter months when fresh butter was not made. Today salted is added to butter as ingredients. It is not ideally used in preparation of pastries.

Compound butter : these are made by adding a particular natural flavor or color to butter, depending on the type of food with which it is served. It is generally used as an accompaniment e.g. Lobster butter, parsley butter etc.

GHEE

Ghee is obtained by **clarifying butter**. Butter is heated to evaporate water. Pure ghee has a higher keeping quality and is a good cooking medium and shortening agent used in Indian cuisine.

Quality of ghee-

Consumer judge the quality of ghee base on its inherence flavour, colour and appearance. Ghee should have characteristic pleasant, nulty, slightly cooked rich aroma. Ghee flavour is best described as lack of blandness, sweetly rather than acid. Golden yellow to light yellow colour of ghee is appreciated largely. Granular appearance of the product rather more score as it is important quality as well as purity preventer of ghee.

Apart from above sensory characteristics, its chemical and other physical preventers are evaluated to judge the quality of ghee and also to prevent adulteration of ghee.

(i) Refractive Index: It is the ratio of the velocity of light in vacuum to the velocity of light in the sample medium. In case of milk fat reading is normally made at 40 degree C using Abbe refractometer and its values range from 1.4157 to 1.4566. This value is low in comparison to the other fats and oils. The RI if ghee is influenced by both the molecular weight and the degree of saturation of the component fatty acids. RI could be used as indicator of adulteration.

(ii) Iodine Number: It is defined as number of grams of iodine absorbed by 100 g of fat under specified conditions. Thus constant is a measure of the unsaturated linkages present in a fat. The iodine number for milk fat falls within the range of 26 to 35 which is low in comparison to other fat and oils.

(iii) Reichert-Meissl Number (RM Number): This is defined as number of ml of n/10 Sodium hydroxide required to neutralize the steam volatile water soluble fatty acids distilled from 5 g of ghee under precise conditions specified in the method. It is primarily measure of butyric acid and caproic acid. The value for milk fat ranges between 17 to 35 and it is above that of all other fats and oils. Therefore, milk fat contains more of these acids than any of the fats.

(iv) Polenske Number: It is defined as number of ml of N/10 Sodium hydroxide required to neutralize the steam volatile water insoluble fatty acids distilled from 5 g of fat under precise conditions specified in the method. Caprylic acid, capric acids which are somewhat steam volatile but longely insoluble in water are indicated mainly in Polenske number and it ranges from 12 to 24 for milk fat.

(v) Saponification Number: It is defined as the number of milligrams of potassium required to saponify one gram of fat. The value ranges from 210 to 233 and more often falls in the range of 225 to 230. This constant is an indication of the average molecular weight of the fatty acid present. Saponification value is more useful in detecting the presence of minerals oils in ghee as they are not acted upon by alkali and such a sample does not form a homogeneous solution on saponification.

(vi) Melting Point: Melting point for milk fat ranges from 30 degree to 41 degree C as reported in literature.

Adulteration of ghee in India is more prevalent especially in unorganized sector. Being the most expensive fat people started to adulterate the product to make profits. Major adulterants of ghee are as follows:

i**). Vanaspati (Hydrogenated vegetable oil). Because of close resemblance in its texture most commonly used this as adultrant to ghee.**

ii). Refined (de-odourized) vegetable oil.

iii). Animal body fat.

Government has made it compulsory that all Vanaspati must contain a maximum of 5% of Sesame oil which can be identified in ghee by a simple colour test (known as Baudouin test). By means of this Adultration of ghee with Vanaspati ti an extent of 3% can be detected.

CURD/DAHI

Dahi is a dairy product which is obtained when pasteurized milk or boiled milk is soured using previously cultured milk or by using lactic cultures. Pasteurised milk is cultured with *Streptococcus or*

Leuctonostoc bacterias and remain undisturbed after sealing for 15-20 hours at 22-26 degree Celsius to reach acidity of 0.9.

RABRI

It is prepared concentrated and sweetened product comprising of several layers of clotted cream. The layer of cream formed, as a skin is continuously removed. When the milk is reduced to 1/3 of the original volume, sugar is added and the layer of cream skin is mixed.

KHOA

Khoa is a partially dehydrated whole milk product.

PANEER

Paneer refers to the indigenous variety of rennet-coagulated, small-sized, soft cheese.

CHHENA

Chhena, also called paneer in certain parts of the country, constitutes one of the two chief bases (the other being khoa) for the preparation of indigenous sweetmeats. Chhana refers to the milk-solids obtained by the acid coagulation of boiled hot whole milk and subsequent drainage of whey. The acids commonly used are lactic or citric, in both natural and chemical forms. It should not contain more than 70% moisture, and the milk fat content should not be less than 50.0 per cent of the dry matter.

Please check the below table giving a complete overview of all the tests performed on the aforementioned dairy products:

Material Test	Tests Performe	Test Method
Milk Powder,	Moisture/ Water	IS:1165-1992/ IS:13334-1998
	Total solids	
	Acidity	
	Fat	
	Protein	
Fresh Milk	Total solids	IS: 13688-1999
	Total fat	
	Solids not fat	
	Protein	
	Sugars	
Pure (Deshi) Ghee	Loss on Drying	IS: 13689-1992
	Acidity/F.F.A.	
	BR Value	
	RM Value	
	Polenske Value	
	B.T. Test	
Butter Pasteurised	Loss on drying	IS: 13690-1992
	Fat	
	Acidity	
	Curd	
	Salt	
	Colouring matter	

Various Milk Tests

Milk Testing – Clot on Boiling Test (COB)

Objectives: *To determine the stability of milk for heat processing.*

If milk is kept as such at room temperature, there will be increased in the acidity which is called as developed acidity. If acidity is increased to more than 0.2 percent, there is coagulation due to heat treatment, which is the result of dissociation of calcium caseinate salt. Hence it is essential to know the heat stability of incoming raw milk for further processing.

Milk Testing – Sediment Test

Objective: *To know the extent of visible dirt present in the milk as a mark of clean milk production.*

Sediment test of raw milk will reveal the extent to which visible insoluble matter has gained entrance in the milk. It is a rapid test indication quantitative measure of carelessness in handling the milk and lack of sanitation. But in milk that appears as visible or insoluble sediment is always associated with relative number of microbes. The test is carried out by allowing a measured quantity of milk to pass through a fixed area of a filter disc and comparing the sediment with the prescribed standards.

Milk Testing – Alcohol Test

Objective: *To detect abnormal milk such as colostrum or mastitis milk.*

The alcohol test is used for rapid assessment of stability of milk for processing particularly for condensing and sterilization. The alcohol test is useful as an indication of the mineral balance of milk and not as an index of developed acidity. The test aids in detection abnormal milk such as colostrum, milk from animals in late lactation, milk from animals suffering from mastitis and milk in which mineral balance has been disturbed.

Milk Testing- Resazurin Test

Objective- *To check quality and consistency of the milk.* It also determines the bacteria that are present in the milk. Resazurin is a type of test that defines the quality and consistency of the milk. It also determines the bacteria that are present in the milk. This test is designed to assess the quality of raw milk. It is a rapid test of three hours that suggests the milk whether is all good or bad for us. The resazurin test gives the bluish characteristic colour to the milk that is all based on the quality of the milk. The milk quality is considered by only noting the colour change degree of the milk.

Through an earlier report, it is found that this test is particularly a chemical indicator that can determine the sanitary quality of the bulked milk. This test is also used to conclude more prominent information on milk quality. This test takes place in an isolated laboratory and there is no point of compromise at the time of the test in the laboratory at any cost. The blue colour of the milk suggests the perfect character of the milk after testing the milk.

Milk Testing – Platform Tests

Objectives: *For examination of milk by adopting rapid test for acceptance / rejection of incoming milk.*

Platform tests include the tests for judging the quality of the raw milk.

These are:

(a) organoleptic evaluation (OE),
(b) Clot on boiling test (COP),
(c) Alcohol test (AT),
(d) Sediment test (ST)
(e) Resazurin test (RT).

The milk is collected from various sources and transported to milk scheme for processing, marketing and distribution. Large quantity of milk is supplied to the plant through different agencies, so that is subjected to check for its suitability. Hence it is essential to examine the milk by using different platform tests.

Milk Testing- Alkaline Test

Objectives: *To verify if the heating process of pasteurization is done correctly.*

The alkaline phosphatase (ALP) is an enzyme normally present in raw milk and it is inactivated in conditions of heat treatment. The temperature of inactivation of ALP is slightly higher than that required for the destruction of pathogenic bacteria. So, the ALP test in pasteurized milk is used to verify if the heating process of pasteurization is done correctly.

SELECTION का दूसरा नाम

Indian IQ Institute

- 250+ Selections In IBPS AFO 2022 (AIR 1 and 10 Other Top Rankers with 70+ Marks From Indian IQ Institute)
- 140+ Selections In FCI AG3 (Techincal) 2022
- 150+ Selection In IBPS AFO 2021
- 3 in IFFCO AGT, 2 in OPSC AAO

Why Indian IQ Institute?

- India's Topmost **Agricultural Exam** Related Institute, known for our crisp and exam-relevant content, actual exam-level mock tests, Topper's talk sessions, AFO Maha-Mock, Target-based disciplined practice, etc.
- The founder is a **gold medallist in Agriculture** and has cleared SSC Phase 7 (AIR 1), was Nominated for MoA&FW and IBPS RRB AO exam, and also qualified for different levels of IBPS clerical, SSC CGL, SSC 12th Level for analysis and review.
- Produced 500+ **Final selections in IBPS AFO, FCI AG3 (Technical), IFFCO AGT, ADO, and AAO** just in 2 years, Mentored **lakhs of students on channel** and thousands in different courses.
- Produced **best-selling e-books** in the Brahmashtra series for IBPS AFO, NABARD, MP RAEO, RHEO, SADO and FCI Technical
- We focus on to-the-point, smart study, in-depth exam analysis, rigorous practice, competitive environment fortified with direct learning from toppers.
- All Subject Matter Experts & Content Development Team Members are well qualified from **NABARD, AFO, MSc, Gold medals & AO exams background.**
- **The Board of Advisors** includes Senior Edu-veterans from reputed universities and newly recruited young Officers for practical approaches and improvements.

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- 500+ Selections In 2 Years Only
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- 10+ Courses of Agri-exams
- Best Selling Books Of Indian IQ
- Target Based Test In Courses
- Exam Relevant & Updated Contents
- Personalized Guidance

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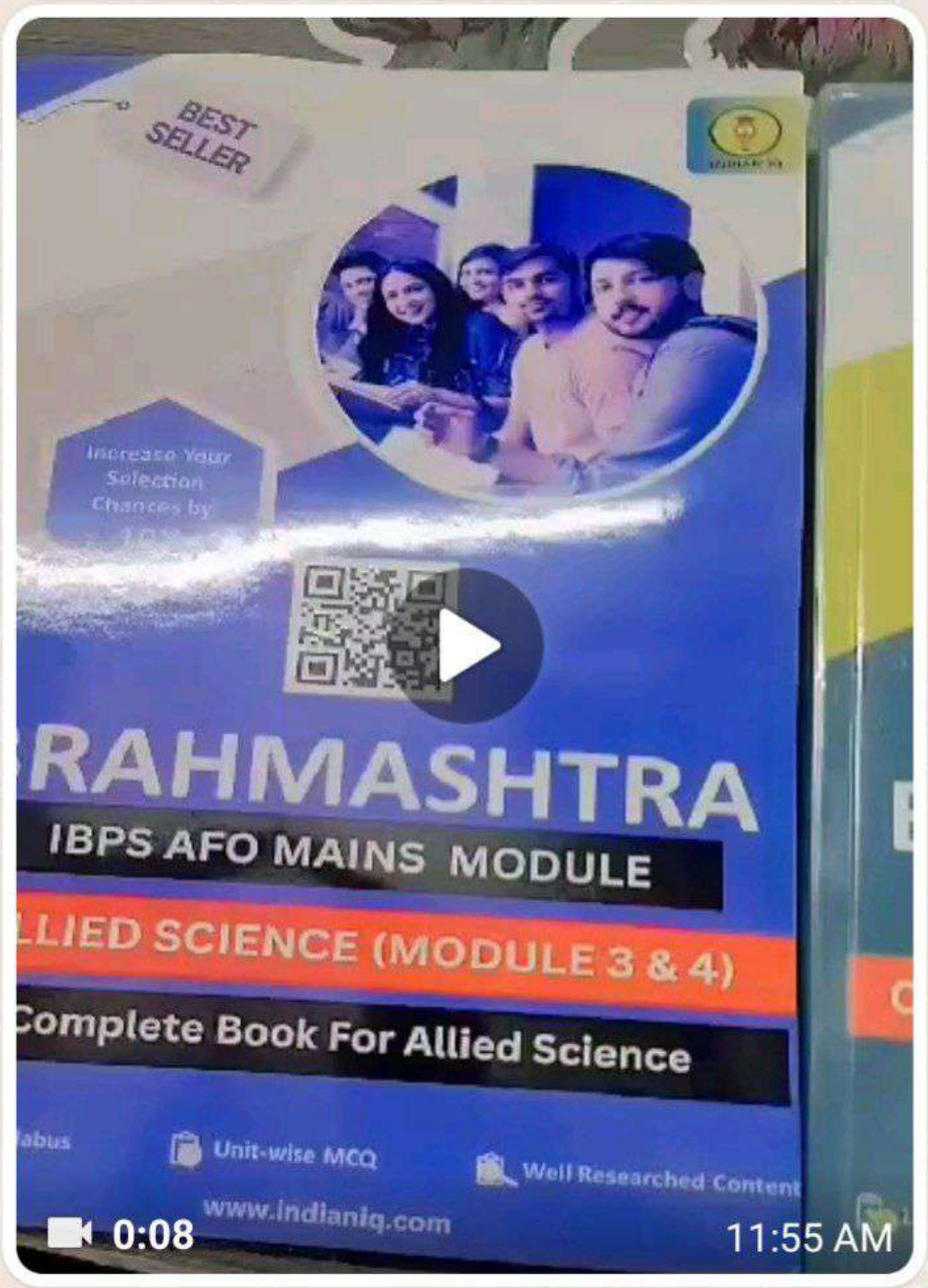
011-45683444

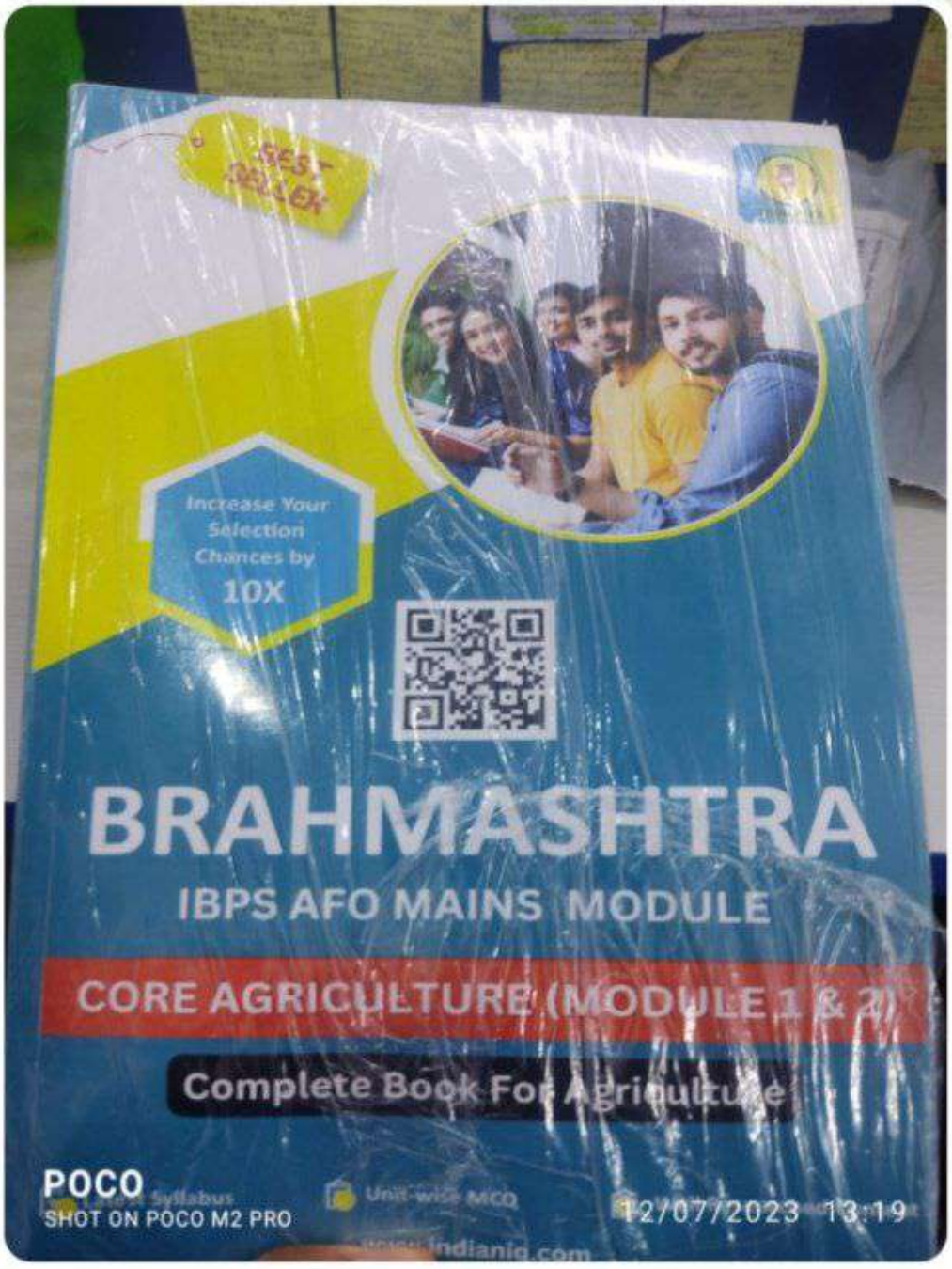


Finally..received the happiness sir.. 🙏 12:02 PM

In this running week 2:23 PM

2 Unread Messages

Today



Thanku Sir... Received successfully

1:46 PM

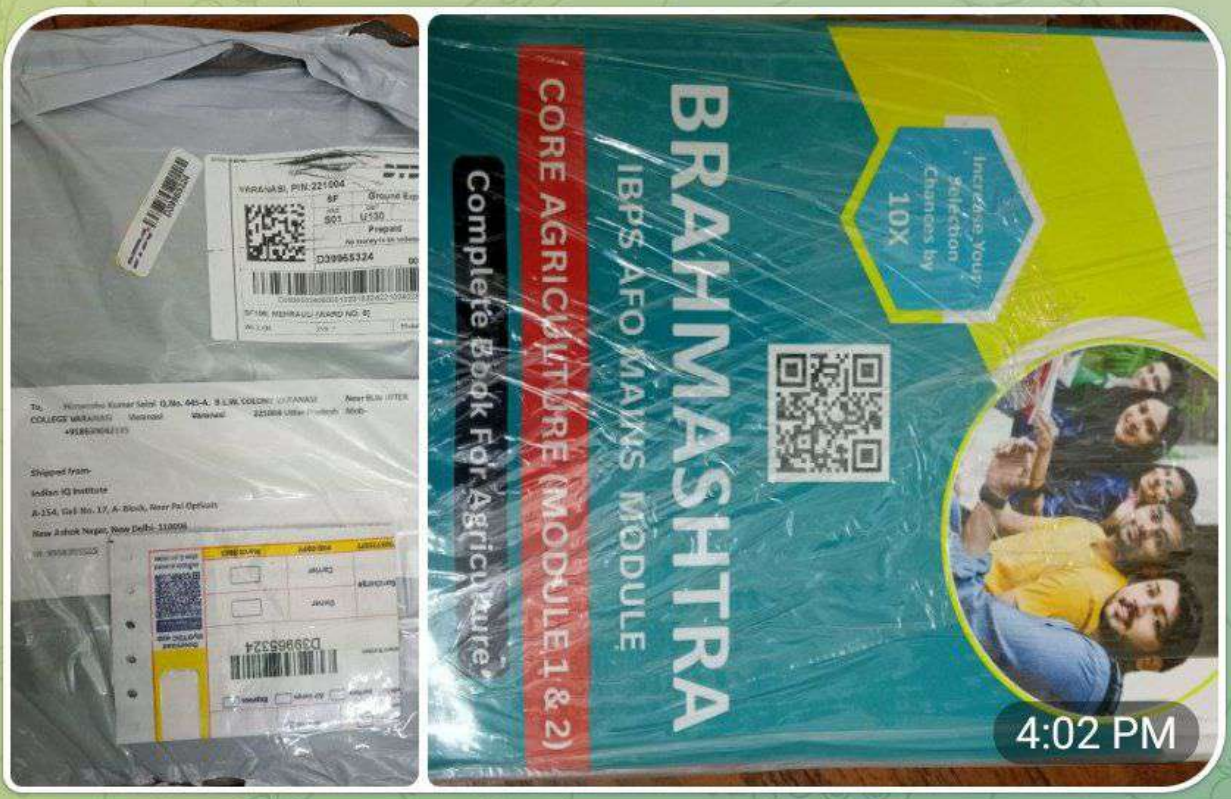
Finally i can read them without my eyes getting stressed from my mobile screen 1:47 PM

Ek ek student ka jaa chuka 12:17 PM

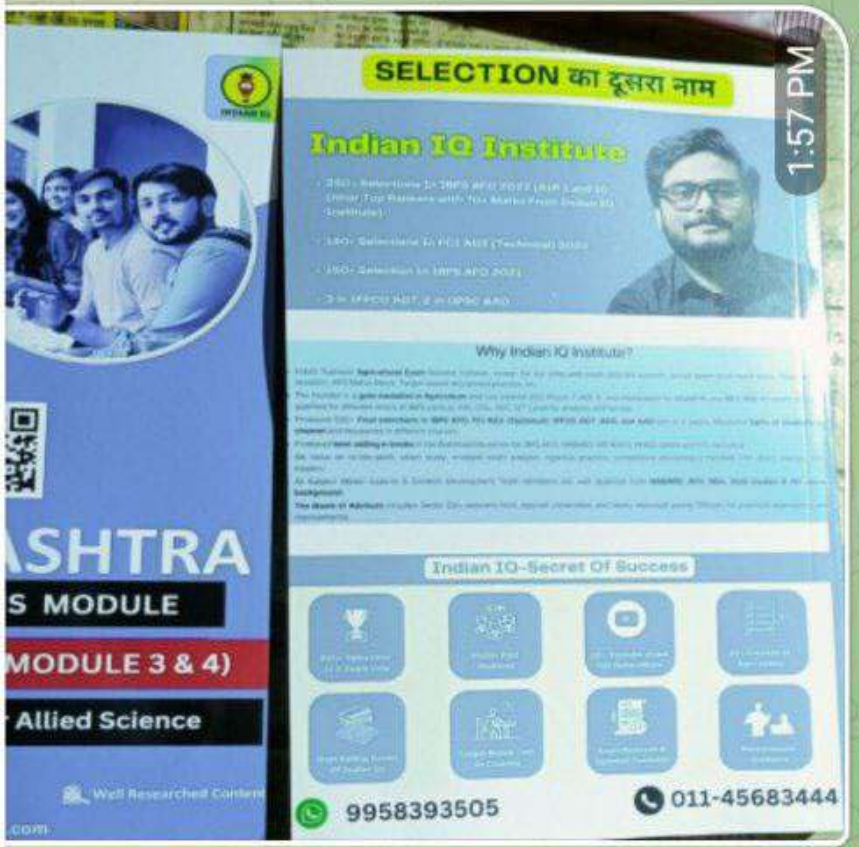
Unread Messages

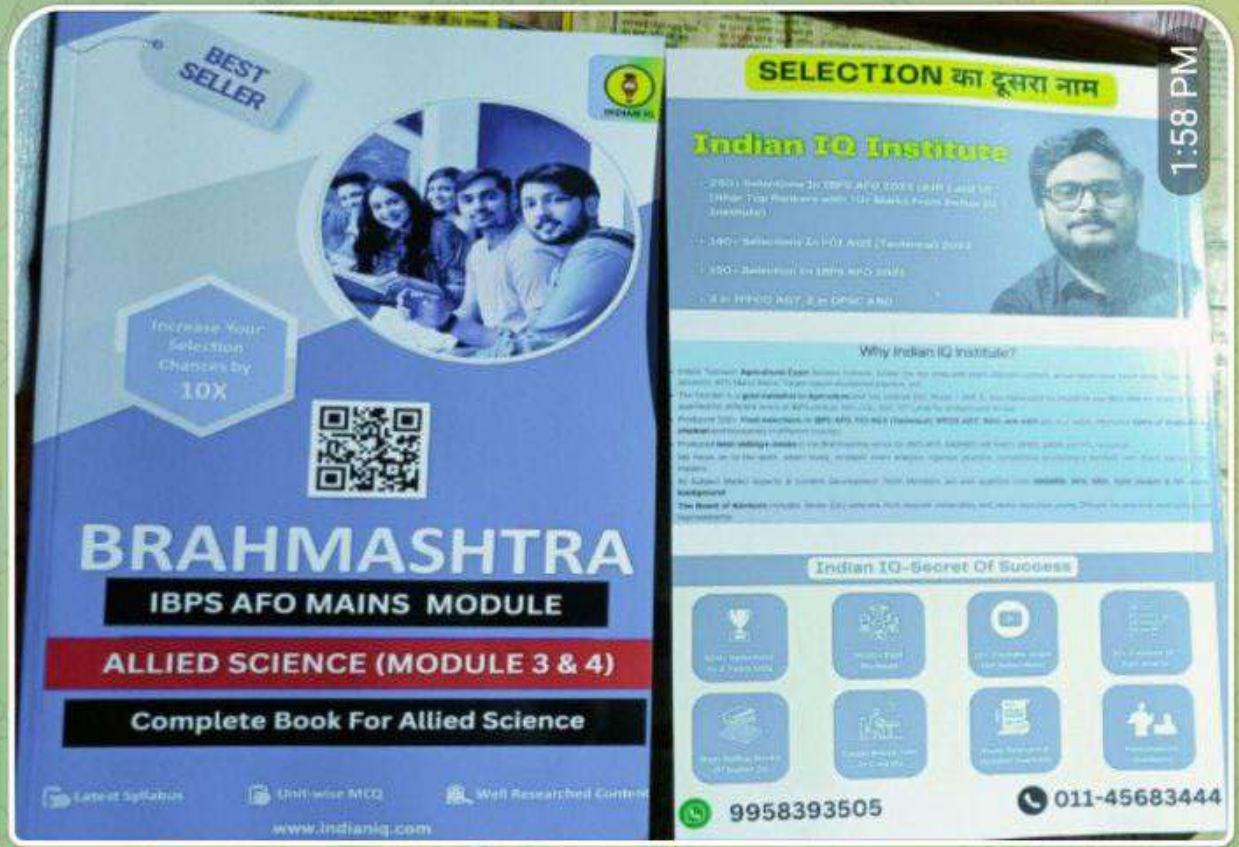
Hamara b aajaye bss 12:22 PM

July 13



Sir kaafi happy hu atleast ab aankh me pressure nhi pdega aur bhut acha lgrha hai
Thank you sir ji 🙏🙏books are awesome 4:02 PM





Today I received the books 1:58 PM

Books received sir🙏 1:14 PM

❤️❤️❤️🥳🥳🥳

1:56 PM ✓

Wow wow wow!!🤩🤩❤️❤️😊
So so so happy sir.
Thankful & grateful to you sir💯your immense efforts means alot💯🙏💯

Sir I'm so so so thankful to you Sir.
These books are TRUE BLESSINGS of 2023 for me.

Thanks a ton sir🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏🙏

3:08 PM

Content... Wow.. So unique & authentic 💯🙏🤩
Clarity💯
Description💯
Error less😍

These books arw bunch of "SUCCESS + HAPPINESS" for every AFO aspirant not just AFO for every agriculture Aspirant💯🙏🤩🌼

Blessed & grateful Sir.🕉️🙏

3:10 PM

It means a lot ❤️❤️❤️❤️
Hardwork is paying off... Make me proud at any cost 🌸🌸

❤️ 3:19 PM ✓✓

> **Indian IQ**
> It means a lot ❤️❤️❤️❤️ Hardwork is paying off... M...

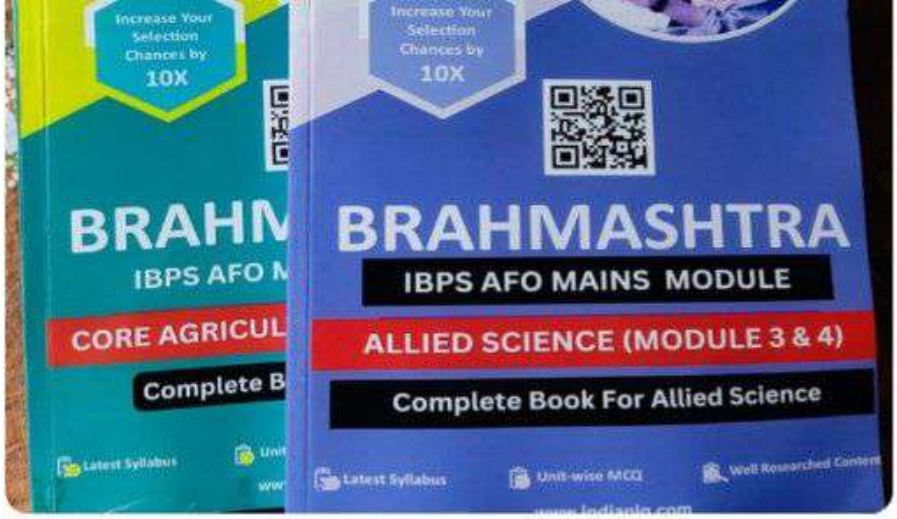
Yes sir💯
Sure.💯
Trying my best sir ❤️❤️❤️❤️❤️

😇😇😇😇😇😇😇😇😇😇😇😇😇😇

3:25 PM

1

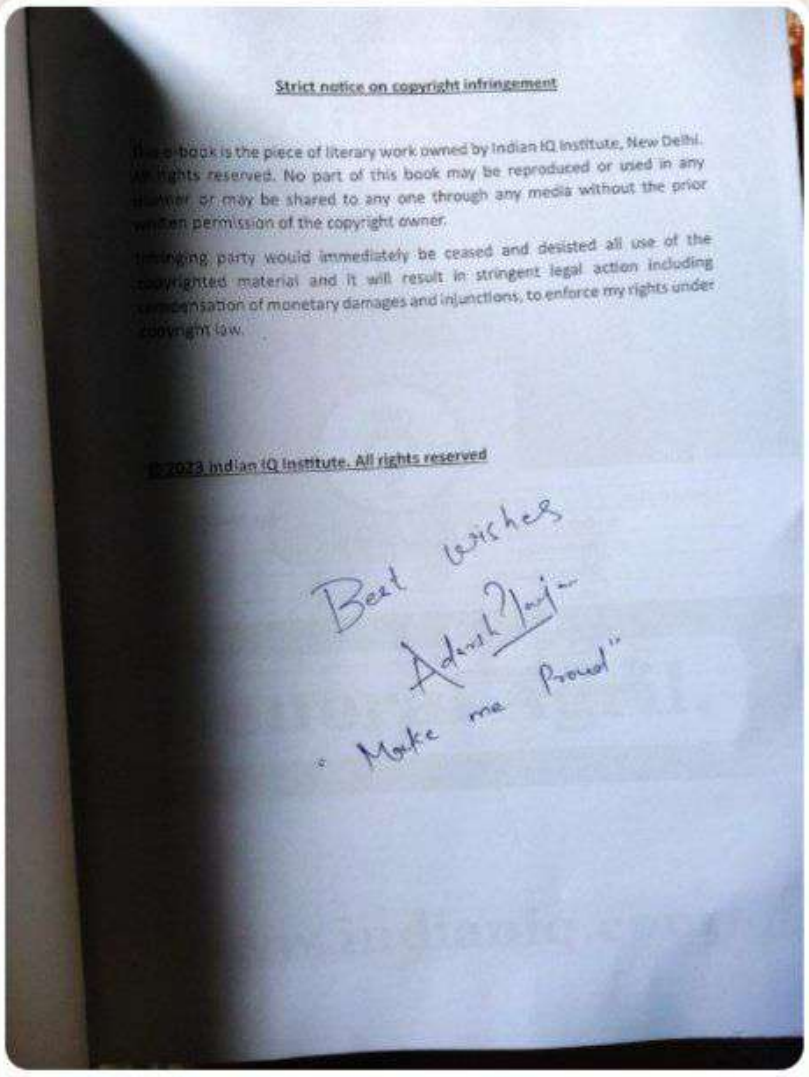
🕉️🙏😇



Sir, Finally got the "Brahmastra"s❤️

Extremely happy to have these 😊

4:15 PM



Thank you so much for the beautiful message ❤️. Will make my family and YOU proud for sure 🤦‍♂️

4:15 PM

All the best champion 🏆🏆

4:21 PM ✓✓

July 17

Sir...Books a gaya😍😍😍😍😍 8:42 PM

🥳🥳🥳🥳🥳🥳

8:50 PM ✓

Keep tracking 👍👍 9:08 AM ✓✓

Ok sir 9:27 AM

Today

Sir finally got the **BRAHMASHTRA** books 🥳

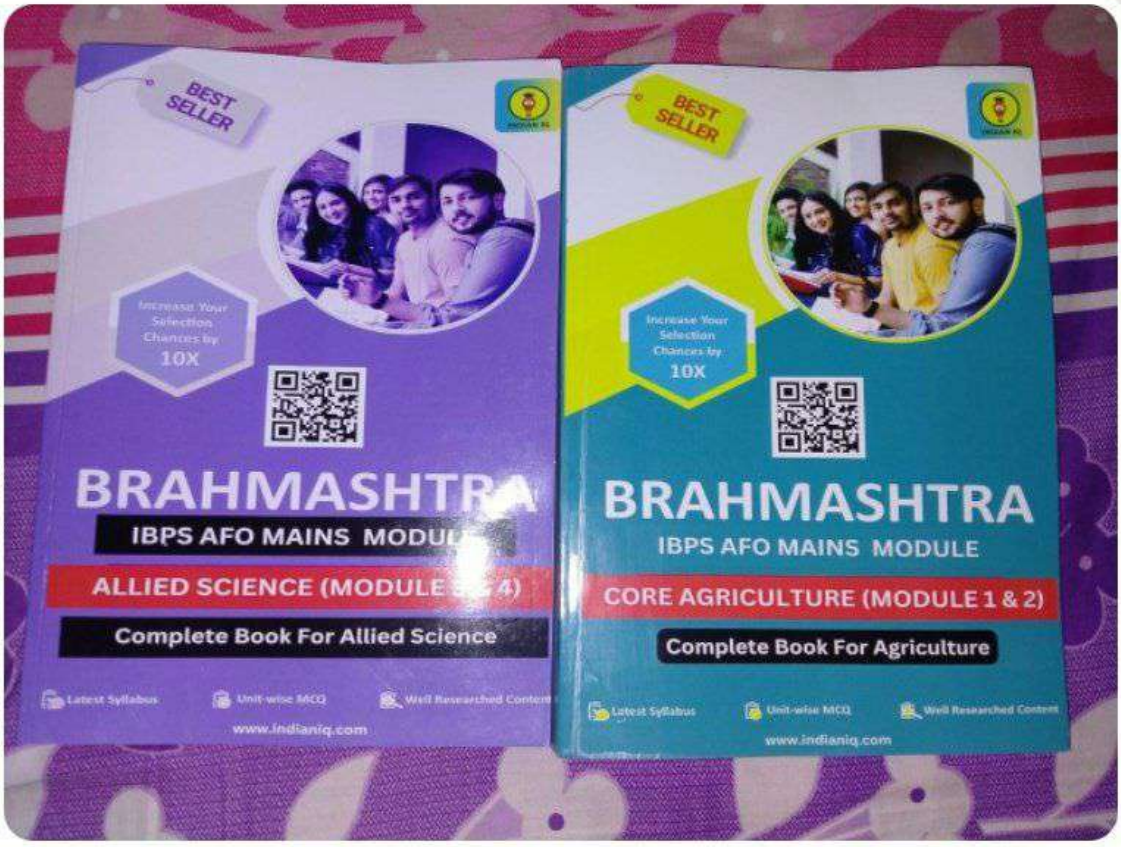
6:08 PM

🥳🥳🥳🥳 7:23 PM ✓✓

Make me extremely proud 👍👍

4:03 PM

Today



Finally received the happiness sir😊😊

5:23 PM

Make me proud 🥳🥳🥳🥳

7:23 PM ✓✓

July 17

Received the books sir..
Thank you sir 🤩

3:15 PM

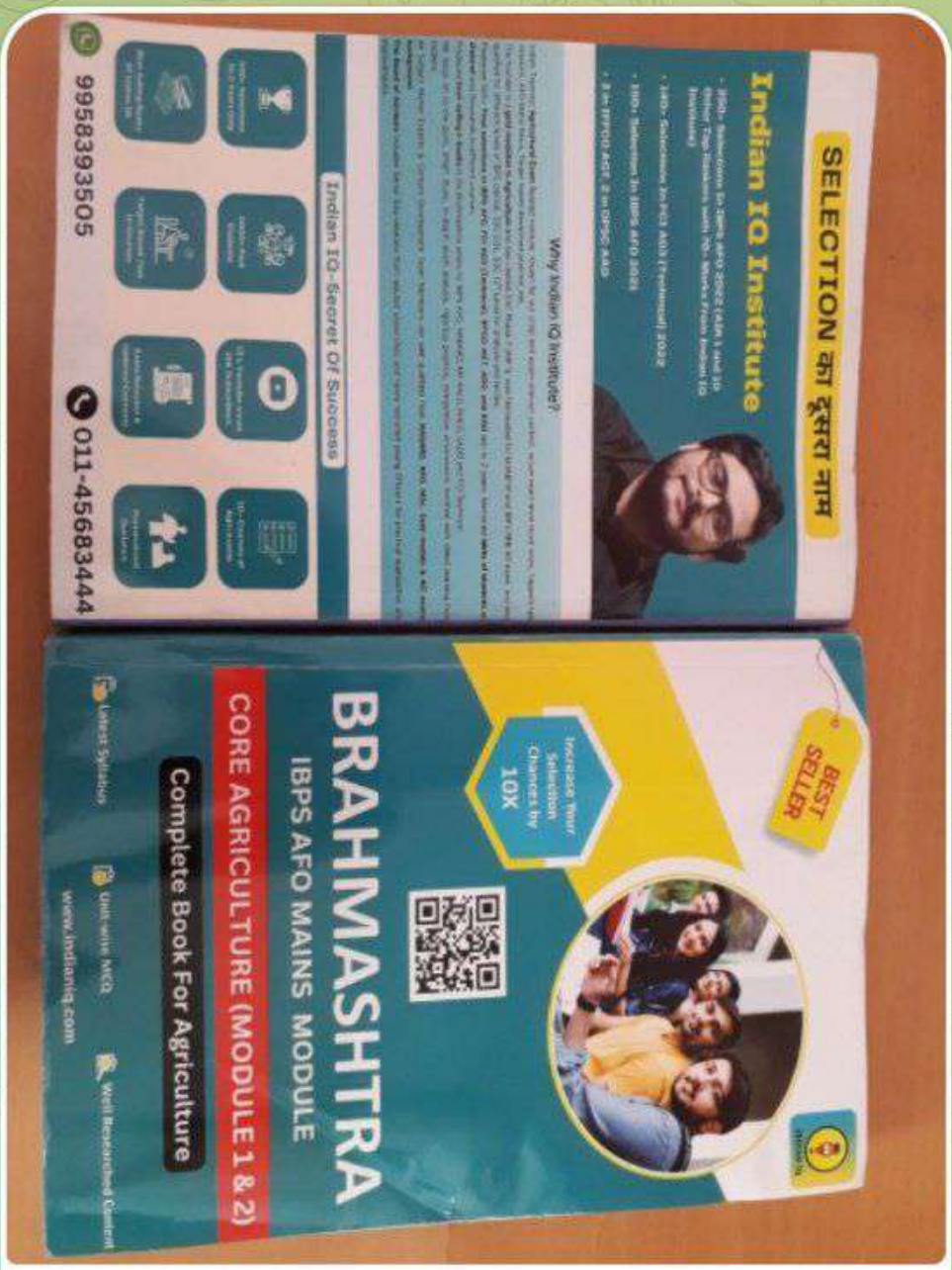
😍😍😍😍😍
Dhuadhar padhai kijiye 🔥 🔥 🔥

3:24 PM ✓

8:04 PM ✓✓

Ok sir thank you...😊 8:06 PM

July 17



Books aa gai sir...😍😍
Thank you so much..

"Is bar AFO par" 1:29 PM

❤️❤️🥳🥳😍😍

1:47 PM ✓

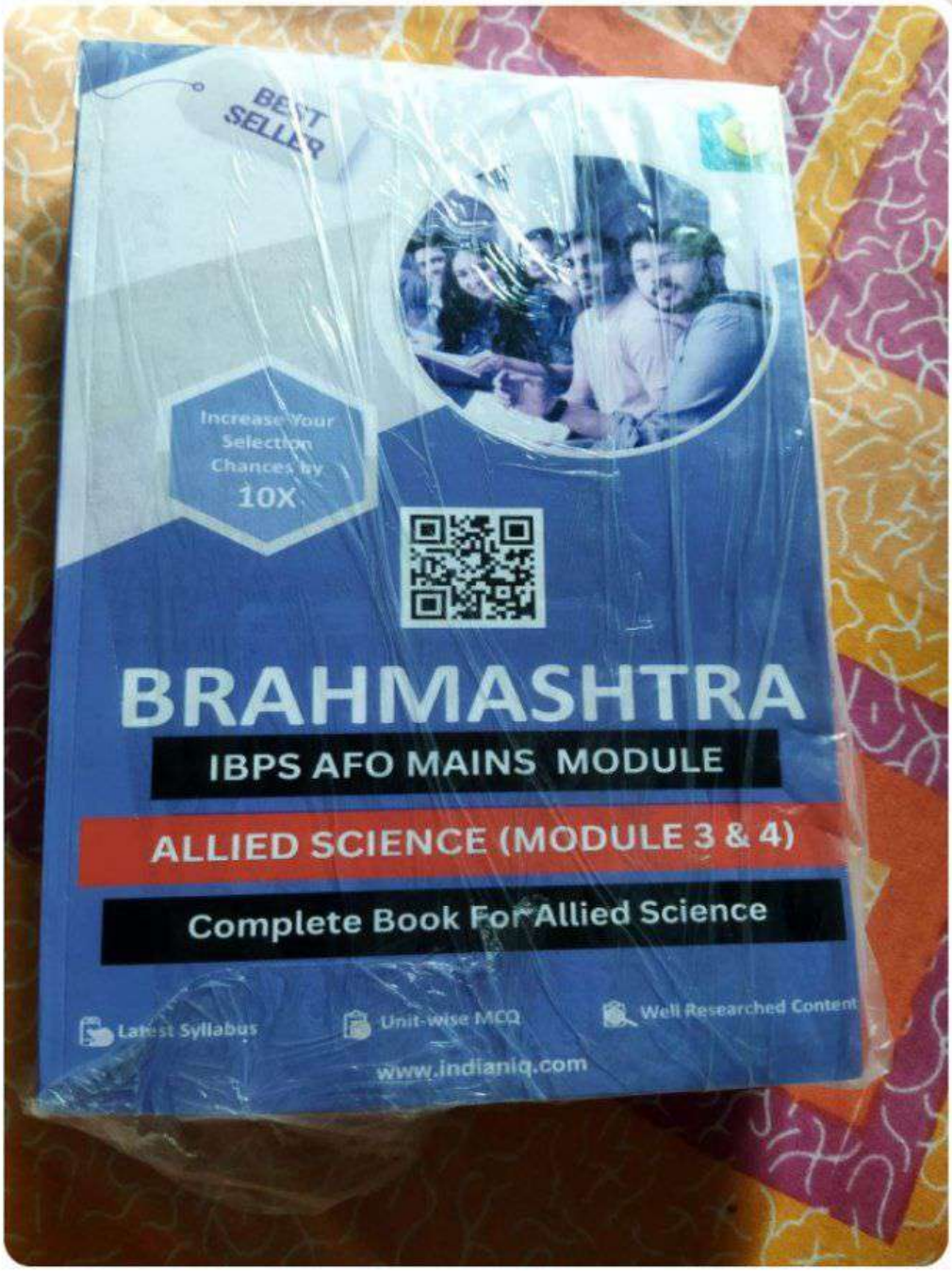
Lag jaaiye ekdum.. make me proud at any cost.

1:47 PM ✓

Expires On Apr 1, 2024

GO TO DASHBOARD 10:09 AM

Today



Thank you soo much sir, I have received this book . And i will try my best for upcoming exams. 2:20 PM

July 15

FCI me horti kaise eligible sir 4:42 PM

July 17

Books aagye❤️Best Content yaha se aur koi book padhne ki awashyakta hi nai hai ....Matlb not a single source👌👌👌 7:37 PM

Upsc bhi clear ho jaye isse😄😄 7:39 PM

🥳🥳🥳🥳
These words means a lot.. ❤️❤️
Make me proud soon 🥳🥳🥳 8:02 PM ✓

Ok Sir I am eagerly waiting for that one ...

11:30 AM

July 17

Today I Received the Brahmastra Of Agriculture 😍❤️

9:48 PM

Bole to jhakaas sir 👌👌 9:54 PM

Abki baar AFO paar 😎🤓 9:54 PM

🥳🥳🥳🥳 9:54 PM ✓✓

Exam se pehle 5 baar khatam kijiye is book ko kam se kam 9:54 PM ✓

Make me proud 🥳🥳🥳

8:15 PM

July 18

Sir Finally Received...
Thank you so much Sir ..🙏 10:40 AM

You are most welcome dear 👍👍👍 7:04 PM ✓

Isko ghooti ke tarah pi jaaiye ab 👍👍 7:05 PM ✓

revision test 9:13 PM

That's good, could have been better. 9:58 PM ✓✓

👍👍

9:58 PM ✓✓

Ok sir... edited 10:24 PM

July 18

Received the books sir... I'm very excited ❤️😍 4:39 PM

Make me proud soon... AT ANY COST

🥳🥳🥳👍👍 7:04 PM ✓

Already in the way 6:15 PM

On* 6:15 PM

Ok sir thank you 😊 6:16 PM

😊 😊

6:16 PM

July 18

Finally Received Sir😍👍 5:12 PM

Vijayi bhava 🥳🥳👍👍 7:04 PM ✓

Aap aaye the na? 1:12 PM

Ji sir attend kiye ,bahoot help mila
Thankyou sir 1:36 PM

❤️❤️ 1:44 PM

July 18

Thankyou sir❤️❤️❤️ 6:29 PM

🥳🥳🥳🥳🥳 7:03 PM

Today Most awaited books received. 9:14 AM

😍😍🌸🌸🥳🥳 6:59 PM ✓✓

Achhe se 4-5 baar padh ke khatam kijiye, nischint hoke exam dijiye fir 6:59 PM ✓✓

Kal ek mail jaayega aapke paas 10:48 PM

> **You**
> Kal ek mail jaayega aapke paas

Ok sir 10:50 PM

Today

अंततः ब्रम्हास्त्र ❣️ आ ही गया सर... 5:43 PM

बहुत-बहुत शुक्रिया सर 🙏😊 5:44 PM

🌺🌺🌺 6:57 PM ✓

Yashashwi bhava 👍👍 6:57 PM ✓

Richard- Term 12:30 PM

Thank you sir 12:31 PM

I have received Bramhastra books two days back sir. From that day itself started reading. Best books i have ever encountered. To the point to the syllabus.

Thank you so much sir. 12:33 PM

🥳🥳🥳😍😍😍🌸🌸🌸

Must revise the books 4-5 times before exam and you will definitely get Selection, that is my guarantee. Make me proud. 12:35 PM

Sir nodal centre dtdc mein bat hui unhone bola ki hum parcel deliver denge jaldi se..
Recv hone ke bad mein apko confirm kar dungi sir

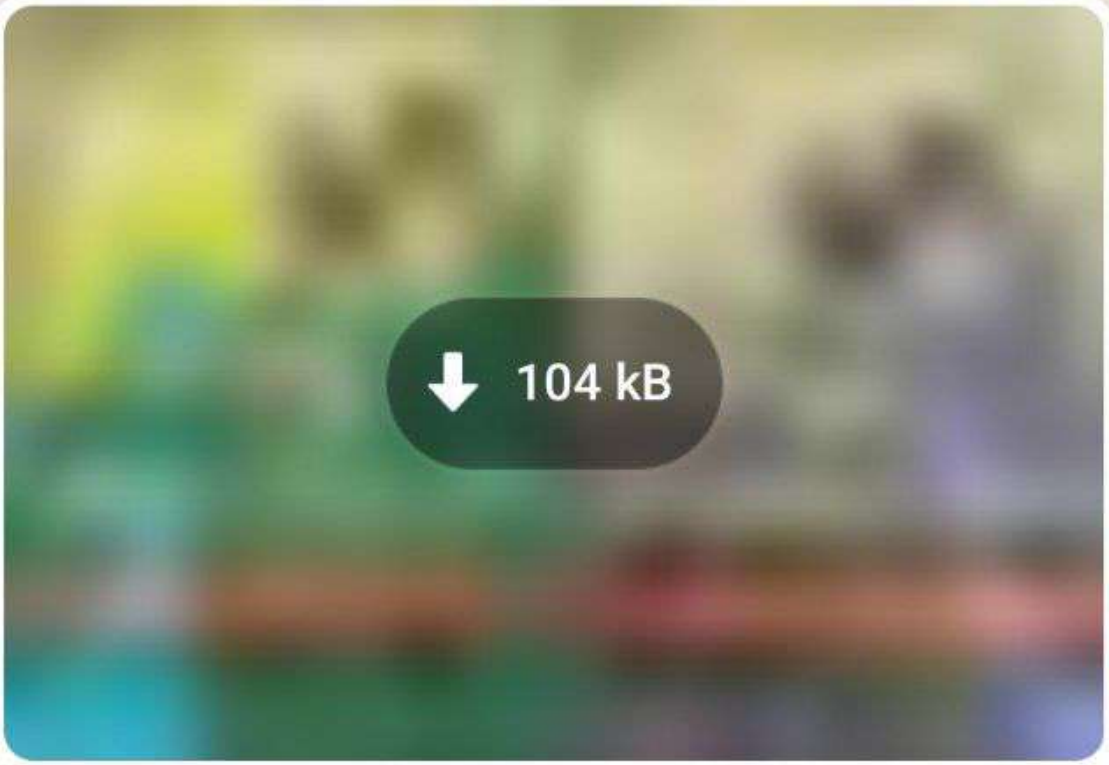
3:56 PM

🥳🥳🥳

5:02 PM

Sir ap jese bole the ki target ke liye wo portal mein show kar dete hai....

8:18 PM



Now I received two excellent books and tq so much sir for ur concerns and response 🥰🥰🥳🥳🥳🥰

8:19 PM

> +91 [redacted]
> Sir ap jese bole the ki target ke liye wo portal mein show kar dete hai....

Haan ji

9:07 PM

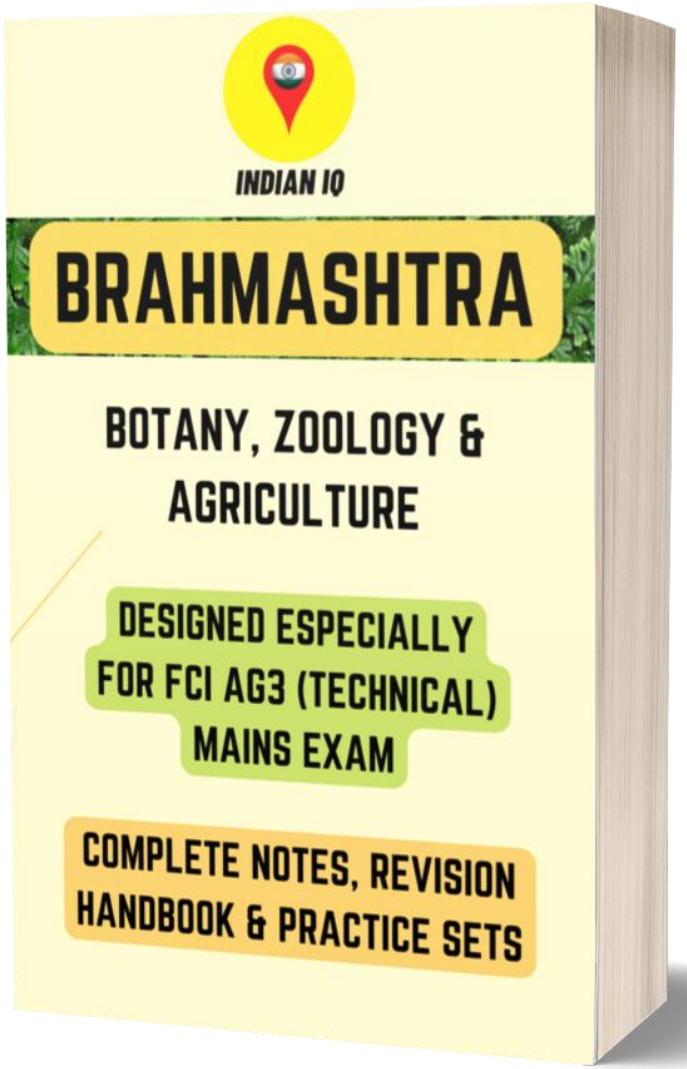
Maha Marathon Session on all Important Government Schemes (Agri)

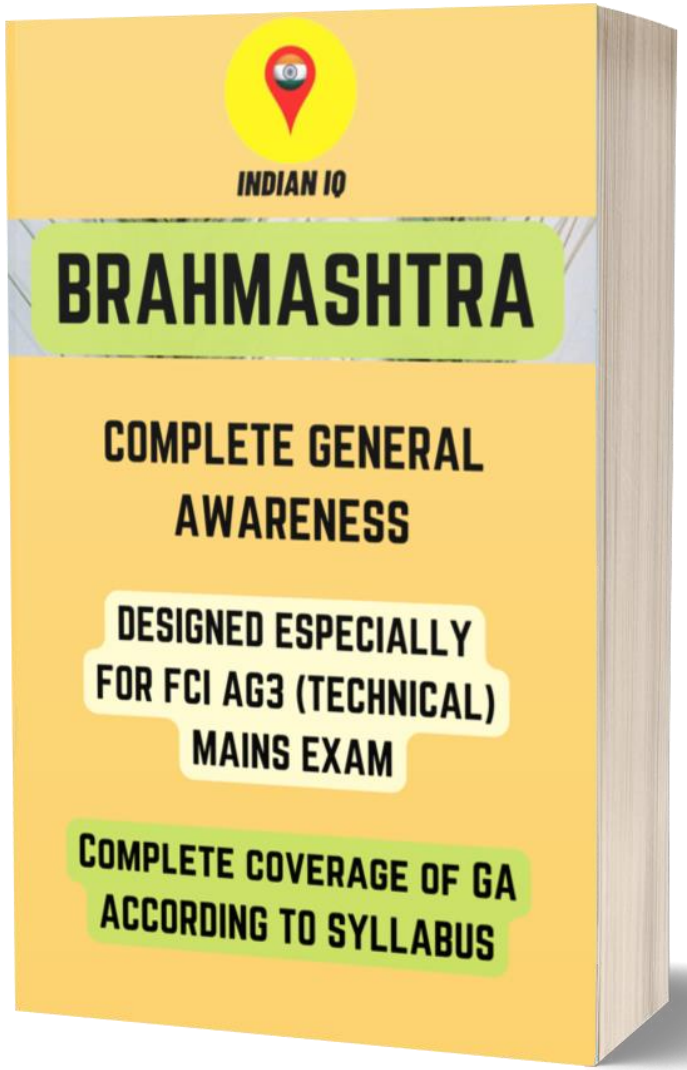
INDIAN IQ

18. Important Cabinet Ministers and Ministries (Agriculture and Associated Ministries)

19. Budget Allocation for 2022-23

20. Latest Horticultural Data


INDIAN IQ
BRAHMASHTRA
BOTANY, ZOOLOGY & AGRICULTURE
DESIGNED ESPECIALLY FOR FCI AG3 (TECHNICAL) MAINS EXAM
COMPLETE NOTES, REVISION HANDBOOK & PRACTICE SETS


INDIAN IQ
BRAHMASHTRA
COMPLETE GENERAL AWARENESS
DESIGNED ESPECIALLY FOR FCI AG3 (TECHNICAL) MAINS EXAM
COMPLETE COVERAGE OF GA ACCORDING TO SYLLABUS

E-NAM (National Agriculture Market)

- April, 2016
- Electronic trading portal, to integrate mandis under “One Nation One Market”
- Registered Mandi: 1260
- Total commodities: 203
- Ministry of Agriculture & Farmers’ Welfare
- Grant of Rs. 30 lakh to the participating mandis
- SFAC is the promoter of e-Nam
- Total language of app- 12

Kisan Credit Card

- August, 1998
- Issue- Application + 14 days
- Credit for procurement of agri-inputs like seeds, fertilizer, pesticides etc. & to draw cash as per needs of production, to meet short term credit need, post-harvest expenses, product marketing loan, consumption requirement, working capital for maintenance of farm assets, investment credit for agriculture.
- From 2004, credit facility started for allied activities as well (non farm activities)
- Any farmer, individual/joint borrower, tenant, oral lesees, sharecropper, SHGs, JLGs, all eligible
- Validity- 3 to 5 years, reviewed annually
- Any number of withdrawal allowed, subject to limit
- Repayment period- 1 year max
- Collateral free loan- Up to 1.6 lakh
- Insurance- Rs. 50,000 in case of death, Rs. 25,000 for accident

Kisan Credit Card

- RuPay Card,
- Short Term Crop Loan- Up to Rs. 3 lakh at 7% interest. 3% discount (subvention) on interest if paid on or before due date, so only 4% to be paid
- Maximum Limit- No limit
- Document- Application form, Id Proof & Address Proof
- KCC now available for animal husbandry, fisheries
- Commercial banks, SFB, Cooperative banks can issue KCC.
- RV Gupta committee recommended KCC

Agri clinic & Agribusiness Centre Scheme

- Launched- April, 2002
- MoA&FB with NABARD
- 20 lakh loan to single person & 1 Crore to group of 5 person for 10 years of 18-60 years and graduate/diploma/post graduate diploma/+2 in agriculture and allied science/Bsc Bio+PG in agriculture or allied
- Training by MANAGE to eligible candidates
- Subsidy- 36% of project cost and 44% for SC/ST, women and NE candidates
- Agri clinics provide expert advise and services to farmer in order to improve productivity and increase farm income
- Agribusiness are commercial units established by professionals of agriculture for custom hiring of equipment, sales of inputs and other services related to cultivation and post harvest.

PM KISAN Scheme

INDIAN IQ

- February, 2019
- MoA&FW
- Central Sector scheme, launched from GKP, UP
- Identification of benificiairies by state govt.
- Income support of Rs. 6000 in three instalment deposited directly to farmers' accounts, all farmers are eligible who are land holders with no land limit but should not be any present or former holder of constitutional post, present or former minister, mayor/chairperson, Retired officer, pensioner with pension of Rs. 10,000 or more, or paid income tax last year or is any professional like Engg, Doct, CA etc.
- Fund is transferred directly to bank account.
- Rythu bandhu is Telangana (Same scheme)

PMFBY

- Kharif 2016
- Premium- 2% for Kharif crops, 1.5% for Rabi and 5% for commercial and horticultural crops
- Mandatory till 2020 but now optional
- Easy reporting of loss within 72 hours of occurrence of any event through Crop Insurance App
- Coverage-
- Insufficient rainfall or adverse condition leading to prevention from sowing/germination etc. (25% of S.I)
- Damage of standing crops
- Crop harvested, and are spread for drying and wasted due to cyclone, hailstorm, rain etc. (within 2 weeks of harvesting)
- Loss due to war, nuclear risk, malicious damage not covered
- Loss due to animal- Sikkim first state

PM Krishi Sichai Yojana

INDIAN IQ

- July, 2015, Centrally sponsored scheme (75:25 and 90:10 for NE and Hilly states)
- “Har khet ko Pani”
- Micro-irrigation- Per drop more crop
- Investment in irrigation, enhance access of water to crops, improve farm water use efficiency, increase usage of micro irrigation, development of rainfed areas, water harvesting etc.
- Components-
- Accelerated Irrigation Benefits Programme (AIBP) & Har Khet Ko Pani ,Ministry of Jal Shakti
- Watershed Development, MoRD
- Per drop more crop, MoA&FW

Soil Health Card

- Feb, 2015 (International Year of Soil) at Suratgarh, Rajasthan
- “Swasth Dhara, Khet Hara, MoA&FW
- Status of soil w.r.t 12 parameters, N, P, K, S, Zn, Fe, Cu, Mn, Bo, pH, EC, OC
- Soil Health Card Portal- Report download, 22 languages
- Soil samples are collected 2 times in a year after harvesting of crops
- SHC issued to farmers every 2 years to provide basis to address nutritional deficiencies in fertilization practices.

- Mridaparikshak- Feb, 2015
- A digital mini lab kit
- Determines 15 soil parameters- SHC parameters + lime requirement, gypsum requirement, calcareousness

Pradhan Mantri Mudra Yojana

INDIAN IQ

- April, 2015
- Central Sector Scheme, Loan up to 10 lakh
- Loan by Comm Banks, RRB, Coop Bank, SFBs, NBFCs and MFIs, provided to MSMEs which are non farm and non corporate, to beneficiaries having own business or going to start it, No guarantee required
- Interest rate is not fixed

- Shishu- Up to Rs. 50,000 for new entrepreneurs & start-up
- Kishor- Up to Rs. 5,00,000 for existing business
- Tarun- Up to Rs. 10,00,000 for business expansion

Paramparagat Krishi Vikas Yojana

- April, 2015
- To promote organic cultivation in India, MoA&FW
- 50/50+ farmers form a cluster of 50 acre land to take organic farming under the scheme
- Centrally sponsored scheme, 60:40 by Central and State, 90:10 in NE and hilly
- Components-
- Model Organic Farm
- Modern Organic Cluster Demonstration
- PKVY- Induced Cluster Formation

PM KISAN SAMPADA Yojana

INDIAN IQ

- 2016, MoFPI, Renamed in 2017
- To create modern infrastructure for food processing, effective forward and backward linkages- farmers, traders, processors etc.
- Schemes under PMKSY-
- Mega Food Park, Integrated Cold Chain and Value Addition Infrastructure, Creation/Expansion of Food Processing Clusters, Creation of Forward and Backward linkages, Infrastructure for Agro-Processing Clusters, Human Resources and Institutes, Food Safety and Quality Assurance Infrastructure

PM Formalization of Micro Food Processing Enterprises Scheme

INDIAN IQ

- June, 2020, MoFPI
- 2020-21 TO 2024-25 implementation period, 35 states/UTs
- Aim- To set up or to upgrade 2 lakh micro food processing units under the period.
- Centrally sponsored, 60:40, 90:10 for NE and hilly states with a outlay of 10,000 crore for 5 years
- One district One product Scheme borne out of it

- Support-
- Credit linked capital subsidy of 35% of the project cost for food processing entrepreneurs, max limit- 10 lakh per unit
- Seed funding- Rs. 40,000 per Self Help Group members for working capital and procurement of small tools and implements

Priority Sector Lending

- **Important and sensitive sector which should be given priority**
- **Agriculture, MSMEs, Export Credit, Education, Social Infrastructure, Housing, Renewable energy and others**

Categories	Domestic commercial banks (excl. RRBs & SFBs) & foreign banks with 20 branches and above	Foreign banks with less than 20 branches	Regional Rural Banks	Small Finance Banks
Total Priority Sector	40 per cent of ANBC	40 per cent of ANBC	75 per cent of ANBC	75 per cent of ANBC
Agriculture	18 per cent of ANBC or CEOBE, whichever is higher; out of which a target of 10 percent# is prescribed for Small and Marginal Farmers (SMFs)	Not applicable	18 per cent ANBC or CEOBE, whichever is higher, out of which a target of 10 percent is prescribed for SMFs	18 per cent of ANBC or CEOBE, whichever is higher, out of which a target of 10 percent is prescribed for SMFs
Micro Enterprises	7.5 per cent of ANBC or CEOBE, whichever is higher	Not applicable	7.5 per cent of ANBC or CEOBE, whichever is higher	7.5 per cent of ANBC or CEOBE, whichever is higher
Advances to Weaker Sections	12 percent of ANBC or CEOBE, whichever is higher	Not applicable	15 per cent of ANBC or CEOBE, whichever is higher	12 percent# of ANBC or CEOBE, whichever is higher

Target for lending to Small and marginal farmers and for weaker sections:						
	2022-23	2023-24				
SMFs Targets	9.50%	10%				
Weaker Section Targets	11.50%	12%				

Weaker Sections

Priority sector loans to the following borrowers will be considered as lending under Weaker Sections category:

(i) Small and Marginal Farmers
(ii) Artisans, village and cottage industries where individual credit limits do not exceed ₹1 lakh
(iii) Beneficiaries under Government Sponsored Schemes such as National Rural Livelihood Mission (NRLM), National Urban Livelihood Mission (NULM) and Self Employment Scheme for Rehabilitation of Manual Scavengers (SRMS)
(iv) Scheduled Castes and Scheduled Tribes
(v) Beneficiaries of Differential Rate of Interest (DRI) scheme
(vi) Self Help Groups
(vii) Distressed farmers indebted to non-institutional lenders
(viii) Distressed persons other than farmers, with loan amount not exceeding ₹1 lakh per borrower to prepay their debt to non-institutional lenders
(ix) Individual women beneficiaries up to ₹1 lakh per borrower (For UCBs, existing loans to women will continue to be classified under weaker sections till their maturity/repayment.)
(x) Persons with disabilities
(xi) Minority communities as may be notified by Government of India from time to time.

Minimum Support Price

- For financial stability into agriculture system and encourage production, ensures minimum guaranteed price.
- 23 commodities covered, MSP for 22 mandated crop and FRP for sugarcane.
- 7 cereals, 5 pulses, 7 oilseeds, 4 commercial crops
- Recommended by Commission for Agriculture Costs and Prices (CACP), announced by CCEA.

Minimum Support Prices for all Kharif crops for Marketing Season 2022-23	
(₹ per quintal)	
Crop	**MSP 2022-23**
Paddy (Common)	2040
Paddy (Grade A)^	2060
Jowar (Hybrid)	2970
Jowar (Maldandi)^	2990
Bajra	2350
Ragi	3578
Maize	**1962**
Tur (Arhar)	6600
Moong	7755
Urad	6600
Groundnut	5850
Sunflower Seed	6400
Soyabean (yellow)	4300
Sesamum	**7830**
Nigerseed	7287
Cotton (Medium Staple)	6080
Cotton (Long Staple)^	6380

INDIAN IQ

MSP for all Rabi Crops for Marketing Season 2023-24			
(Rs. Per quintal)			
S.No.	**Crops**	**MSP 2023-24**	
1	Wheat	2125	
2	Barley	**1735**	
3	Gram	5335	
4	Lentil (Masur)	**6000**	
5	Rapeseed & Mustard	5450	
6	Safflower	5650	

	Pradhan Mantri Suraksha Bima Yojana	Pradhan Mantri Jeewan Jyoti Bima Yojana
Feature	Accidental insurance scheme cover accidental disability and death	Life insurance cover death due to any reason
Term	1 year, renewable	1 year coverage, renewable
Age limit	18-70 years	18-50 years
Premium	Premium- Rs. 20 per year per member and deducted on or before 1 June as coverage period is 1 June- 31 May	Premium- Rs. 436 per year per member
Benefit	Death, Irrecoverable loss of both eyes, loss of use of both hands or feet or loss of sight of one eye and loss of use of hand or foot- Rs. 2 lakh, Total and irrecoverable loss of one yer or one hand hand or one foot- Rs. 1 lakh	2 lakh, death due to any cause

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Section 1

Q.1) Colostrum gives a laxative effect which is helpful in the expulsion of the first faeces of a calf known as

[A] Pellets

[B] Scat

[C] Dung

[D] Muconium

[E] Ordure

Q.2) A condition known as "milk fever" primarily affects dairy cows

[A] who is about to give birth

[B] who is under one year of age

[C] who is more than 20 years old

[D] who has never given birth to young

[E] whose blood calcium level is high

Q.3) The practice of trimming lower branches with sharp tools without harming the plant is

[A] Singling

[B] Training

[C] Beushening

[D] Brashing

[E] Tending

Q.4) ..... is the practice of obtaining seedlings from the forest itself and growing them in a natural environment.

[A] Climatization

[B] Tending

[C] Coppicing

[D] Wilding

[E] Regeneration

Q.5) Chanderi weaving consists of pure, as well as degummed mulberry silk. The extremely fine property of the silk yarn gives out a splendid lustrous look to the fabric. Chanderi silk belongs to the regions of

[A] Tamil Nadu

[B] Bihar

[C] Assam

[D] Karnataka

[E] Madhya Pradesh

Q.6) Which of the following gland of bees starts to mature three days after the emergence of the bee, and develops only when the insect secretes royal jelly to feed the young larvae and the queen?

[A] Hypopharyngeal gland

[B] Wax gland

[C] Pheromone gland

[D] Thymus gland

[E] Adrenal gland

Q.7) Individual nest for layer birds is sufficient to accommodate

[A] only one layer bird

[B] four-five layer birds

[C] forty-fifty layer birds

[D] hundred and more layer birds

[E] None of the above

Q.8) The gestation (pregnancy) period in rabbit ranges from

[A] 15-18 days

[B] 40-45 days

[C] 60-65 days

[D] 28-32 days

[E] 12-15 days

Q.9) The buildup over time, within animal tissues, of substance (e.g. heavy metals) that cannot be excreted by an organism is termed as

[A] Biomass

[B] Eutrophication

[C] Bioaccumulation

[D] Bycatch

[E] Water pollution

Q.10) Cartilagineous fish differs from bony fish as

[A] Cartilagineous fishes are generally freshwater fishes

[B] In cartilagineous fishes breeding is internal, unlike bony fish.

[C] The air bladder is present in cartilaginous fishes but absent in bony fishes

[D] Cartilagineous fishes belong to class osteichthyes but bony fishes belong to chondrichthyes

[E] All of the above

Q.11) Which of the following is not a species of fish?

[A] *Pterophyllum sp.*

[B] *Catla sp.*

[C] *Clarias sp.*

[D] *Labeo sp.*

[E] *Notopterus sp.*

Q.12) Which of the following disease of fish is caused due to protozoa infestation?

[A] Fin rot and tail rot

[B] Dropsy

[C] Water mould disease

[D] Ichthyophthiriasis

[E] None of the above

Q.13) The principle of the espalier system of training temperate plants is much similar to the

[A] Kiniffin system of training grapes

[B] Modified bower system

[C] Pandal system of training of ornamental creepers

[D] Vertical cordon system

[E] None of the above

Q.14) Reduction of copper and zinc and increase in iron and manganese may be observed in the soil in case of

[A] pH below 4

[B] presence of plenty of moisture

[C] deficiency of oxygen

[D] well drained soil

[E] All of the above

Q.15) The availability of micronutrients is mainly concentrated in

[A] Surface soil

[B] Organic soil

[C] Problematic soil

[D] Sub surface soil

[E] Deeper layer of soil

Q.16) When the irrigation water in the soil evaporates, it leaves behind minerals and salt, the condition is known as 'salinization'. Which of the following is the effect of salinization on irrigated land?

[A] It raises the water table in the area

[B] It fills the air space of soil with water

[C] It decreases the demand for nutrient supply

[D] It increases the crop production upto an extent

[E] It may lead to detrimental impact on crop yield

Q.17) Which of the following techniques is/are used for the production of transgenic crops?

[A] Cytoplasmic male sterility

[B] Gene silencing

[C] Budding and grafting

[D] A and B

[E] A, B and C

Q.18) Which of the following crop species does not belong to the Fabaceae family?

[A] Groundnut

[B] Sunflower

[C] Soybean

[D] Cowpea

[E] Lathyrus

Q.19) Cultivation of crops in areas where rainfall is approximately 950 mm is

[A] Dry farming

[B] Dryland farming

[C] Rainfed farming

[D] Extensive farming

[E] Intensive farming

Q.20) Crop + Fish + Poultry type of integration of farming is observed in case of

[A] Garden land-based farming system

[B] Dry land-based farming system

[C] Wetland based farming system

[D] Hill region based farming system

[E] None of the above

Q.21) Which of the following type of tillage is possible only with the successful application of herbicides?

[A] Minimum tillage

[B] Strip tillage

[C] Till planting

[D] Row zone tillage

[E] Secondary tillage

Q.22) Which of the following type of crop is grown with the prime objective to protect the land from erosion?

[A] Border crops

[B] Companion crops

[C] Fouling crops

[D] Contour crops

[E] Ley crops

Q.23) In KCC in some cases the collateral security is to be provided. If the loan amount is above ..... then the cardholder has to pledge his land as mortgage and hypothecate the crops raised on it.

[A] Rs. 1 lakh

[B] Rs. 2 lakh

[C] Rs. 3 lakh

[D] Rs. 10 lakh

[E] Rs. 25 lakh

Q.24) A group of mature fishes, which are used as a source of replacement for, or enhancement of, seed and fry numbers is called

[A] Freshwater fishes

[B] Brooder

[C] Game fishes

[D] Broodstock

[E] Fingerlings

Q.25) The temperature range in which food-borne bacteria can grow is known as the danger zone. What is the danger zone in connection with temperature and food spoilage?

[A] 27-130 degree Farhenheit

[B] 20-123 degree Farhenheit

[C] 40-140 degree Farhenheit

[D] 50-150 degree Farhenheit

[E] 60-160 degree Farhenheit

Q.26) The methods of irrigation used in India can be broadly classified into major, medium and minor irrigation schemes. Irrigation projects having Culturable Command Area (CCA) of less than _____each are classified as minor projects.

[A] 1000 hectares

[B] 2000 hectares

[C] 5000 hectares

[D] 10,000 hectares

[E] 20,000 hectares

Q.27) Which of the following effect is observed with higher doses of nitrogen fertilizers application on pest infestation?

[A] Pest population is decreased

[B] Pest population is increased

[C] Pest population first increases then decreases

[D] Pest population first decreases then increases

[E] No effect associated

Q.28) Which of the following is/are the correct phase/phases of Watershed Management Programme?

[A] Restoration phase

[B] Recognition phase

[C] Protection phase

[D] Improvement phase

[E] All of the above

Q.29) All of the following are the popular varieties of coffee except

[A] Catuai

[B] Brutte

[C] Rairu 11

[D] Maragaturra

[E] Burley

Q.30) Which of the following country is the largest importer of Indian seafood in value and volume term both?

[A] China

[B] Japan

[C] Indonesia

[D] Brazil

[E] USA

Q.31) What is the share of marine products export to the total agricultural exports of the country?

[A] 12%

[B] 22%

[C] 17%

[D] 26%

[E] 9%

Q.32) Majority of the storage insect pests belongs to the order

[A] Diptera and Hemiptera

[B] Hemiptera and Thysanura

[C] Coleoptera and Lepidoptera

[D] Lepidoptera and Hymenoptera

[E] Hymenoptera and Coleoptera

Q.33) 'Ficin' is a biochemical constituent found in

[A] Apple

[B] Pineapple

[C] Papaya

[D] Finger lime

[E] Fig

Q.34) Suitable pH range for cultivation of chickpea is

[A] 4.0-5.5

[B] 5.0-6.0

[C] 6.0-7.5

[D] 7.0-8.5

[E] 5.0-6.5

Q.35) The Essential Commodities Act (ECA) is an act of the Parliament of India that was established to ensure the delivery of certain commodities or products, the supply of which, if obstructed due to hoarding or black marketing, would affect the normal life of the people. It was enacted in the year

[A] 1948

[B] 1955

[C] 1963

[D] 1978

[E] 1991

Q.36) Indian Institute of Sugarcane Research is located at

[A] Coimbatore

[B] Calcutta

[C] Chennai

[D] Lucknow

[E] Chandigarh

Q.37) Fire blight of apple is caused by *Erwinia amylovora* which is a

[A] Protozoa

[B] Nematode

[C] Fungus

[D] Bacteria

[E] Mycoplasma

Q.38) Downy mildew is an extremely serious fungal disease of grapes that can result in severe crop loss. It is caused by the fungus *Plasmopara viticola* introduced from

[A] Indonesia

[B] Europe

[C] Srilanka

[D] Netherland

[E] Australia

Q.39) Which of the following mechanism in plants promote cross pollination?

[A] Homogamy

[B] Cleistogamy

[C] Chasmogamy

[D] Bisexuality

[E] Dichogamy

Q.40) In how many phases does the seed certification process takes place?

[A] 3

[B] 4

[C] 6

[D] 8

[E] 9

Q.41) 'Elaichi' is a small-sized commercial variety of ..... used for desert purposes.

[A] Grapes

[B] Banana

[C] Papaya

[D] Sapota

[E] Mango

Q.42) *Mammillaria Camptotricha* also called *Dolichothele decipiens* is a globular cactus with long tubercles that have golden twisting soft spines nearly obscuring the body. It is commonly known as

[A] Rat's tail cactus

[B] Optunia

[C] Chin cactus

[D] Bird's nest cactus

[E] Old man's cactus

Q.43) Which of the following variety is a mutant variety of roses available in India?

[A] Priya

[B] Abhisarika

[C] Pusa christina

[D] Madhosh

[E] All of the above

Q.44) Which fruit crop leads in terms of the largest share in overall production across India?

[A] Mango

[B] Banana

[C] Papaya

[D] Apple

[E] Guava

Q.45) Based on the number of liquid handles, sprayers are classified into various parts. Low-volume sprayers are those which has a capacity of

[A] 400-500 liters/hectare

[B] 5-400 liters/hectare

[C] less than 5 liters/hectare

[D] less than 2 liters/hectare

[E] 500-1000 liters/hectare

Q.46) A method of drainage that is used in high water table areas, hilly areas, having open drain collection to common field outlet under the surface is

[A] Open channel

[B] Tile drainage

[C] Gravity outlet

[D] Mole drainage

[E] Sub surface drainage

Q.47) ..... mark is a certification mark mandatory on all processed fruit products sold in India such as packaged fruit beverages, fruit jams, squashes, pickles, dehydrated fruit products, and fruit extracts, following the Food Safety and Standards Act of 2006.

[A] BEE star rating

[B] ISO

[C] Hallmark

[D] Agmark

[E] FPO

Q.48) ..... process involves reducing the size of the fat globules (the cream that rises to the top of the glass or bottle) into minuscule portions that are dispersed evenly throughout the milk. It is usually achieved by pumping milk through small openings under very high pressure.

[A] Standardization

[B] Pasteurization

[C] Homogenization

[D] Fortification

[E] Adulteration

Q.49) To make India a global hub in terms of production and supply, the Government of India designated ..... as *"Shree Anna".*

[A] Cereals

[B] Pulses

[C] Fruits

[D] Millets

[E] Oilseeds

Q.50) The Minimum Support Price (MSP) for grade A paddy for the marketing season 2023-24 is

[A] Rs. 2183

[B] Rs. 2203

[C] Rs. 2500

[D] Rs. 3846

[E] Rs. 2560

Q.51) As per the Department of Animal Husbandry and Dairying, the largest milk-producing state in India is

[A] Uttar Pradesh

[B] Punjab

[C] Haryana

[D] Rajasthan

[E] Bihar

Q.52) According to DAHD, the per capita availability of eggs during 2021-22 was

[A] 95/annum

[B] 65/annum

[C] 75/annum

[D] 105/annum

[E] 85/annum

Q.53) Mineralization occurs when the C:N ratio is

[A] <20:1

[B] >200:1

[C] >30:1

[D] <300:1

[E] >300:1

Q.54) Less quantity of the commodity is supplied due to a fall in the price it is called as

[A] Market supply

[B] Extension of supply

[C] Contraction of supply

[D] Increase in supply

[E] None of the above

Q.55) The ratio of actual vapor pressure to the saturated pressure is ..... expressed as a percentage.

[A] Vapor Pressure Deficit

[B] Humidity

[C] Dew Point

[D] Relative Humidity

[E] Atmospheric pressure

Q.56) Planting trees for good looking of the surroundings is called

[A] Extension Forestry

[B] Xeriscaping

[C] Bio-aesthetic plantations

[D] Community forestry

[E] Afforestation

Q.57) Rate of decrease of diameter of the lobe per unit increase in height above the base of tree is called as

[A] Form factor

[B] Taper

[C] Stere

[D] Roundwood

[E] None of the above

Q.58) ICRAF stands International Centre for Research in Agro forestry. ICRAF is located at

[A] Japan

[B] USA

[C] Kenya

[D] New zealand

[E] Indonesia

Q.59) "Karnal Bunt" is a serious disease of

[A] Wheat

[B] Mustard

[C] Apple

[D] Sunflower

[E] Coconut

Q.60) Mascarpone is an ..... cheese from the Lombardy region, made by curdling milk cream with citric acid or acetic acid.

[A] hard, italian

[B] semi hard, american

[C] soft, italian

[D] semi soft, japanese

[E] semi hard, english

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Answers

Section 1

Q.1)D Q.2)A Q.3)D Q.4)D Q.5)E Q.6)A Q.7)B Q.8)D Q.9)C Q.10)B Q.11)A Q.12)D

Q.13)A Q.14)B Q.15)A Q.16)E Q.17)D Q.18)B Q.19)B Q.20)C Q.21)C Q.22)D Q.23)D

Q.24)D Q.25)C Q.26)B Q.27)B Q.28)E Q.29)E Q.30)E Q.31)C Q.32)C Q.33)E Q.34)C

Q.35)B Q.36)D Q.37)D Q.38)B Q.39)E Q.40)C Q.41)B Q.42)D Q.43)E Q.44)B Q.45)B

Q.46)B Q.47)E Q.48)C Q.49)D Q.50)B Q.51)D Q.52)A Q.53)A Q.54)C Q.55)D Q.56)C

Q.57)B Q.58)C Q.59)A Q.60)C

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Explanations

Section 1

Q.1) Explanation:

Multiple Choice Type Question: ** Explanation Not Available **

Q.2) Explanation:

A condition known as "milk fever" primarily affects dairy cows who are about to give birth.

It is a metabolic condition brought on by low levels of blood calcium (hypocalcaemia).

Q.3) Explanation:

Multiple Choice Type Question: ** Explanation Not Available **

Q.4) Explanation:

Multiple Choice Type Question: ** Explanation Not Available **

Q.5) Explanation:

Multiple Choice Type Question: ** Explanation Not Available **

Q.6) Explanation:

Multiple Choice Type Question: ** Explanation Not Available **

Sectional Test 45: Horticulture

Section 1

Q.1) Which of the following is not correct about the objectives of training in horticultural plants?

[A] Pruning is mainly concerned with giving a frame and shape to the plant but Training has an effect on the function of plant as it influences bearing or fruiting of plant.

[B] Training facilitates orchard cultural operations

[C] Training primarily allow lightening to reach the tree and expose maximum leaf surface to the Sun

[D] By training, we can secure balance distribution of fruit-bearing parts on the main limb of the plant

[E] All of the above

Q.2) Which of the following is correct about the process of pruning in horticultural plants?

[A] Pruning originated from the observation that the branches horizontally disposed of bear more fruit than the vertical ones which are sky-to-bearing likewise the upper branches bear more fruit than the lower ones.

[B] Pruning is mainly concerned with giving a frame and shape to the plant.

[C] Pruning primarily determines the general character and even details of a plant out line its branching and framework.

[D] By pruning, we keep the plant or vine in a manageable shape and can dispose of the branches in a desirable direction and position.

[E] None of the above

Q.3) The main branches arising from the head of trees are known as

[A] Scaffold branches

[B] Trunk

[C] Spur

[D] Sucker

[E] None of the above

Q.4) The angle made by scaffold limbs to the trunk or the secondary branch to the scaffold limb is called as

[A] Crotch

[B] Spur

[C] Cone

[D] Axis

[E] Crown

Q.5) Numerous shoot growth which are abundant over the fruit trees and upon which most of the fruit is borne is known as

[A] Sucker

[B] Trunk

[C] Scaffold branch

[D] Water shoots

[E] Spur

Q.6) In which of the following kind of training systems, the fruit trees are structurally very weak and limbs are more likely to break in case of strong winds?

[A] Central leader

[B] Open center

[C] Modified leader

[D] Both Central and modified leader

[E] None of the above

Q.7) The branches are well distributed allowing plenty of sunshine to reach the interior of the tree and trees are structurally strong and not prone to limb breakage in case of

[A] Central leader system

[B] Modified leader system

[C] Open centre system

[D] Both Open and Central leader system

[E] None of the above

Q.8) Which of the following system of training is suitable for vigorous varieties of grapes like Anab-e-shahi and Banglore Blue in which they are trained on mandap?

[A] Spindle bush system

[B] Bower system

[C] Kniffin system

[D] Open centre system

[E] None of the above

Q.9) Which of the following system of training is also called the Telephone system of training which is used to train moderately vigorous varieties of grapes like Thomson seedless?

[A] Modified leader system

[B] Spindle bush system

[C] Modified bower system

[D] Over head trellis

[E] Kniffin system

Q.10) Two trellis of wires are strung supported by vertical posts, the vine is trained so that it bears ..... canes one along each wire, and bear shoots can hang freely in case of Kniffin system of training.

[A] One

[B] Two

[C] Three

[D] Four

[E] Five

Q.11) Removal of the branches entirely from its base leaving no stubs is termed as

[A] Thinning out

[B] Heading back

[C] Disbudding

[D] Rubbing off

[E] Pinching

Q.12) Pruning or cutting the main stem or all or few of the branches leaving a basal portion is termed as

[A] Thinning out

[B] Heading back

[C] Disbudding

[D] Pinching

[E] Topping

Q.13) Heading back is a method of pruning often employed to prune

[A] Hedges

[B] Ornamental shrubs

[C] First dormant pruning of grapes

[D] October pruning of grapes

[E] All of the above

Q.14) Removal of the tip of the shoot alone with a view to stimulate mildly the lateral growth is called pinching. It is practiced to allow side branches to grow vigorously in case of

[A] Desi cotton

[B] Chrysanthemum

[C] Rose

[D] Carnation

[E] All of the above

Q.15) During the resting period the water supply to the plant is stopped for a few days and the roots are exposed to the sun by removing the surface soil around the trunk in case of

[A] Wintering

[B] Pinching

[C] Defoliation

[D] Topping

[E] Disbudding

Q.16) Which of the following type of horticultural practice is performed in order to regulate soil temperature, to conserve moisture, and to control weeds with the help of plastics, leaves and straw?

[A] Defoliation

[B] Pruning

[C] Mulching

[D] Training

[E] Fertigation

Q.17) Which of the following type of pruning practice is performed normally with the help of thumb and forefinger?

[A] Pinching

[B] Heading back

[C] Thinning out

[D] Summer pruning

[E] Top working

Q.18) In late winter a combination of thinning and heading back is practiced in case of

[A] Grapes

[B] Plum

[C] Mango

[D] Phalsa

[E] None of the above

Q.19) Which of the following intercultural practice is performed in horticultural plants with the objective to upgrade the seedling plantation of inferior varieties with superior commercial cultivars or hybrids suitable for domestic or export markets?

[A] Ringing

[B] Nipping

[C] Heading back

[D] Top working

[E] Notching

Q.20) Which of the following type of pruning ensures the reduction of nitrogen supply by stopping the food to the roots and hence the root growth stops, the result will be a wide C:N ratio, and then flowering is increased?

[A] Ringing

[B] Notching

[C] Top working

[D] Heading back

[E] None of the above

Q.21) Bahar treatment is followed in fruit trees species like

[A] Mosambi

[B] Guava

[C] Grape fruit

[D] Pomegranate

[E] All of the above

Q.22) The flowering season hasta bahar occurs in the month of

[A] June-July

[B] January-February

[C] October-November

[D] December- January

[E] None of the above

Q.23) The practice of smoking the tree by burning brushwood on the ground and allowing smoke to pass through the center of the crown of the tree to induce swelling of buds is termed as

[A] Smudging

[B] Notching

[C] Girdling

[D] Top working

[E] None of the above

Q.24) Fruit crops are trained at a 45-degree angle in case of an oblique cordon system of training. It is widely used for training

[A] Apple

[B] Pear

[C] Peach

[D] All of the above

[E] None of the above

Q.25) The principle of the espalier system of training is very much similar to the

[A] Kiniffin system of training in grapes

[B] Modified bower system

[C] Pandal system of training of ornamental creeper

[D] Vertical cordon system

[E] None of the above

Q.26) Which of the following is not an advantage of the "Open Centre System of training"?

[A] The trees are trained to allow maximum sunshine to reach their branches

[B] The better coloration of fruits on the inferior side

[C] Spraying, pruning, thinning and harvesting are easier

[D] Trees resist to damage from strong wind

[E] All of the above characteristics are the advantage of Open Centre System

---

Q.27) The vine is trained so that it bears cane one along each wire and bearing shoots can hang freely, also known as four cane system of training. Identify the type of training being mentioned.

[A] Telephone system

[B] Over head trellis

[C] Spindle bush system

[D] Oblique cordons

[E] Kiniffins system of training

Q.28) Which of the following are the characteristics of the modified bower system of training?

[A] After every two meters, space is kept to walk and carry out inter-cultural operations.

[B] T-trellis is used in this system of training

[C] It is also known as the telephone system of training

[D] It is followed for moderately vigorous varieties of grapes like Thompson seedless

[E] All of the above

Q.29) Removal of only the top 5-8 cm of new growth is done so as to obtain a uniform level of pruning surface in case of

[A] Nipping

[B] Rejuvenation pruning

[C] Hard pruning

[D] Medium pruning

[E] Skiffing

Q.30) The partial ringing of a branch below a dormant bud to increase the number of flowering shoots and to induce spurs from the bud is termed as

[A] Dehorning

[B] Notching

[C] Nicking

[D] Bending

[E] Root pruning

Sectional Test 45: Horticulture

Answers

Section 1

Q.1)A Q.2)E Q.3)A Q.4)A Q.5)E Q.6)B Q.7)B Q.8)B Q.9)C Q.10)D Q.11)A Q.12)B

Q.13)E Q.14)E Q.15)A Q.16)C Q.17)A Q.18)B Q.19)D Q.20)A Q.21)E Q.22)C Q.23)A

Q.24)D Q.25)A Q.26)D Q.27)E Q.28)E Q.29)E Q.30)C

Sectional Test 45: Horticulture

Explanations

Protected Cultivation

IBPS AFO I RRB SO I NABARD GRADE A

Indian IQ

Q.1) A structure covered with a transparent material in which various crops are grown under a system of farming known as

[A] Green House

[B] Vertical Farming

[C] Precision Farming

[D] Organic Agriculture

[E] None of the above

Q.2) Sawtooth and Quonset greenhouses are the types of greenhouses classified on the basis of

[A] Shape

[B] Utility

[C] Cost

[D] Covering material

[E] None of the above

Q.3) Silpaulin type sheet used as covering material of greenhouse is..... based.

[A] Glass

[B] Plane sheet FRP

[C] Corrugated sheet FRP

[D] Plastic film

[E] None of the above

Q.4) Manual exhaust fans and thermo-stat are mainly used to control temp and cooling pads/mist system to control humidity in

[A] Low-cost greenhouse

[B] Medium cost greenhouse

[C] High-cost greenhouse

[D] Fully automated green house

[E] None of the above

Q.5) ..... is the most economical material for constructing the greenhouse frame as it can be shaped as needed to form various structural components of the greenhouse and needs no maintenance after installation.

[A] Iron

[B] Bamboo

[C] Glass

[D] Aluminium

[E] Copper

Q.6) According to NABARD, which of the following covering materials of the greenhouse has the highest durability?

[A] Polyethylene

[B] PE

[C] Fiber glass

[D] Poly carbonate

[E] Double strength glass

Q.7) The average cost of construction per square foot of shade net house is approximately

[A] Rs. 100

[B] Rs. 250

[C] Rs. 400

[D] Rs. 600

[E] Rs. 900

Q.8) Which high-value crop among the following is suitable for a low-cost greenhouse/shade net?

[A] Chilly

[B] Capsicum

[C] Rose

[D] Orchid

[E] Mushroom

Q.9) Which high-value crop among the following is suitable for a medium-cost greenhouse/shade net?

[A] Chilly

[B] Export Roses

[C] Papaya

[D] Mushroom

[E] Orchid

Q.10) Which high-value crop among the following is suitable for a high-cost greenhouse/shade net?

[A] Carnation

[B] Mushroom

[C] Papaya

[D] Chilly

[E] Capsicum

Answers-
Q.1)A Q.2)A Q.3)D Q.4)B Q.5)D Q.6)E Q.7)B Q.8)A Q.9)B Q.10)B

Daily Practice Paper (DPP) For IBPS AFO Nurture Batch 2023

Topic- Soil Science

DPP No.- SOIL03

1. Which of the following is a correct statement?
   A. Minerals are always inorganic in nature
   B. Minerals are always organic in nature
   C. Minerals may be organic or inorganic in nature
   D. Minerals keep changing their form from organic to inorganic naturally
   E. None of the above
2. Pyrites are those minerals which contain
   A. Iron only
   B. Sulphur only
   C. Aluminium Only
   D. Iron and Sulphur
   E. None of the above
3. Which type of minerals will predominate in the soil largely and mainly depends on
   A. Parent Material
   B. Residual material
   C. Standard material
   D. Acessory material
   E. None of the above
4. Weathering is essentially a process of
   A. Disintegration
   B. Decomposition
   C. Denitrification
   D. Disintegration and Decomposition
   E. None of the above
5. “Soil solum” consists of horizons namely
   A. A, B and C
   B. O, A, B and C
   C. A and B
   D. B and C
   E. None of the above
6. In tropical climatic condition, the rate of weathering as compared to temperate is
   A. More
   B. Less
   C. Approximately equal
   D. Rate of weathering does not depend on climatic condition
   E. None of the above
7. The parent material transported by water and are deposited along the side of rivers is termed as

A. Alluvium
B. Lacustrine
C. Colluvium
D. Loess
E. All of the above

8. Generally the availability of micronutrient beneficial for crop growth is higher in case of
   A. Acidic soil
   B. Alkaline soil
   C. Neutral soil
   D. Saline soil
   E. All of the above
9. The organic matter content is generally higher than others in case of
   A. Subsoil of forest
   B. Subsoil of arid region
   C. Topsoil of forest
   D. Topsoil of arid region
   E. All of the above
10. During decomposition of plant materials, proteins are hydrolysed into
   A. Polypetides
   B. Quinines
   C. Humins
   D. Humic acids
   E. Glucose

Answer Key-

1. C

2. D

3. A

4. D

5. C

6. A

7. A

8. C

9. C

10. A

***

PROFIT AND LOSS

Profit and loss is the second pillar of math out of four (namely percentage, profit and loss, ratio and proportion and average). In pre-exams 2-3 Word problems are asked directly and in the DI section many times DI based on profit and loss are asked. (Like income expenditure DI sets)

If we talk about the mains exam the same pattern is followed in word problem section and in data interpretation section its importance becomes more as some direct DI sets are asked in examinations nowadays especially in PO mains exams. In short, we can say that this is a section you cannot leave for exams.

Profit and Loss terminologies

1. Cost Price (CP):

The price, at which an article is purchased, is called its cost price, usually denoted by C.P. In simple words we can say the money that goes out of the pocket of the seller is added to its cost price. (like the price paid by the seller to the wholesaler, transportation cost, labour charges and different types of miscellaneous charges) Sometimes it is denoted by expenditure.

2. Selling Price (SP):

The price, at which an article is sold, is called its selling prices, abbreviated as S.P. In short, we can say that the amount that comes in the pocket of the seller is added to its selling price. Sometimes it is denoted by income.

3. Marked Price:

When we purchase any item or article, we see that a price is marked on it and we pay the same or ask for some discount, this price marked on it is known as marked price. Sometimes it is denoted by labelled price or first price.

4. Profit or Gain:

If S.P. is greater than C.P., the seller is said to have a profit or gain. or we can say if the seller got somewhere more what he spends then it’s a case of profit.

5. Loss:

If S.P. is less than C.P., the seller is said to have incurred a loss. or we can say if the seller got somewhere less what he spends then its case of loss.

6. Profit percentage = Profit percentage is sometimes calculated on CP and sometimes SP. If profit percent is calculated on CP, then.

$$P\% = \frac{SP - CP}{CP} \times 100$$

If profit percent is calculated on SP, then.

$$P\% = \frac{SP-CP}{SP} \times 100 \text{ 7.}$$

7. Loss percentage = Loss percentage is sometimes calculated on CP and sometimes SP. If loss percent is calculated on CP, then,

$$P\% = \frac{CP - SP}{CP} \times 100\%$$

If loss percent is calculated on SP, then,

$$P\% = \frac{CP - SP}{SP} \times 100\%$$

Markup price=Usually sellers mark the price of any article more than its cost price this percentage is called markup price. a percentage is sometimes calculated on CP and sometimes SP.

$$\text{Markup price} = \frac{MP-CP}{CP} \times 100\%$$

Discount percentage=Usually sellers give any article at some lower price than what is written on it. This percentage decrease in price of an article is called discount.

Discount percent is always calculated on marked price.

$$D\% = \frac{MP - SP}{MP} \times 100$$

Note-Sometimes discount is given by the seller but not directly but in some conditional form like if you will buy 5 articles, I will give you 1 article absolutely free this is also a case of discount. How to calculate discount percent in these cases we will study ahead.

Equivalent discount percent = When two successive discounts are given then equivalent discount may be calculated easily by this formula.

Equivalent discount $= \mathrm{X} + \mathrm{Y} - \frac{XY}{100}$

Points to Remember

- CP + Profit=SP
- CP-Profit=SP
- SP+ Discount=M P
- If there is a PROFIT of $x\%$, the calculating figures would be 100 and $(100 + x)$.
- If there is a PROFIT of $x\%$, the calculating figures would be 100 and $(100 + x)$.
- Calculating figures be Cost Price and Selling Price respectively.

Now let's discuss some examples and then we will study some important formulae.

Q1. A shopkeeper fixes the marked price of an item 35% above its cost price. The percentage of discount allowed to gain 8% is?
(1) 18%
(2) 20%
(C) 22%
(4) 24%
(5) None of these

Answer: (2) 20%
Explanation:
Let the cost price = Rs.100/-
then, Marked price = Rs.135/-
Required gain = 8%,
So, Selling price = Rs.108/-
Discount $= 135 - 108 = 27$
Discount % $= \frac{27}{135} \times 100\%$
$= 20\%$

Q2. A person incurs a loss of 5% by selling a watch for Rs. 1140. At what price should the watch be sold to earn 5% profit?
(1) Rs. 1200
(2) Rs. 1230
(3) Rs.1260
(4) Rs. 1290
(5) None of these

Answer: (3) Rs.1260
Explanation:
Let $\mathrm{CP} = 100$
$\mathrm{SP} = 95$
New $\mathrm{SP} = 105$
Required answer $= \frac{1140}{95} \times 105 = 1260$

Q3. If the cost price of 12 bananas is equal to the selling price of 8 bananas, the gain percent is?
(1) 12%
(2) 50%
(3) 30%
(4) 60%
(5) None of these.

Answer: 2
Explanation:
We know we will need to gain an amount to get gain percent, right. So, let's get gain first.
Let the cost price of 1 banana is Rs 1
Cost of 8 bananas = Rs 8
Selling price of 8 bananas $= 12$
Gain $= 12 - 8 = 4$
Gain % $= \frac{4}{8} \times 100\% = 50\%$

Some Important Concept

1. If a person sells two similar articles, one at a gain of a% and another at a loss of a%, then the seller always has a loss which is given by $\text{Loss}\,\% = \left(\frac{a}{10}\right)^2$ don't afraid this formula came from successive concepts and you can easily calculate it.
2. If a'th part of some items is sold at $x\%$ loss, then required gain per cent in selling rest of the items in order that there is neither gain nor loss in whole transaction, is

$$\frac{ax}{(1-a)}\%$$

3. If cost price of 'a' articles is equal to the selling price of ' b ' articles, then profit percentage can be directly calculated by

$$\frac{(a-b)}{b} \times 100\%$$

4. If a dishonest trader professes to sell his items at CP but uses false weight, then Gain%= $\frac{E}{T} \times 100\%$
   Where $E =$ error
   T = true value

5. If ' a ' part of an article is sold at $x\%$ profit/loss, ' b ' part at $y\%$ profit/loss and c part at $z\%$ profit/loss and finally there is a profit/loss of Rs. R, then Cost price of entire article

$$= \frac{R}{ax+by+cz} \times 100$$

Some Formula:

1. If an article is sold at a profit/gain of 30%, then S.P. $= 130\%$ of the C.P.
2. If a article is sold at a loss of 20%, then S.P. $= 80\%$ of the C.P.
3. When there are two successive Profit of $x\%$ and $y\%$ then the resultant profit per cent is given by $X + Y + \frac{XY}{100}$
4. If there is a Profit of $x\%$ and loss of $y\%$ in a transaction, then the resultant profit or loss% is given by $X - Y - \frac{xy}{100}$

Note:

For profit use sign + in previous formula and for loss use - sign.

if resultant come + then there will be overall profit. if it comes - then there will be overall loss.

5. A man purchases a certain no. of articles at m a rupee and the same no. at n a rupee. He mixes them together and sold them at p a rupee then his gain or loss %

$$\left(\frac{2mn}{(m+n)} - 1\right) \times 100$$

Note $+=$ Profit,$-=$ Loss

6. If a seller marks his goods at $x\%$ above his cost price and allows purchasers a discount of $y\%$ for cash, then overall gain or loss

$$\text{X} - \text{Y} - \frac{xy}{100}$$

Profit or loss according to sign $+=$ Gain, $-=$ Loss.

Solved Examples

Type 1:

The cost price of 40 articles is the same as the selling price of 25 articles. Find the gain per cent.

(a) 65%

(b) 60%

(c) 15%

(d) 75%

Answer: (b)

Gain per cent $\frac{40-25}{25} \times 100 = 60\%$

Type 2:

Bananas are bought at the rate of 6 for Rs. 5 and sold at the rate of 5 for Rs. 6 . Profit per cent is

(a) 36%

(b) 42%

(c) 44%
(d) 48%
Answer: (c)

To avoid fraction, let the number of bananas bought LCM of 5 and $6 = 30$
CP of 30 bananas $= 5 \times 5 =$ Rs. 25
SP of 30 Bananas $= 6 \times 6$
$=$ Rs. 36
Profit $=$ Rs. $(36 - 25) =$ Rs. 11
Profit % $= \frac{11}{25} \times 100 = 44\%$

Type 3:

A man bought oranges at the rate of 8 for Rs 34 and sold them at the rate of 12 for Rs. 57. How many oranges should be sold to earn a net profit of Rs 45?
(a) 90
(b) 100
(c) 135
(d) 150
Answers: (a) 90

Let the man buy 24 (LCM of 8 and 12) oranges.
C.P. of 24 oranges $= \frac{34}{8} \times 24 = 102$
S.P. of 24 oranges $= \frac{27}{12} \times 24 = 114$
Gain $= 114 - 102 =$ Rs. 12
Rs. $12 = 24$ oranges Rs. $45 = \frac{24}{12} \times 45 = 90$ oranges

Type 4:

A shopkeeper earns a profit of 12% on selling a book at 10% discount on printed price. The ratio of the cost price to printed price of the book is?
(a) $45: 56$
(b) $50: 61$
(c) $90: 97$
(d) $99: 125$
Answer: (a) $45: 56$
C.P. of the book $=$ Rs. x

Printed price = Rs. Y

$$\frac{y \times 90}{100} = \frac{X \times 112}{100}$$

$$\frac{x}{y} = \frac{45}{56}$$

Type 5:

A dealer sold two types of goods for Rs 10,000 each. On one of them, he lost 20% and on the other he gained 20%. His gain or loss per cent in the entire transaction was

(a) 2% loss

(b) 2% gain

(c) 4% gain

(d) 4% loss

Answers: (d) 4%loss

Here, S.P. is the same, hence there is always a loss. Loss per cent $= \frac{20 \times 20}{100} \times = 4\%$

Type 6:

On selling an article for Rs170, a shopkeeper loses 15%. In order to gain 20%, he must sell that article at rupees:

(a) 215.50

(b) 212.50

(c) 240

(d) 210

Answer: (c) 240

C.P. of article $= \frac{170}{85} \times 120 = 240$

Type 7:

An article is sold at a loss of 10%. Had it been sold for Rs. 9 more, there would have been a gain of 12.5% on it. The cost price of the article is

(a) Rs. 40

(b) Rs. 45

(c) Rs. 50

(d) Rs. 35

Answers:(a) Rs. 40

	CP	SP
Before	100	90
After	100	112.5

Now difference of S.P 22.5% = 9
So required answer = 40

Type 8:

A sell a suitcase to B at 10% profit. B sells it to C at 30% profit. If C pays Rs 2860 for it, then the price at which a bought it is
(a) 1000
(b) 1600
(c) 2000
(d) 2500
Answer: (c) 2000

If the C.P. of the suitcase for A be Rs. x, then

$$X \times \frac{110}{100} \times \frac{130}{100} = 2860$$

x = Rs. 2000

MULTIPLE CHOICE QUESTION

Q 1. If the cost price of an article is Rs. 500 and it is sold at a profit of 20%, what is the selling price?
A. Rs. 600
B. Rs. 550
C. Rs. 480
D. Rs. 520
E. None of these

Answer: A. Rs. 600
Solution:
Profit% = (Profit/Cost Price) x 100%
20% = (Profit/500) x 100%
Profit = 100

Selling price = Cost price + Profit
Selling price = 500 + 100 = Rs. 600

Q 2. If the selling price of an article is Rs. 720 and the profit percentage is 20%, what is the cost price?
A. Rs. 600
B. Rs. 600
C. Rs. 600
D. Rs. 600
E. None of these

Answer: A. Rs. 600
Solution:
Profit% = (Profit/Cost Price) x 100%
20% = (Profit/Cost Price) x 100%
Profit = (20/100) x Cost Price
Profit = 0.2 x Cost Price
Selling price = Cost price + Profit
720 = Cost price + 0.2 x Cost price
720 = 1.2 x Cost price
Cost price = 720/1.2
Cost price = Rs. 600

Q 3. A shopkeeper sold an article at a loss of 20%. If the selling price was Rs. 400, what was the cost price?
A. Rs. 500
B. Rs. 480
C. Rs. 450
D. Rs. 420
E. None of these

Answer: A. Rs. 500
Solution:
Loss% = (Loss/Cost Price) x 100%
20% = (Loss/Cost Price) x 100%
Loss = 0.2 x Cost Price

Selling price = Cost price - Loss
400 = Cost price - 0.2 x Cost Price
400 = 0.8 x Cost Price
Cost Price = 400/0.8
Cost Price = Rs. 500

Q 4. A trader marks his goods at 30% above the cost price but allows a discount of 20% on the market price. What is his profit percentage?
A. 4%
B. 6%
C. 8%
D.10%
E. None of these

Answer: A. 4%
Solution:
Let the cost price be Rs. 100.
Marked price = Cost price + 30% of cost price
Marked price = 100 + 30 = Rs. 130
Discount = 20% of marked price
Discount = 20% of 130 = Rs. 26
Selling price = Marked price - Discount
Selling price = 130 - 26 = Rs. 104
Profit = Selling price - Cost price
Profit = 104 - 100 = Rs. 4
Profit% = (Profit/Cost Price) x 100%
Profit% = (4/100) x 100%
Profit% = 4%

Q 5. A manufacturer sells a product to a dealer at a profit of 20%. The dealer sells it to a customer at a profit of 25%. If the customer pays Rs. 300 for the product, what was the cost price for the manufacturer?
A. Rs. 200
B. Rs. 210
C. Rs. 220
D. Rs. 225

E. None of these

Answer: A. Rs. 200
Solution:
The manufacturer sells the product to the dealer at a profit of 20%. This means that the selling price for the dealer is:
Selling price for the dealer = Cost price + 20% of cost price
Selling price for the dealer = x + 0.2x = 1.2x
The dealer sells the same product to the customer at a profit of 25%. This means that the selling price for the customer is:
Selling price for the customer = Selling price for the dealer + 25% of selling price for the dealer
Selling price for the customer = 1.2x + 0.25(1.2x) = 1.5x
We know that the customer pays Rs. 300 for the product. Therefore, we can write:
1.5x = 300
Solving for x, we get:
x = 200

Q 6. A vendor bought some oranges at Rs. 10 per dozen. He sold them at the rate of 10 oranges for Rs. 8. What was his profit or loss percentage?
A. 20% profit
B. 20% loss
C. 25% profit
D. 25% loss
E. None of these

Answer: A. 20% profit
Solution:
Cost price of 1 orange = 10/12 = 5/6
Selling price of 1 orange = 8/10 = 4/5
Profit% = [(Selling price - Cost price) / Cost price] x 100%
Profit% = [(4/5 - 5/6) / (5/6)] x 100%
Profit% = 20%

Q 7. A watch is bought for Rs. 200 and sold at a profit of 10%. What is the selling price of the watch?

A. Rs. 220
B. Rs. 210
C. Rs. 202
D. Rs. 198

Answer: A. Rs. 220
Solution:
Profit% = (Profit / Cost price) x 100%
10% = (Profit / 200) x 100%
Profit = Rs. 20
Selling price = Cost price + Profit
Selling price = 200 + 20 = Rs. 220

Q 8. A trader sells two tables at Rs. 500 each. On one table he gains 20% and on the other table, he loses 20%. What is his overall profit or loss percentage?
A. 4% loss
B. 4% profit
C. No profit no loss
D. 2% loss
E. None of these

Answer: C. No profit no loss
Solution:
Profit on 1st table = 20% of 500 = Rs. 100
Loss on 2nd table = 20% of 500 = Rs. 100
Total cost price = 500 + 500 = Rs. 1000
Total selling price = 500 + 500 = Rs. 1000
Total profit or loss percentage = [(Selling price - Cost price) / Cost price] x 100%
Total profit or loss percentage = [(1000 - 1000) / 1000] x 100%
Total profit or loss percentage = 0%

Q 9. A dealer sold a book at a loss of 10%. If the selling price of the book is Rs. 450, what is its cost price?
A. Rs. 500
B. Rs. 495
C. Rs. 440

D. Rs. 400
E. None of these

Answer: A. Rs. 500
Solution:
Loss% = (Loss / Cost price) x 100%
10% = (Loss / Cost price) x 100%
Loss = 0.1 x Cost price
Selling price = Cost price - Loss
450 = Cost price - 0.1 x Cost price
450 = 0.9 x Cost price
Cost price = 450/0.9
Cost price = Rs. 500

Q 10. A shopkeeper earns a profit of 12% on selling a book at 10% discount on the printed price. The ratio of the cost price and the printed price of the book is:
A. $45:56$
B. $45:51$
C. $47:56$
D. $47:51$
E. None of these

Answer: A. $45:56$
Solution:
Let the CP be 100
Hence,
SP $= 100 + 12\%$ of 100
$= 112$
If the marked price be X, then
90% of $X = 112$
$\Rightarrow x = \frac{112 \times 100}{90}$
$\Rightarrow x =$ Rs. $\frac{1120}{9}$
Hence,
Required ratio
$= 100: \frac{1120}{9}$
$= 900: 1120$
$= 45: 56$

Q 11. By selling a bicycle for Rs. 2,850, a shopkeeper gains 14%. If the profit is reduced to 8%, then the selling price will be:
A. Rs. 2600
B. Rs. 2700
C. Rs. 2800
D. Rs. 3000
E. None of these

Answer: B. Rs. 2700
Solution:
Let Cost Price was X.
$X + 14\%$ of $X = 2850$
$X + \frac{14X}{100} = 2850$
$X + 0.14X = 2850$
$1.14X = 2850$
$X = 2500.$
So, cost Price = Rs. 2500
Now, Selling Price When profit remains at 8%,
$= 2500 + 8\%$ of 2500
= Rs. 2700
Short-Cut
CP of bicycle $= \frac{100}{114} \times 2850 =$ Rs. 2500
SP for a profit of $8\% = \frac{108}{100} \times 2500 =$ Rs. 2700

Q 12. A sells an article to B at a profit of 10% B sells the article back to A at a loss of 10%. In this transaction:
A. A neither losses nor gain
B. A makes a profit of 11%
C. A makes a profit of 20%
D. B loses 20%
E. None of these

Answer: B. A makes a profit of 11%
Solution:
First Method
Let CP was 100 for A originally
A sells article to B at 10% profit,
CP for $B = 100 + 10\%$ of $100 = 110$

Now, B sells it A again with loss 10%
Now, CP for A this time $= 110 - 10\%$ of $110 = 99$
A makes Profit $= 110 - 99 = 11$
% profit for $A = \frac{11 \times 100}{100} = 11\%$

Second Method

It could be easily shown by net percentage change graphic.
$100(A) = 10\%$(Profit) $\Rightarrow 110(B) == 10\%$(Loss) $\Rightarrow 99(A)$
In this transaction A makes a profit of $(110 - 99 = 11\%)11\%$
[10% on selling to B and 1% profit on buying back from B]

Q 13. A person sold a horse at a gain of 15%. Had he bought it for 25% less and sold it for Rs. 600 less, he would have made a profit of 32%. The cost price of the horse was:
A. Rs. 3,750
B. Rs. 3,250
C. Rs. 2,750
D. Rs. 2,250
E. None of these

Answer: A. Rs. 3,750
Solution:
Let the original CP = Rs. X
Hence, SP $= X + 15\%$ of X
$= \frac{115X}{100}$
$=$ Rs. $\frac{23x}{20}$
New CP $= x - 25\%$ of X
$= \frac{75x}{100} = \frac{3x}{4}$
New $SP = \frac{3x}{4} + 32\%$ of $\frac{3x}{4}$
$= Rs.\frac{99x}{100}$
According to the question,
$\frac{23x}{20} - \frac{99x}{100} = 600$
Or, $\frac{115x - 99x}{100} = 600$
$16x = 600 \times 100$
$X = 600 \times \frac{100}{16}$

$=$ Rs. 3750

Q 14. If a man were to sell his chair for Rs. 720, he would lose 25%. To gain 25% he should sell it for:
A. Rs. 1,200
B. Rs. 1,000
C. Rs. 960
D. Rs. 900
E. None of these

Answer: A. Rs. 1,200
Solution:
Let the Cost price of the Chair is X.
SP $=$ X $-$ 25% of X
$720 = 0.75X$
$X = 960$
CP $=$ Rs. 960
So, To gain 25%, SP would be
$= 960 + 25\%$ of $960 =$ Rs. 1200
Short-cut
CP of chair $= \frac{100}{75} \times 720 =$ Rs. 960
To gain 25%, SP $= \frac{125}{100} \times 960 =$ Rs. 1200

Q 15. A shopkeeper marks his goods 30% above his cost price but allows a discount of 10% at the time of sale. His gain is:
A. 21%
B. 20%
C. 18%
D. 17%
E. None of these

Answer: D. 17%
Solution:
Let the cost price be Rs. 100
then the mark up price which is 30% above the cost price,
Mark price $= (100 + 30\%$ of $100) =$ Rs. 130
Shopkeeper gives a discount of 10% on mark up price, then the
Selling Price $= (130 - 10\%$ of $130) =$ Rs. 117
Gain $= 117 - 100 =$ Rs. 17

$\%\ \text{gain} = \frac{17\times100}{100} = 17\%$

Short Cut method:

$100(\text{CP}) == 30\% \uparrow$

$\Rightarrow 130(\text{MP}) = 10\% \downarrow \Rightarrow 117(\text{SP})$

Gain $= 17\%$

Q 16. If the profit per cent got on selling an article is numerically equal to its cos price in rupees and the selling price is Rs. 39, then cost price (in Rs.) will be:

A. 20
B. 22
C. 28
D. 30
E. None of these

Answer: D. 30
Solution:

$\text{SP} =$ Rs. 39
$\text{CP} = \text{x(let)}$

Profit $\% = CP$

$$\text{or, } \frac{39-x}{x}\times 100 = x \left[\%\ \text{profit } = \frac{\text{SP } - \text{ CP}}{\text{CP}}\right]$$

$3900 - 100x = x^2$
$x^2 + 100 - 3900 = 0$

$x = 30$ (We cannot take negative value of x)

Q 17. An article is listed at Rs. 920. A customer pays Rs. 742.90 for it after getting two successive discounts. If the rate of first discount is 15%, the rate of 2nd discount is:

A. 3%
B. 5%
C. 8%
D. 12%
E. None of these

Answer: B. 5%
Solution:

$\text{MP} = 920$
After first discount Marked Price (MP) become,
$= 920 - 15\%\ \text{of}\ 920 = 782$

The Selling Price (SP) $= 742.90$
Let second discount was x% on 782.

$782 -$ x% of $782 = 742.90$

$\frac{782x}{100} = 39.1$

$782\text{x} = 3910$

$\text{x} = 5\%$

Second Discount $= 5\%$

Short-Cut Method:

$920 = 15\%(1^{\text{st}}\text{ discount}) = 782 = x\% \downarrow (2^{\text{nd}}\text{ discount}) \Rightarrow 742.90$

Then,

$$x\% = \frac{(782 - 742.90) \times 100}{742.90}$$

$$= \frac{39.1 \times 100}{742.90}$$

$$= 5\%$$

Q 18. A bicycle marked at Rs. 2,000, is sold with two successive discount of 20% and 10%.An additional discount of 5% is offered for cash payment. The selling price of the bicycle at cash payment is:
A. Rs. 1,368
B. Rs. 1,468
C. Rs. 1,568
D. Rs. 1,668
E. None of these

Answer: A. Rs. 1,368
Solution:
Marked Price $= 2000$
SP after first Discount of $20\% = 2000 - 20\%$ of $2000 = 1600$
SP after second Discount of $10\% = 1600 - 10\%$ of $1600 = 1440$
Now, the final selling price at cash $= 1440 - 5\%$ of $1440 =$ Rs. 1368
Shortcut by using Graphic Change
$2000(\text{MP}) == 20\%$ (disc.) $\Rightarrow 1600 == 10\%$ (disc.) $\Rightarrow 1440 =$
$= 5\%$ (disc.) $\Rightarrow 1368$ (SP)

Q 19. The marked price of shirt and trousers are in the ratio 1: 2. The shopkeeper gives 40% discount on the shirt. If the total discount in the set of the shirt and trousers is 30%, the discount offered on the trousers is:
A. 15%
B. 20%
C. 25%
D. 30%
E. None of these

Answer: C. 25%
Solution:
Let the price of shirt and trouser be Rs. 100 and Rs. 200 respectively.
Then, price of set of shirts and trouser = Rs. 300.
After giving 30% discount on the set,
Selling Price $= 300 - 30\%$ of $300 = 210$.
Total Discount on Set $= 90$.
And Discount on shirt is 20% alone,
SP of shirt alone $= 100 - 40\%$ of $100 = 60$.
Rs. 40 is the discount on shirt then Rs. 50 must be the discount on the trouser.
So, discount on trouser $= \frac{50 \times 100}{200} = 25\%$.

Q 20. A dealer buys an article marked at Rs. 25,000 with 20% and 5% off. He spends Rs. 1,000 for its repairs and sells it for Rs. 25,000. What is his gain or loss per cent?
A. loss of 25%
B. gain of 25%
C. gain 10%
D. loss of 10%
E. None of these

Answer: Option B
Solution:
Marked Price $= 25000$.
After first discount it become, $= 25000 - 20\%$ of $25000 = 20000$.
After second discount, it becomes $= 20000 - 5\%$ of $20000 = 19000$.
So, SP $= 19000$.
CP for the man who bought it, as he spends 1000 on repair.
$= 19000 + 1000 = 20000$

$$\text{Profit} = 25000 - 20000 = 5000.$$

$$\%\ \text{Profit} = \frac{5000 \times 100}{20000} = 25\%$$

Short-Cut Method:

$25000(\text{MP}) = 20\%\ (\text{Disc.}) \Rightarrow 20000 == 5\%\ (\text{disc.}) \Rightarrow 19000(\text{CP})$

Spends on repair = Rs. 1000
Then, CP becomes $= 19000 + 1000 = 20000$
Profit $= 5000$
% profit $= \frac{5000 \times 100}{20000} = 25\%$

Q 21. A trader sells his goods at a discount 20%. He still makes a profit of 25%. If he sells the goods at the marked price only, his profit will be:
A. 56.25%
B. 25.56%
C. 50.25%
D. 54.25%
E. 51.25%

Answer: A. 56.25%
Solution:
Let the marked price $=$ Rs. 100
Then, $SP = 100 - 20\%$ of $100 =$ Rs. 80
Profit $= 25\%$
Let HisCP $= X$
SP $= 80$
$X + 25\%$ of $X = 80$
Hence, $X =$ Rs. $\frac{100 \times 80}{125} =$ Rs. 64
CP $=$ Rs. 64
Profit after selling on marked price $= 100 - 64 =$ Rs. 36
% gain $= \frac{36 \times 100}{64} = 56.25\%$

Q 22. A merchant has announced 25% rebate on prices of ready-made garments at the time of sale. If a purchaser needs to have a rebate of Rs. 400 , then how many shirts, each costing Rs. 320, should he purchase?
A. 10
B. 7
C. 6
D. 5
E. None of these

Answer: D. 5
Solution:
Discount on one shirt,

$= 25\%$ of $320 = \frac{320 \times 25}{100} =$ Rs. 80

Hence, number of shirt he must buy to get a rebate of Rs. $400 = \frac{400}{80} = 5$

Q 23. A sells an article to B at gain of 25% sells it to C at a gain of 20% and C sells it to D at a gain 10%. If D pays Rs. 330 for it, how much did it cost to A?

A. Rs. 200
B. Rs. 250
C. Rs. 275
D. Rs. 290
E. Rs. 500

Answer: Option A

Solution:

First Method

Let Cost Price for A was 100

Then CP for $B = 100 + 25\%$ of $100 = 125$

CP for $C = 125 + 20\%$ of $125 = 150$

CP for $D = 150 + 10\%$ of $150 = 165$

But, D pay Rs. 330 , Then it must be equal to

$165 = 330$

$1 = \frac{330}{165}$

$100 = \frac{330 \times 100}{165} = 200$

Thus, CP for A $=$ Rs. 200

Short-cut

A's $CP = 330 \times \frac{100}{125} \times \frac{100}{120} \times \frac{100}{110} =$ Rs. 200

Q 24. I sold two watches for Rs. 300 each, one at loss of 20% and other at the profit of 20%. What is the percentage of loss $(-)$ or profit $(+)$ that resulted from the transaction?

A. $(+)4$
B. $(-)1$
C. $(+)1$
D. $(-)4$
E. None of these

Answer: D. $(-)4$

Solution:

In such cases, always loss occurs. It can be calculated by this formula, $= \frac{(\text{ loss or gain percentage })^2}{100} = 4$

That is 4% of loss
Graphic Change method

$$100 = 20\%(\text{ loss }) \Rightarrow 120 = 20\%(\text{ gain }) \Rightarrow 96$$

$$\%\ \text{Loss } = 4\%$$

Q 25. A shopkeeper wishes to give 5% commission on the marked price of an article but also wants to earn a profit of 10%. If his cost price is Rs. 95, then marked price is:
A. Rs. 100
B. Rs. 110
C. Rs. 120
D. Rs. 130
E. Rs. 600

Answer: B. Rs. 110
Solution:
CP = Rs. 95.
Then SP = 95 + 10% of 95 = Rs. 104.5
Let MP = X. He gives 5% commission on MP.
So,

$$\text{SP} = \text{X} - 5\%\ \text{of X}$$

$$\text{SP} = 0.95\text{X}$$

$$104.5 = 0.95\text{X}$$

$$\text{X} = \frac{104.5}{0.95} = 100$$

Thus, MP = Rs. 110
Short-cut

$$95 = 10\%(\text{ gain }) \Rightarrow 104.5 = 5\%(\text{ Commission }) \Rightarrow 109.72(= 110)$$

Q 26. Two successive discounts of 10% and 20% are equivalent to a single discount of:
A. 30%
B. 28%
C. 26%
D. 25%
E. 30%

Answer: B. 28%
Solution:
Use Formula,
Equivalent Discount $= (\text{A} + \text{B}) - \frac{\text{AB}}{100}$ where A = First Discount, B = Second Discount.
Equivalent Discount $= (20 + 10) - \frac{20\times10}{100}$
Equivalent Discount $= 30 - 2 = 28\%$

Graphic Change Method

$$100 == 20\% \text{ (disc.)} \Rightarrow 80 == 10\% \text{ (disc.)} \Rightarrow 72$$

Equivalent discount $= 28\%$

Q 27. A dealer allows his customer a discount of 25% and still gains 25%. If cost price of a radio is Rs. 1440, its marked price is:

A. Rs. 2500
B. Rs. 2440
C. Rs. 2400
D. Rs. 2020
E. None of these

Answer: C. Rs. 2400
Solution:

Let $\text{MP} = \text{X}$
$\text{CP} = 1440$
$\text{SP} = 1440 + 25\% \text{ of } 1440 = \text{Rs. } 1800$
$\text{SP} = \text{MP} - 25\% \text{ of MP}$
$\text{SP} = \text{X} - 25\% \text{ of } 100$
$\text{SP} = \text{X} - 0.25\text{X}$
$1800 = 0.75\text{X}$
$X = 2400$
MP = Rs. 2400

Short-Cut

Let the marked price $=$ Rs. x
Hence,

$$\frac{75 \times \text{x}}{100} = 1440 \times \frac{125}{100}$$

$$\Rightarrow \frac{1440 \times 125}{75} = \text{Rs. } 2400$$

Q 28. The selling price of an article after giving two successive discounts of 10% and 5% on the marked price is Rs. 171. What is the marked price?

A. Rs. 200
B. Rs. 220
C. Rs. 240
D. Rs. 250
E. Rs. 600

Answer: A. Rs. 200
Solution:

Equivalent Discount,

$= (A + B) - \frac{AB}{100}$

$= (10 + 5) - \frac{10 \times 5}{100}$

$= 14.5\%$

Let MP $= X$

Now,

$X - 14.5\%$ of $X = 171$ (Selling Price)

$0.855X = 171$

$X = 200$

Hence, MP = Rs. 200

Going through options,

$200(\text{MP}) == 10\%$ (disc.) $\Rightarrow 180 == 5\%$ (disc.) $\Rightarrow 171(\text{CP})$

Q 29. A man purchased some fruits for Rs. 1000. He sold few fruits worth 400 at 10% profit. At what profit per cent, must he sell the rest in order to gain 20% on the whole?

A. $26\frac{2}{3}\%$

B. 25%

C. 30%

D. $33\frac{1}{3}\%$

E. None of these

Answer: A. $26\frac{2}{3}\%$

Solution:

To get 20% profit on whole,

$1000(\text{CP}) \Rightarrow 20\%$ (gain) $\Rightarrow 1200(\text{SP})$

Total Profit $= 1200 - 1000 =$ Rs. 200

$400 \Rightarrow 10\%$ (gain $\Rightarrow 440$

He gets Rs. 40 profit on 400

Rest Profit $= 200 - 40 = 160$

Then he must get Rs. 160 as profit on Rs. 600

Hence, % profit

$= \frac{160 \times 100}{600}$

$= \frac{80}{3}$

$= 26\frac{2}{3}\%$

Q 30. A dealer offers a cash discount of 20% and still makes a profit of 20%, when he further allows 16 articles to a dozen to a particularly sticky bargainer. How much percent above the cost price were his wares listed?
A. 100%
B. 80%
C. 75%
D. $66\frac{2}{3}\%$
E. None of these

Answer: A. 100%
Solution:
Let the CP of the article be Rs. x, since he earns a profit of 20%, hence SP = X + 20% of $X = 1.2$x
It is given that he incurs loss by selling 16 articles at the cost of 12 articles [loss = $\frac{16-12}{16} = 25\%$]
His selling price = SP − 25% of SP = SP × 0.75
Hence, SP × 0.75 = 1.2X
Or, SP = $\frac{1.2\times x}{0.75} = 1.6$X
This SP is arrived after giving a discount of 20% on MP.
Let $MP = Y$
$Y - 20\%$ of $Y = SP$
0.80Y = 1.6X
Y = 2X
It means that the article has been marked 100% above the cost price. Or Marked Price was twice of cost price.

Q 31. A man buys a chair and table for Rs. 6000. He sells the chair at a loss of 10% and the table at gain of 10%. He still gains Rs. 100 on the whole. Cost price of chair is:
A. Rs. 2500
B. Rs. 2850
C. Rs. 3050
D. Rs. 3500
E. Rs. 3000

Answer: A. Rs. 2500
Solution:
If the CP of the chair be Rs. x then,
Total SP = $\frac{x\times 90}{100} + \left((6000 - x) \times \frac{110}{100}\right)$

Or, $9x + 66000 - 11x = 61000$
Or, $2x = 66000 - 61000 = 5000$
Or, $x =$ Rs. 2500

Q 32. By selling a bicycle for Rs. 2,850 , a shopkeeper gains 14%. If the profit is reduced to 8%, then the selling price will be:
A. Rs. 2600
B. Rs. 2700
C. Rs. 2800
D. Rs. 3000
E. Rs. 3100
Answer: B. Rs. 2700
Solution:
CP of bicycle $= 100 \times \frac{2850}{114} =$ Rs. 2500
SP for the profit of $8\% = 108 \times \frac{2500}{100} =$ Rs. 2700

Q 33. By selling an article, a man makes a profit of 25% of its selling price. His profit percent is:
A. 20%
B. 25%
C. $16\frac{2}{3}\%$
D. $33\frac{1}{3}\%$
E. None of these

Answer: D. $33\frac{1}{3}\%$
Solution:
He gets 25% profit on the selling price.
Let $SP = x$; then

$$CP = x - \frac{x}{4}$$

$$= \text{ Rs. } \frac{3x}{4}$$

Hence,

$$\% \text{ gain} = \frac{\frac{x}{4}}{\frac{3x}{4}} \times 100$$
$$= \frac{100}{3}$$
$$= 33\frac{1}{3}$$

Q 34. Two successive price increase of 10% and 10% of an article are equivalent to a single price increase of:

A. $26\frac{2}{3}$
B. 25%
C. 21%
D. $33\frac{1}{3}$
E. None of these

Answer: C. 21%
Solution:
$100 - -10\% \uparrow\rightarrow 110 - -10\% \uparrow\rightarrow 121$
Equivalent price increase $= 21\%$

Q 35. A stockiest wants to make some profit by selling sugar. He contemplates about various methods. Which of the following would maximize his profit?
I. Sell sugar at 10% profit.
II. Use 900 g of weight instead of 1 kg.
III. Mix 10% impurities in sugar and selling sugar at cost price.
IV. Increase the price by 5% and reduced weights by 5%.
A. I or II
B. II
C. II, III and IV
D. Profits are same
E. None of these

Answer: B. II
Solution:
Let the CP of 1 kg of sugar be Rs. 100 .
Then, CP of 900 g sugar $= \frac{100\times900}{1000} =$ Rs. 90
Hence, profit % $= \frac{100-90}{90} \times 100 = 11.11\%$

If he add 10% impurity then his CP for 1 kg $= \frac{100\times1000}{1100} =$ Rs. 90.9

And % profit $= \frac{100-90.9}{90.9} \times 100 = 10.01\%$

Q 36. A rickshaw dealer buys 30 rickshaws for Rs. 4725. Of these, 8 are four seaters and the rest are two seaters. At what price must he sell the four seaters so that if he sells the two-two seaters at $\frac{3}{4}$ th of this price, he makes a profit 40% on his outlay?

A. Rs. 180
B. Rs. 279
C. Rs. 360
D. Rs. 450
E. None of these

Answer: B. Rs. 279
Solution:
On an investment of Rs. 4725, a profit of 40% means a profit of 1890.
Hence, the targeted sales realization is Rs. 6615.
The required equation:

$$8p + 22 \times \frac{3p}{4} = 6615$$

Or, $8p + \frac{33p}{2} = 6615$

In the expression for LHS $=$ RHS; we need $\frac{33p}{4}$ to be odd number.
This can only happen when p is not a multiple of 4.
Hence, option a and c gets eliminated automatically.
Now, we check for option B which is correct.

Q 37. A driver of auto rickshaw makes a profit of 20% on every trip when he carries 3 passengers, and the price of petrol is Rs. 30 a litre. Find the % profit for the same journey if he goes for 4 passengers per trip and the price of petrol reduces to Rs. 24 litres? (revenue per passenger is same)

A. 20%
B. 33.33%
C. 100%
D. 65.66%
E. Data inadequate

Answer: C. 100%
Solution:
Assume the cost price $= 100$ and selling price $= 120$
Then, when price of petrol is reduced

Cost price become 60 and selling price $= 160$
Profit increased $= 100\%$

Q 38. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. He also uses a 900-gram weight instead of a 1 kilogram weight. Find his percentage profit due to these maneuvers?
A. 8%
B. 12%
C. 20%
D. 16%
E. None of these

Answer: C. 20%
Solution:
He sells only 900 grams when he takes the money for 1 kg.
and he sells at a 8% profit (20% markup, 10% discount)
Hence, his selling price is Rs. 108 for 900 grams
$\%$ profit $= \frac{18}{90} \times 100 = 20\%$

Q 39. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. He also uses a 900-gram weight instead of a 1 kilogram weight. Find his percentage profit due to these maneuvers?
A. 20%
B. 11%
C. 14%
D. 18%
E. None of these

Answer: Option A
Solution:
Let $CP =$ Rs. 1 per gram
Then SP of 1000gram is $1000 + 20\%$ of $1000 =$ Rs. 1200
Now Dealer gives 10% discount $= 1200 - 10\%$ of $1200 =$ Rs. 1080
Then, Dealer is dishonest and sells 900 g is 1080
And, CP of 900 grams is 900
Profit $= 1080 - 900 = 180$
$\therefore \%$ profit $= \frac{180 \times 100}{900} = 20\%$

Q 40. The cost of setting up the type of a magazine is Rs. 1000 . The cost of running the printing machine is Rs. 120 per 100 copies. The cost of paper, ink and so on is 60 paise

per copy. The magazines are sold at Rs. 2.75 each. 900 copies are printed, but only 784 copies are sold. What is the sum to be obtained from advertisements to give profit of 10% on the cost?
A. Rs. 730
B. Rs. 720
C. Rs. 726
D. Rs. 736
E. Rs. 750

Answer: C. Rs. 726
Solution:
Total cost = type + Printing + paper, ink

$= 1000 + 120 \times 9 + 540 = 2620$

Net sum to be recovered = Rs. 2882
Total magazine sold 784 for $= 784 \times 2.75 = 2156$
Sum obtained from advertisement $= 2882 - 2156 =$ Rs. 726

Q 41. A tradesman fixed his selling price of goods at 30% above the cost price. He sells half the stock at this price, one-quarter of his stock at discount of 15% on the original selling price and rest at a discount of 30% on the original selling price. Find the gain percentage altogether?
A. 14.875%
B. 15.375%
C. 15.575%
D. 16.375%
E. 16.5%

Answer: . 15.375%
Solution:
Let $CP = 100$; then marked price $= 130$;
Now, revenue

$$= \frac{1}{2} \times 130 + \frac{1}{4} \times 0.85 \times 130 + \frac{1}{4} \times 0.7 \times 130$$
$$= 65 + 27.65 + 22.5$$
$$= 115.4$$
$$\% \text{ profit } = \frac{15.4 \times 100}{100}$$
$$= 15.4\%$$

$$= \frac{1}{2} \times 130 + \frac{1}{4} \times 0.85 \times 130 + \frac{1}{4} \times 0.7 \times 130$$
$$= 65 + 27.65 + 22.5$$
$$= 115.4$$
$$\%\text{profit} = \frac{15.4 \times 100}{100}$$
$$= 15.4\%$$

Q 42. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. Besides, he also cheats both his supplier and his buyer by 100 grams while buying or selling 1 kilogram. Find the percentage profit earned by the shopkeeper?
A. 20%
B. 25%
C. 32%
D. 46.66%
E. 50%

Answer: C. 32%
Solution:
While buying,
He buys 1100 gram instead of 1000 gram.
Suppose he bought 1100 grams for Rs. 1000.
While selling,
He sells only 900 grams when he takes the money for 1 kg.
Now, according to the problem,
he sells at a 8% profit (20% markup, 10% discount).
Hence, his selling price is Rs. 1080 for 900 grams.
Now,
1100 grams for Rs. 1000
Hence, 1188 grams for Rs. 1080
Selling: 900 grams for Rs. 1080
Hence, % profit $= \frac{288}{900} \times 100 = 32\%$
(using goods left by goods sold formula).

Q 43. Ajay bought a motor cycle for Rs. 50,000.2 years later he sold it to Vijay at 10% less of the cost price. Vijay spend 5% of the purchasing price on its maintenance. Later Vijay displayed the sale price of his motorcycle Rs. 50,000. Chetan wanted to purchase it at 15% discount but Vijay gave him two successive discounts of 10% and 5% instead of 15% in one time. What is the actual discount availed by Chetan?
A. 15% ×

B. 15.5%
C. 14.5%
D. 16.5%
E. None of these

Answer: Option C
Solution:
$100 - -10\% \downarrow (1^{st} \text{ discount }) \rightarrow 90 - -5\% \downarrow \rightarrow 85.5$
Net discount $= 100 - 85.5 = 14.5\%$

Q 44. A trader sells goods to a customer at a profit of k% over the cost price, besides it he cheats his customer by giving 880 g only instead of 1 kg. Thus his overall profit percentage is 25%. Find the value of k ?
A. 8.33%
B. 8.25%
C. 10%
D. 12.5%
E. None of these

Answer: Option C
Solution:
$$\% \text{ Profit } = \frac{25}{100} = \frac{120 + k}{880}$$
$$\rightarrow k = 100$$
Thus,
$$\text{Net \% profit } = \frac{100 \times 100}{1000} = 10\%$$

Q 45. A watch costing Rs. 120 was sold at a loss of 15%. At what price was it sold?
A. Rs. 112
B. Rs.102
C. Rs. 135
D. Rs. 110
E. Rs. 100

Answer: B. Rs.102
Solution:
$120 \text{ (CP)} - - 15\% \downarrow (\text{ loss}) \rightarrow 102 \text{ (SP)}$
Mental work:

10% of Rs. $120 = 12$
5% of Rs $120 = 6$

Q 46. The cost of setting up a magazine is Rs. 2800. The cost of paper and ink etc is Rs. 80 per 100 copies and printing cost is Rs. 160 per 100 copies. In last month 2000 copies were printed but only 1500 copies could be sold at Rs. 5 each. Total 25% profit on the sale price was realized. There is one more resource of income from magazine which is advertising. What sum of money obtained from the advertising in magazine?
A. Rs. 1750
B. Rs. 2350
C. Rs. 1150
D. Rs. 1975
E. None of these

Answer: Option D
Solution:
Set up cost = Rs. 2800
Paper etc = Rs. 1600
Printing cost = Rs. 3200
Total cost = Rs. 7600
Total sale price $= 1500 \times 5 = 7500$
Let amount obtained from advertising be x then,
$(7500 + x) - 7600 = 25\%$ of 7500
$x = 1975$

Q 47. A person bought a certain quantity of rice at the rate of Rs. 150 /quintal. 10% of the rice was spoiled. At what rate (per quintal) should he sell the remaining rice to earn 20% profit.
A. Rs. 180
B. Rs. 200
C. Rs. 210
D. Rs. 220
E. None of these

Answer: B. Rs. 200
Solution:
Suppose he buy 1 quintal of Rice in Rs. 150.
10% is spoiled so he now have to sell of 90 kg remaining).
But he has to make a profit of 20%,so he will sell

90 kg for Rs. 180
This means his selling price is Rs. 200 per quintal.

Q 48. Kamal bought a house, whose sale price was Rs. 8 lakh. He availed 20% discount as an early bird offer and then 10% discount due to cash payment. After that he spent 10% of the cost price in interior decoration and lawn of the house. At what price should he sell the house to earn a profit of 25% ?
A. Rs. 9 lakh
B. Rs. 7.99 lakh
C. Rs. 7.92 lakh
D. Rs. 7 lakh
E. None of These

Answer: C. Rs. 7.92 lakh
Solution:
Let the marked price be 100
$100 = 20\% \downarrow$ (discount) $\Rightarrow 80 = 10\% \downarrow$ (discount) $\Rightarrow 72$ (CP) $= 10\% \uparrow$ (interior) $\Rightarrow$ 79.2 (Total CP)
Now, selling price would be 25% above the Total cost price.
SP $= 79.2 + 25\%$ of 79.2
SP $= 99$
Now, On comparing,
$100 \Rightarrow 800000$
$99 \Rightarrow \frac{800000}{100} \times 99 \Rightarrow 7{,}92{,}000$
So, SP $=$ Rs. 7,92,000

Q 49. Find the selling price of goods if two salesmen claim to make 25% profit each, one calculating it on cost price while another on the selling price, the difference in the profits earned being Rs. 100 and selling price being the same in both the cases?
A. Rs. 1200
B. Rs. 1600
C. Rs. 2400
D. Rs. 2500
E. Rs. 3000

Answer: A. Rs. 1200
Solution:
Let CP's be Rs. 1000 each, their respective SP will be,
$1000 = 25\% \uparrow \Rightarrow 1250$ [person calculating profit on the CP]
$1000 = 33.33\% \uparrow \Rightarrow 1333.33$ [The person calculating his profit on SP: 25% of SP $=$

33.33% of CP]
The difference turned out to be $= 83.33$. This has occured when we have assumed the CP as 1000. But, we are given difference of Rs. 100
So, on comparing,

$$83.33 = 1000$$

$$1 = \frac{1000}{83.33}$$

$$100 = \frac{1000}{83.33} \times 100 = \text{ Rs. } 1200$$

Q 50. A pharmaceutical company made 3000 strips of tablets at a cost of Rs. 4800. The company gave away 1000 strips of tablets to doctors as free samples. A discount of 25% was allowed on the printed price. Find the ratio profit if the price is raised from Rs. 3.25 to Rs. 4.25 per strip and if at the latter price, samples to doctors were done away with. (New profit / Old profit).

A. 55.5
B. 63.5
C. 75
D. 99.25
E. 80

Answer: 63.5
Solution:
Total sales revenue (Old) $= 2000 \times 3.25 \times 0.75 = 4875$ [0.75 as 25% discount was allowed]
Profit old = Total sales revenue -4800
$= 4875 - 4800 = 75$
Total sales revenue (New) $= 3000 \times 4.25 \times 0.75 = 9562.5$ [New price is calculated on doctors samples as well.]
Ratio,

$$\frac{\text{Profit}_{\text{new}}}{\text{Profit}_{\text{old}}} = \frac{4762.5}{75} = 63.5$$

TEST ON ALPHABETS

Alphabet Test is one of the most important sections of the Reasoning sections. Candidates must have a crystal-clear understanding of the Alphabet Test which is a part of Logical Reasoning section to score well in various Government Competitive examinations. We all know about the alphabets such as A to Z but most of us fail to give the correct answer to the questions asked from this section as they are designed in a tricky way.

Many prestigious government exams such as UPSC, SSC, RBI Grade B, SBI PO, SBI Clerk, IBPS PO, IBPS Clerk etc. ask questions from Alphabet Test every year. As we use the alphabets regularly in our daily life for writing or reading so we all have the basic idea of what alphabets are. In this article, we are going to cover the key concepts of the Alphabet Test reasoning section along with the solved examples, practice questions and the tips and tricks which will be sufficient to the candidates if they wish to appear in any of the upcoming government examinations. Before starting out let us see some of the basic concepts we should know to proceed further in this section.

Points to Remember:

- "A" Preceded by "B" means B A
- "A" Followed by "B" means A B
- "A" Precedes "B" means A B
- "A" Follows "B" means B A
- The Vowels are A, E, I, O, U
- The Consonants are B, C, D, F, G, H, J, K, L, M, N, P, Q, R, S, T, V, W, X, Y, Z
- A number which is divisible by any number except 1, are known as Prime Numbers.
- Examples of Prime Numbers are 2,3,5,7,11,13,17,19,23, etc.
- A number which is divisible by 2, is known as Even Numbers.
- Examples of Even Numbers are 0,2,4,6,8,10,12,14,16,18,20,22, etc.
- A number which is not divisible by 2, is known as Odd Numbers.
- Examples of Odd Numbers are 1,3,5,7,9,11,13,15,17,19,21, etc.

What is the Alphabet Test?

Before going to the next part let us now understand what an Alphabet Test is? In general, arranging the known alphabet letters which are given in jumbled letters or in word form sequence, are known as Alphabetic Arrangement.

When the arrangement of letters or words sequence involves two or more patterns of letters including numbers and symbols with an equal occurrence and all together making some pattern in general are called patterns of words or letters in general.

So, in Alphabet Test questions are based on finding the place of an English letter to the left or right of another English letter in the alphabetical order. Sometimes the questions are based on finding the number of English letter/s between two different letters.

This type of questions varies on the arrangement of alphabetical order. It can be backward, first half backward, second half, backward, multiple letter segments in changed order etc. Some of the questions asked in this section are based on finding the middle letter of two specified letters and in some questions, it is asked which letter/s do not change their place/s after the alphabetical arrangement.

Types of Alphabet Test

As now we know what consists of an Alphabet Test reasoning section. Let us see the various types of Alphabet Test one by one from below.

1. Number Series (Group Based)

The first type in the Number Series in which a group of numbers will be given and based on that multiple operations need to be performed on them such as Addition, Multiplication, Interchanging of digits and so on.

Given Series: 567289376189852

Example: If 1 is added to the 2nd digit of each number and then the position of the first and last digits are interchanged, which of the following will be the highest number?

Solution: Given Series: 567289376189852

By adding 1 with the 2nd digit, we get: 577299386199862.

Now if we interchange the first and last digits then we get: 775992683991268.

Therefore, 992 is the highest number which came from 289.

2. Alphabet Series (Group Based)

In this type of Series, a group of alphabets will be given and based on that multiple operations need to be performed on them such as arrange in dictionary or reverse dictionary order, interchanging of alphabets and so on.

Given Series: DEW BIG RAW FAN DOG

Example: If the position of the first and last alphabets of each word are interchanged and arranged in dictionary order then, which word comes last?

Solution: Given words are DEW BIG RAW FAN DOG

On interchanging the first and last alphabet we get the series as

WED GIB WAR NAF GOD

Now if we arrange the series in dictionary order then we get the series like this

GIB GOD NAF WAR WED

3. Mixed Series

Mixed Series involves the arrangement of numbers, letters, and symbols in a certain way. Various types of Mixed Series are given below.

(a) Simple Series

Questions from Simple Series will involve questions based on positions only. No types of operations will need to be performed in these types of questions.

Given Series: A B 6 P 72 Z @ X? V T W # & N S L%

Example: What element in 6th to the left of the 12th element from the left end?

Solution: If we carefully observe the given series then the 12th position from the left end is T. (A B 6 P 7 2 Z @ X? V T W # & N S L %)

Whereas the 6th position to the left of the 12th element is 2. (A B 6 P 72Z@X? V T W # & N SL %)

Therefore, the answer will be 2 is the 6th to the left of the 12th element from the left end.

(b) Operation Based Series

In this type of mixed series candidates need to apply a few operations asked in the question to get the desired result. Examples regarding this type of mixed series are given later in this article.

4. Creating New Words

In this type of Alphabet Test reasoning section candidates will be given a few letters from which they need to find if the given letters are making a meaningful word or not. If meaningful words are present or can be formed using the given letters, then questions such as how many meaningful words can be formed at any position can also be asked.

Example: How many meaningful English words can be formed with the help of letter T, A, E such that no letter is missed, and no letter is repeated.

Solution: T A E, we can clearly see that various words can be formed by using these 3 letters such as TEA, EAT and ATE. So, the answer is 3 meaningful words can be formed.

5. Position of Letters and Numbers in a Word

In this type of questions, candidates need to find the pairs of letters or digits which may have as many letters or digits between them as in words or numbers between them in the English Alphabetical Series and Number Sequence explained above.

Example: How many such letters are there in the word "INTERNET"' after arranging the letters of the word in alphabetical order each of which has as many letters between them in the word, as they have between them in English Alphabetical series? (Forward direction)

Solution: The word "INTERNET" can be represented as follows.

Letters	I	N	T	E	R	N	E	T
Alphabet Position	9	14	20	5	18	14	5	20

As we can see, 2 such pairs are there such as NT and IN.

How to Solve Question Based on Alphabet Test Know all Tips and Tricks

Candidates can find various tips and tricks from below for solving the questions related to the Alphabet Test reasoning section.

Tip #1: For questions such as the example of the Number Series type alphabet test reasoning highest number after interchanging the first and last digits were asked. To solve these types of questions candidates don't need to add 1 to the 2nd digit of every number, instead they should check the last digit of each number only.

Tip #2: For questions where the lowest number after arranging the digits in increasing order is asked, candidates should check which number has the lowest digit.

Tip #3: For the questions where the number of words is starting with vowels after replacing vowels of each word by its next letter and consonant by its previous letter is asked. Candidates must replace only the first letter of the word which is starting with a consonant.

Tip # 4: Left - Left means from the left end, Right + Left means from left end, and Right - Right means from the right.

Alphabet Test Formula

Candidates can find the various formulas related to the Alphabet Test reasoning section from below.

Formula 1: (Related to Simple Series)

- Left - Left = From the left end
- Left + Right = From the right end
- Right - Right = From the right end
- Right + Left = From the left end

Formula 2: (Related to Operation Based Series)

For solving this type of question candidates need to sequence the steps as asked in the question.

- **Step 1:** The vowels are exchanged with its next letter.
- **Step 2:** The symbols are exchanged with 8.
- **Step 3:** Numbers are increased by 1.

Note: For other formulas related to the Alphabet Test reasoning section candidates can refer to the "Points to Remember" section of this article.

Alphabet Test Sample Questions

Question 1: Given Series: 567289376189 852, now if all the digits are arranged in increasing order within the numbers, then which number will be the lowest? (Related to Number Series - Group Bases)

Solution: For Given Series: 567289376189 852, if we arrange all the digits in an increasing order then we get: 567289367189258.

As we can see here, 189 is the lowest number which comes from 189.

Question 2: Given Series: 567289376189 852, now if the position of the first digits of each number is replaced by its previous number, how many numbers will have minimum two same digits? (Related to Number Series - Group Bases)

Solution: For Given Series: 567289376189 852, if the position of the first digit of each number is replaced by its next number and last digits of each number are replaced by its previous number then it becomes like this: 666388375288951

Question 3: Given Series: DEW BIG RAW FAN DOG, now if the positions of first and last alphabets of each word are interchanged, then how many meaningful words are formed? (Related to Alphabet Series - Group Bases)

Solution: For Given Series: DEW BIG RAW FAN DOG, if we exchange the alphabets we get: WED GIB WAR NAF GOD, from the words 4 are meaningful words such as WED, GIB, WAR and GOD.

Question 4: Given Series: A B 6 P 72 Z @ X? V T W # & N SL%, which element is 4th to right of the 11th element from the left end? (Related to Simple Series)

Solution: 11th element from the left end of the given series is V (A B 6P72Z@X ? VTW # & N SL%).

And the 4th element to the right of the 11th element is & (A B 6P72Z@X? VTW # & N SL%)

Question 5: Given Series: A B 6 P 72 Z @ X? V T W # & N S L%, which element is the 5th to the right of the 9th element from the right end? (Related to Simple Series)

Solution: 9th element from the right end is A B6P 72Z @ 2? V WW # & NSL%, and 5th to the right of the 9th element from the right end is N (A B 6P 72Z@X? V TW # & N SL %)

Question 6: Given Series: N P L B S % & 1 E 4 G 4 $ T G 2 I 0 U K @ 17 V A, how many 8 are there in the mixed series after completing step 2? (Related to Operation based series)

Solution:

Step 1: First we need to exchange the vowels with its next letter, and it becomes like this: N P L B S % 1F 4G G $TG 2 J0VK@17VB.

Step 2: Then the symbols need to be exchanges with 8 and we get series like this: N P L B S 881 F 4G 48 TG 2 J 0VK817VB.

Step 3: Then we need to increase the number by 1 and we get: N P L B S 992 F 5 G 59 T G 3 J 1 V K 9 28VB.

So, as we can see there are four 8 in the series after completing the Step 2.

Question 7: How many meaningful English words can be formed with the help of 4th, 5th, 7th, and 13th letter of INTERNATIONAL such that no letter is repeated?

Solution: E, R, A, L are the 4th, 5th, 7th, and 13th letter of INTERNATIONAL so the meaningful words that can be formed are Real, Earl, Rale (3 words).

Question 8: If it is possible to make only one meaningful English word with the 1st, 5th, 6th, and 8th letter of the word INFORMATION, which of the following will be the fourth letter of that word? If no such word can be made, then give " X " as the answer and if more than one such word can be made then give " Y " as the answer.

Solution: The 1st, 5th, 6th, and 8th letter of the word INFORMATION is I, R, M, T. If you observe carefully then we can say that only one word is possible and that is TRIM. The fourth letter of that word is M, so the answer is " M ".

Question 9: How many such pairs of letters are there in the word "REPRESENT" each of which has as many letters between them in the word (in both forward and backward directions) as they have between them in the English alphabetical series?

Solution: The word "REPRESENT" can be represented as follows.

Letters	R	E	P	R	E	S	E	N	T
Alphabet Position	18	5	16	18	5	19	5	14	20

As we can see, 3 such pairs are there such as RP, RN and PS.

Question 10: How many such pairs of digits are there in the numbers "2651894" after arranging the digits of the number in increasing order each of which has many digits between them in the number, as they have between them the sequence? (Both Directions)

Solution: The number "2651894" can be represented as follows.

MCQ OF TEST ON ALPHABET:

1. If all the letters in the word “NEGOTIATE” are arranged in alphabetical order from right to left end, then the position of how many alphabet(s) will remain unchanged?
A. Zero
B. One
C. Two
D. Three
E. None of these
Ans: A. Zero

Explanation:

The newly formed will be as follows:

N	E	G	O	T	I	A	T	E
T	T	O	N	I	G	E	E	A

We can observe that position of all the alphabets is changed.

2. Direction: In this question, one word is given along with four options. There is only one option that cannot be made using the alphabets of the given word. Choose out the odd one-

INTERVENTION

A. ENTER

B. INVENTION

C. INTENTION

D. ENTERTAIN

E. None of these

Ans: D. ENTERTAIN

Explanation:

Words that can/cannot be made using the alphabets of the word INTERVENTION is shown below:

(D) ENTERTAIN → INTERVENTION → Cannot be made as one 'A' is required.

(A) ENTER → INTERVENTION → Can be made.

(B) INVENTION → INTERVENTION → Can be made.

(C) INTENTION → INTERVENTION → Can be made.

Therefore, 'ENTERTAIN' is the correct answer.

3. Direction: In this question, one word is given along with four options. There is only one option that cannot be made using the alphabets of the given word. Choose out the odd one-

ADAPTATION

A. PANIC

B. ATTAIN

C. POINT

D. TAINT

E. None of these

Ans: A. PANIC

Explanation:

(A) PANIC – ADAPTATION (Cannot be formed because C is missing)

(B) ATTAIN – ADAPTATION (Can be formed)

(C) POINT – ADAPTATION (Can be formed)
(D) TAINT – ADAPTATION (Can be formed)
Therefore, the correct answer is “PANIC”.

4. From the given alternative words, select the word which cannot be formed using the letters of the given word:
INTROSPECTION
A. INSPECTION
B. SCOPE
C. SECTOR
D. ROUTE
E. None of these
Ans: D. ROUTE

Explanation:
(D) ROUTE → INTROSPECTION → cannot be formed as U is not there
(A) INSPECTION → INTROSPECTION → can be formed
(B) SCOPE → INTROSPECTION → can be formed
(C) SECTOR → INTROSPECTION → can be formed

5. How many pairs of letters are there in the word " CASTRAPHONE" which have as many letters between them in the word as in the alphabet?
A. 3
B. 4
C. 5
D. 6
E. 8
Ans: D. 6

Explanation:
Looking into the alphabets there are six such pairs namely ON, HONE, ST, TRAPHO, TRAPHON, RAP.
1. ON - NO

2. HONE - EFGH

3. ST - ST

4. TRAPHO - OPQRST

5. TRAPHON - NOPQRST

6. RAP - PQR

6. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z.
Which letter in this alphabet is the eighth letter to the right of the letter and which is tenth letter to the left of the last but one letter of the alphabet?
A. X
B. W
C. I
D. H
E. None of these
Ans: B. W

Explanation:
In the given alphabet, last but one letter of alphabet is Y.
10th letter to the left of Y is O
8th letter to the right of O is W

7. Arrange these words in alphabetical order and tick the one that comes last.
1. Abandon 2. Actuate 3. Accumulate 4. Acquit 5. Achieve
A. Actuate
B. Accumulate
C. Acquit
D. Achieve
E. None of these
Ans: B. Actuate

Explanation:
First letters are common. Second letters are: b, c, c, c, c. One of the four words having c is the last word. Let us see the third letters now, there are: t, c, q, h. Clearly t is the last. Hence Actuate is the last word.

8. S L U A Y J V E I O N Q G Z B D R H
What will come in place of question (?) mark in the following series:
LA UJ YI EG?
A. ZH
B. IB
C. NR
D. QH
E. None of these

Ans: D. QH

Explanation:

The first letter follows +1, +2, +3, +4, ...

The second letter follows +2, +3, +4, +5,....

9. B M N G O P C Q R H S T F L U V W X Y A K Z D I E J

Counting from left if it is possible to make a meaningful word from the third and fifth letters from left, using each at least twice and third letter from right in sequence, only once, write the first letter of the word as your answer. If more than one such word can be formed write "M" as your answer, and if no word can be formed write 'X' as your answer.

A. M

B. X

C. O

D. I

E. None of these

Ans: C. O

Explanation:

Specified letters from the left are N and O, and the letter from the right is I.

With these letters, according to the conditions given in the question, one Word ONION can be formed. Clearly, first letter of this word is O.

10. If in the word 'CENTRAL', all the vowels are first arranged alphabetically and then all the consonants are arranged alphabetically and then all the vowels are replaced by the next letters and the consonants are replaced by the previous letters from English alphabet. Which letter will be fourth from the right end?

A. K

B. S

C. Z

D. D

E. None of these

Ans: A. K

Explanation:

Word is- C E N T R A L

Vowels and then consonants arranged alphabetically- A E C L N R T

Vowels replaced by the next letter and consonants replaced by the previous letter- B F B K M Q S

Fourth letter from the right end here is K.

11. In the following question, select the word which cannot be formed using the letters of the given word.
ACEIDOTPHTILUS
A. TRUST
B. COPES
C. HIDES
D. SUCIDE
E. None of these
Ans: A. TRUST

Explanation:
R is not present in the word ACEIDOTPHTILUS. Therefore, we cannot form the word TRUST.

12. If the letters of the word 'FUTURISTIC' are arranged in alphabetical order from left to right, then what will be the third letter of a meaningful English word that can be formed using the third, fifth, sixth and eighth letters of the word formed after such arrangement?
A. R
B. I
C. S
D. T
E. None of these
Ans: B. I

Explanation:
We have given word = FUTURISTIC
By arranging the letters of the word in alphabetical order from left to right, we get = CFIIRSTTUU
Now, the third, fifth, sixth and eighth letters of the word 'CF I I RS T T UU' are I, R, S and T.
The meaningful English word that can be formed using I, R, S and T is STIR.
STIR - Swirl a spoon or other device in circular motions in (a liquid or other substance) to mix thoroughly.
Here the third letter of the word 'ST I R' is 'I'.

13. Direction: From the given alternatives, select the word which CANNOT be formed using the letters of the given word.

HATCHING
A. ACTING
B. NIGHT
C. THING
D. MATCH
E. None of these
Ans: D. MATCH

Explanation:
MATCH word cannot be formed by using the letters of the word HATCHING as 'M' is not present in word HATCHING.

14. If it is possible to make only one meaningful English word with the 1st, 2nd, 3rd, 4th, 5th, and 6th letters of the word AEROPLANE, which of the following will be the fourth letter of that word?
A. A
B. P
C. O
D. E
E. None of these
Ans: C. O

Explanation:
Given Word: AEROPLANE
Chosen letters: A, E, R, O, P, L
Possible word: PAROLE
Fourth Letter of the word: O
Therefore, the fourth letter of the word formed by chosen letters is ‘O’.

15. Which of the words given in the options can be formed using the letters of the word ENTERPRISE?
A. PRIZE
B. PRINT
C. SETTER
D. INTEREST
E. None of these
Ans: B. PRINT

Explanation:

Let's check the options one by one:
(A) PRIZE: Not possible as ENTERPRISE does not have a 'Z'.
(B) PRINT: Possible from the letters of the word ENTERPRISE.
(C) SETTER: Not possible as ENTERPRISE has only one 'T'.
(D) INTEREST: Not possible as ENTERPRISE has only one 'T'.
Therefore, the correct answer is PRINT.

16. Direction: Choose the words from the following options, which could not created using the letters of the given word:
REMEMBRANCE
A. NUMBER
B. EMBRACE
C. REMEMBER
D. MEMBRANE
E. None of these
Ans: A. NUMBER

Explanation:
Let's check each option,
(A) NUMBER → **REM**EM**B**RA**N**CE → Can not be formed (NO U present)
(B) EMBRACE → REM**EMBR**AN**CE** → Can be formed.
(C) REMEMBER → **REMEMBR**ANC**E** → Can be formed.
(D) MEMBRANE → RE**MEMBRANCE** → Can be formed.

17. If the letters in the word POWERFUL are rearranged as they appear in the English alphabet, the position of how many letters will remain unchanged after the rearrangement?
A. Three
B. One
C. Two
D. More than two
E. None of these
Ans: A. One

Explanation:

Sequence in the word	P	O	W	E	R	F	U	L
Alphabetical order	E	F	L	O	P	R	U	W

So, "NUMBER" is the correct answer.

18. Direction: From the given alternatives, select the word which can be formed using the letters of the given word.
HANDKERCHIEVES
A. SHIFT
B. HATCH
C. TEACH
D. HAND
E. None of these
Ans: D. HAND

Explanation:
The word "HAND" can be formed using the letters of the given word.
The logic is:
(A) SHIFT → HANDKERCHIEVES → Can't be formed because one more T and F are required.
(B) HATCH → HANDKERCHIEVES → Can't be formed because one more T is required.
(C) TEACH → HANDKERCHIEVES → Can't be formed because one more T is required.
(D)HAND → HANDKERCHIEVES → Can be formed.

19. From the given alternative words, select the word which cannot be formed using the letters of the given word.
EXAMINATION
A. MAINTAIN
B. TOXIN
C. MENTION
D. ANIMATED
E. None of these
Ans: D. ANIMATED

Explanation:
The logic is:
(D) ANIMATED → EXAMINATION → cannot be formed as there is no D.
(A) MAINTAIN → EX**AMINATION** → can be formed.
(B) TOXIN → E**X**AM**IN**ATION → can be formed.
(C) MENTION → EXA**MIN**ATI**ON** → can be formed.
So, 'ANIMATED' is the correct answer.

20. Which of the words given in the options cannot be formed using the letters of the word CATEGORY?
A. GATOR
B. RACE
C. YARD
D. CATER
E. None of these
Ans: C. YARD
Explanation:
Let's check the options one by one:
(C) YARD: Not possible using the letters of the word C**A**TEGO**RY** as CATEGORY does not have a 'D'.
(A) GATOR: Possible using the letters of the word C**ATE**G**ORY**.
(B) RACE: Possible using the letters of the word **CA**T**E**GO**R**Y.
(D) CATER: Possible using the letters of the word **CATE**GO**R**Y.
Therefore, YARD is the correct answer.

21. If all the Letters of the word 'SEAT' are arranged according to Dictionary then which word will come Third from the right end?
A. E
B. T
C. S
D. A
E. M
Ans: A. E

Explanation:
Given word: SEAT
When arranged according to Dictionary: Left A E S T Right
'E' is Third letter from the right end.

22. If the letters in the word BACKFIELED are arranged as in the English alphabetical order, then which letter will be to the second right of the letter 'F', after the rearrangement?
A. C
B. L
C. E
D. K
E. None of these

Ans: D. K

Explanation:
If we arrange the letters of the word BACKFIELED in alphabetical order then the rearrangement will be ABCDEEFIKL.
So, the alphabet that is 2nd to the right of F will be K.

23. If it is possible to make a meaningful word from second, fourth, fifth, sixth and seventh letters of the word ACKNOWLEDGE, then which will be the first letter of that word? Mark X if no such word can be formed and M if more than one such word can be formed.
A. M
B. C
C. L
D. X
E. None of these
Ans: B. C

Explanation:
Given word: ACKNOWLEDGE
2nd letter = C; 4th letter = N; 5th letter = O; 6th letter = W; 7th letter = L
Letters given: C N O W L
Possible words: C L O W N (a comic entertainer)
Thus, only one word can be formed and the first letter of the word is "C".

24. If the first half of the word AUTOMOBILE is reversed, which of the following will be the fourth to the right of the third letter from the left end?
A. M
B. T
C. O
D. B
E. None of these
Ans: D. B

Explanation:
After reversing the first half of the word AUTOMOBILE, we get
MOTUAOBILE,
Third letter from the left end is T.
So, fourth to the right of the T is B.

25. Unscramble the letters 'RUOPD' to form a five letter English word and find the third letter from left of the unscrambled word?
A. R
B. P
C. U
D. O
E. None of these
Ans: D. O

Explanation:
The word formed is 'PROUD'.
And, O is the third letter from left.

26. Direction: In the following question, from the given alternative words, select the word which cannot be formed using the letters of the given word.
LINGUISTICS
A. SUITINGS
B. UTILISING
C. LISTING
D. STICKS
E. None of these
Ans: D. STICKS

Explanation:
(D) STICKS → LINGUI**STICS**, so the word cannot be formed (as letter K is not present).
(A) SUITINGS → LI**NGUISTI**C**S**, so the word can be formed.
(B) UTILISING → **LINGU**ISTIC**S**, so the word can be formed.
(C) LISTING → **LING**UI**STI**CS, so the word can be formed.

27. In the given question which word from the alternatives can be formed from the word "VICISSITUDE"?
A. ATTITUDE
B. VICIOUS
C. DISSOLVE
D. VISIT
E. None of these
Ans: D. VISIT

Explanation:

(D) VISIT → **VI**CIS**SIT**UDE → can be formed.

(A) ATTITUDE → VICISSITUDE → cannot be formed as there is a single T and no A.

(B) VICIOUS → VICISSITUDE → cannot be formed as there is no O.

(C) DISSOLVE → VICISSITUDE → cannot be formed as there is no L and O.

28. Which of the following words can be formed using the letters of FORTHCOMING? (A letter can be used only as many times as it is used in the given word.)
A. SHOOTING
B. THRONG
C. IGNORANT
D. NOTHING
E. None of these
Ans: B. THRONG

Explanation:
Only THRONG can be formed from the given alternatives by using the letters of FORTHCOMING because the letter S appears in option (A), A, N in option (B) (while N occurs only once in the original word) and option (D) The letter N is used twice, so the words in options (A), (B) and (D) cannot be formed from the root word as the word is different from the letters used in the original word.

29. If it is possible to make only one meaningful English word with the second, the fourth, the fifth, and the sixth letters of the word RATHER, which of the following will be the fourth of that word? If no such word can be made give 'X' as the answer and if more than one such word can be made give 'Y' as the answer.
A. A
B. X
C. E
D. Y
E. None of these
Ans: D. Y
Explnation:

Given Word	RA THE R
Chosen Letters	A HE R
Only 2 possible words	H A R E, H E A R

Thus, the answer would be Y.

30. Direction: In the following question, select the word which cannot be formed using the letters of the given word.
GOVERNMENT
A. MENTOR
B. REMOTE
C. REMOVE
D. REGAIN
E. None of these
Ans: D. REGAIN

Explanation:
Let's check each option:
(D) REGAIN → cannot be formed as there is no 'A' and 'I' in GOVERNMENT.
(A) REMOTE → can be formed as GOVERN**MENT**.
(B) REMOTE → can be formed as GOV**ER**N**ME**NT.
(C) REMOVE → can be formed as G**OVER**N**ME**NT.
So, REGAIN can't be formed from the word GOVERNMENT.

31. Direction: In the following question, from the given alternative words, select the word which can be formed using the letters of the given word.
Incremental
A. Internet
B. Cream
C. Total
D. End
E. None of these
Ans: B. Cream

Explanation:
(B) Cream → In**cre**ment**al** → can be formed
(A) Internet → **Incremen**tal → can't be formed
(C) Total → Incremen**tal** → can't be formed
(D) End → Increm**en**tal → can't be formed
So, Cream can be formed by Incremental.

32. How many meaningful English words can be formed, with the second, the seventh, the ninth and the eleventh letters of the word ORGANISATION, using each letter only once in each word?

A. One
B. Two
C. Three
D. Four
E. None of these
Ans: A. One

Explanation:
Word: ORGANISATION
2nd letter = R, 7th letter = S, 9th letter = T, 11th letter = O
Letters given: RSTO
Possible words: SORT
Thus, only 1 such word is possible.

33. If it is possible to make only one meaningful English word with the 1st, 3rd, 4th, and 7th letters of the word PHOTOGRAPHY, which of the following will be the first letter of that word? If no such word can be made give 'X' as the answer and if more than one such word can be made give 'Y' as the answer.
A. Y
B. T
C. X
D. P
E. None of these
Ans: D. P

Explanation:

Given Word	P H O T O G R A P H Y
Chosen letters	P, O, T, R
possible word	PORT

Hence, the answer will be ' *P* '.

34. If it is possible to make a meaningful word, using the 1st, 3rd, 9th and 11th letters of the word 'AGGREGATION', then what is the third letter from the left end of the newly formed word? If no such word be formed, mark the answer as 'Y'. If more than one word can be formed mark the answer as 'X'.
A. A
B. X
C. I

D. Y
E. None of these
Ans: C. I

Explanation:

1	2	3	4	5	6	7	8	9	10	11
A	G	G	R	E	G	A	T	I	O	*N*

Letters: A, G, I, N
Only 1 word is formed: GAIN
Third letter from the left end of the word 'GAIN' : I
Hence, I would be the third letter from the left in the only word which is formed.

35. If it is possible to make only one six-letter meaningful English word with the 3rd, 4th and 5th letter of the word CONFIRM and 1st, 10th, and 11th letter of the word OPPROBRIOUS, which of the following will be the first letter from the left of that word? If no such word can be made give 'X' as the answer and if more than one such word can be made give 'Y' as the answer.
A. N
B. Y
C. X
D. F
E. None of these
Ans: D. F

Explanation:
Given words: CONFIRM and OPPROBRIOUS
3rd, 4th, and 5th letters from the first word is: N, F, and I
1st, 10th, and 11th letters from the second word is: O, U, and S
Combining and un-jumbling the letters we get: FUSION
Hence, the first letter will be F.

36. If it is possible to make only one six-letter meaningful English word with the 1st, 4th, and 9th of the word RIGMAROLE and 2nd, 3rd, and 5th letter of the word SALUBRIOUS, which of the following will be the sixth letter from the left of that word? If no such word can be made give 'X' as the answer and if more than one such word can be made give 'Y' as the answer.
A. L
B. E

C. X
D. Y
E. None of these
Ans: D. Y

Explanation:
Given words: RIGMAROLE and SALUBRIOUS
1st, 4th, and 9thletters from the first word is: R, M, and E
2nd, 3rd, and 5th letters from the second word is: A, L, and B
Combining and un-jumbling the letters we get: MARBLE, BLAMER, RAMBLE, etc.
More than one such word can be framed.
Hence, Y will be the answer.

37. How many pair of letters are there in the word "BEAUTIFUL" which has as many letters (in both forward and backward direction) between them as they have in English alphabet series?
A. 1
B. 0
C. 2
D. 4
E. None of these
Ans: D. 4

Explanation:
We can use the positional values of the letters/alphabets in the alphabetical series to map the letters in an easier manner.
According to the English alphabetical series, the positional values of letters are given as follows:
Pairs in the Forward direction → E – L, E – I, and I – L
Pairs in the Backward direction → T – U

38. If it is possible to make only one meaningful English word with the first, the fifth, the ninth and the tenth letters of the word SEQUENTIAL, which of the following will be the second letter of that word? If no such word can be formed give 'X' as the answer and if more than one such word can be formed, give Y as the answer?
A. S
B. A
C. X
D. Y

E. None of these
Ans: D. Y

Explanation:
Word: SEQUENTIAL
1st letter: S, 5th letter: E, 9th letter: A, 10th letter: L
Word so formed: SEAL, SALE, LASE.

39. If it is possible to make a meaningful word with the first, third, and eighth letters of the word "PREDOMINANT" which of the following will be the second letter from the right end of that newly formed word? If more than one such word can be made, give M as the answer and if no such word can be made, give Y as the answer.
A. P
B. M
C. E
D. Y
E. None of these
Ans: C. E

Explanation:
The first, third, and eighth letters of the word PREDOMINANT are P, E, and N respectively.
1st letter → P, 3rd letter → E, and 8th letter → N
So, PEN is a meaningful word.
Hence, E is the second letter from the right end.

40. If in the word 'ADVANCE', all the vowels are replaced with the next letters and all the consonants are replaced with the previous letters from the English Alphabet. Now if all vowels are deleted how many consonants are remain there?
A. Three
B. Four
C. Five
D. Six
E. None of these
Ans: A. Three

Explanation:
The given word is 'ADVANCE'
Vowels are replaced by the next letters and consonants are replaced by the previous letters-
B C U B M B F

After deleting Vowel remaining consonant - BCBMBF
Hence, Six consonants are there after deleting vowel in new arrangement.

41. If it is possible to make a meaningful word with the third, sixth, seventh and eights letters of the word "REGENERATION" which of the following will be the second letter from the right end of that newly formed word? If more than one such word can be made, give M as the answer and if no such word can be made, give Y as the answer?
A. M
B. E
C. Y
D. A
E. None of these
Ans: A. M

Explanation:
The third, sixth, seventh and eight letters of the word REGENERATION is G, E, R and A respectively. There are more than one word can be formed by using these letters - GEAR, AGER.
Hence, More than one word word can be formed so M is the answer.

42. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z. Which letter in this alphabet is the eighth letter to the right of the letter and which is the tenth letter to the left of the last but one letter of the alphabet?
A. A. X
B. B. W
C. C. I
D. D. H
E. None of these
Ans: C. C. I

Explanation:
In the given alphabet, last but one letter of alphabet is Y.
10th letter to the left of Y is O
8th letter to the right of O is W

43. If it is possible to from a word with the first, fourth, seventh and eleventh letters in the
A. A. S
B. B. E
C. C. L

D. X
E. None of these
Ans: B. B.E

Explanation:
The first, fourth, seventh and eleventh letters of the word 'SPHERVLVODS'
The word formed is LESS
The second letter is E.

44. If it is possible to make a meaningful word from 1st and 3rd letter letters of the word 'AIR' and 1st and 4th letter of the word 'PORT' then which will be the second letter from the left? If more than one word will be formed then marked it as 'X' otherwise marked it as 'Y'.
A. X
B. Y
C. R
D. P
E. None of these
Ans: A. X

Explanation:
Given words: AIR and PORT.
(1) 1st and 3rd letter letters of the word AIR: A, R
(2) 1st and 4th letter of the word PORT : P, T.
The word can be formed with letters A, R, P and T - PART, TRAP, PRAT, RAPT, TARP.
There are more than one word formed(If more than one word will be formed then marked it as 'X' otherwise marked it as 'Y')

45. If in the word 'SOFTWARE', all the vowels are first arranged alphabetically and then all the consonants are arranged alphabetically and then all the vowels are replaced by the next letters and the consonants are replaced by the previous letters from English alphabet. Which letter will be fourth from the left end?
A. E
B. P
C. Q
D. R
E. None of these
Ans: A. E

Explanation:
Word is- S O F T W A R E
Vowels and then consonants arranged alphabetically- A E O F R S T W
Vowels are replaced by next letter and consonants replaced by the previous letter- B F P E Q R S V=
Hence, fourth letter from the left end is E.
Tips and Tricks:
In the given word 'SOFTWARE' there are three vowels so just take these three vowels and then find out the first consonant according to English alphabetical order. This consonant is the fourth one from left. so, no need to write all remaining consonants in English alphabetical order just find out previous letter for that consonant.

For example:

Word is- S O F T W A R E

Vowels arranged alphabetically- A E

Fourth letter of consonant is – F

46. Which letter is 8th to the right of 7th letter from the left in the English alphabet ?
A. Q
B. O
C. R
D. S
E. None of these
Ans: B. O
Explanation:
7th letter from left = G
∴ 8th letter to the right of G = (7 + 8) th letter from left
= 15th letter from left = O

47. Which letter is between midway of 8th letter from left and 7th letter from right in the English alphabet ?
A. N
B. M
C. P
D. O
E. None of these
Ans: A. N

Explanation:
7th letter from right = (27 -7)th = 20th letter from left
∴ Required middle letter = (8 + 20)/2
= 14th letter from left = N

48. If the letter of the word 'VERTICAL' arranged alphabetically, how many letters will remain at the same position ?

A. Four
B. Three
C. Two
D. Five
E. None of these
Ans: E. None of these
Explanation:
Original word, V E R T I C A L
Alphabetically, A C E I L R T V
There is no letter which will remain at the same position

49. How many meaningful words can be formed with the word ALEP, beginning with "P" and without repeated any letter within that word ?
A. One
B. Three
C. Five
D. Two
E. None of these
Ans: B. Three
Explanation:
After rearranging the given word ALEP , we can form three words.
Required word = PLEA, PALE, PEAL

50. What is the next letter of the following sequence.
N , O , M , P , L , Q , K , R , ?
A. S
B. I
C. J
D. T
E. None of these
Ans: C. J

Explanation:
Here the series has mixed two series.
n m l k...! reverse alphabet
o p q r ...! forward alphabet
So the letter before k is j and after that letter after r is s and so on...

READING COMPREHENSION

TYPES OF PASSAGES

- Reading Comprehension is the test of your focus, patience level, the ability of understanding and analyzing.
- It is one of the most scoring topics (So train your hands for the battle. So here are some types of passages you will encounter while solving RC's.

1. Descriptive Passages
2. Analytical Passages
3. Hypothetical Passages

Descriptive Passages

- These are the long passages with less significance. If you encounter any long passage don't panic there is 90% probability it will be data-driven.
- For solving these passages, it is suggested you should note the important points so that you don't need to scroll up and down.
- The questions will be direct so you don't need to bang your head.

Analytical Passages

- These are bit tricky ones, if you aren't an avid reader, they will bore you.
- These types of passages are mainly an analysis of some theory (Scientific, Political, etc.).
- Read them carefully these are the perplexing ones but they won't ask you much of inference-based questions.
- So just go through the key points, frame the main idea and you will sail through.

Hypothetical Passages

- They kill, difficult ones. If you encounter any passage which is short, there is a high possibility of abstract "philosophical/ fantasy-based passage".
- You may not be able to decode the main idea. So, I would suggest you to not get biased or form opinions.
- Just believe what the author is saying even if it is drop dead bizarre.

How to Tackle Reading Comprehension?

- Reading is the best medicine. If you are an avid reader the ball is in your court.
- Now for the people who are not much into reading, it is all about defending. So, let's prepare how to defend yourself.

Tip no 1

- Start reading different things at a time (editorials are good).
- This will help you to tackle different passages in those 60 minutes.

Tip no. 2

- Attempt it whole-heartedly, like you watch or drink the last cup of your coffee.
- Don't skip, don't rush. Take your time, and gradually build up a fast pace.

Tip no 3

- Learn to skip questions. If you can't perceive the main idea don't try to touch the inference-based questions.
- It is a game of negative marking, so, play wisely.

Tip no 4

- Don't skip the data-driven questions. Develop the skill to note down the main points so that you don't need to search again. This requires a lot of practice.

Tip no 5

- Aim to solve at least 3 to 4 passages per day.
- Mastering reading comprehension is a slow process.
- You cannot complete VARC section in a month or two. So, keep practicing.

Reading Comprehension # 1

Read the passage given below and then answer the questions given below the passage. Pay careful attention.

Social networking has changed the way we interact with friends and associates. While social networks, like Facebook, Twitter, YouTube, FourSquare, and Google+, play a significant role in our lives, they are also a high risk for security threats. With hundreds of millions of users online, these tools not only attract friends and family wanting to stay in touch, but they also attract people wanting to know about you for the wrong reasons.

So, what are the security threats currently out there? Identity thieves gather personal information from social media sites. Even if you have your account on the highest security settings, there are still ways for an identity thief to get your information. Most social network sites have information that is required, such as email address or birthday. It's common for an identity thief to hack an email account by using social information. For example, a common technique to get personal information is by clicking on "forgot password" and trying to recover the information through email.

Once the thief has access to your email account, they then have access to all information on your social networking sites. So what can you do to protect yourself? You don't have to delete all your social profiles or hide from the real world; Just take these precautions and it can reduce our troubles to a certain level. Have a strong password. The stronger your password, the harder it is to guess. Use special characters like symbols and capital letters when creating your password. Also, don't use "common" passwords, like your birthday or your child's name. We should also be careful with our status updates. Often, we innocently post status updates that would give an identity thief information they need to steal our identity. For example, you may post "Happy birthday to my mother!" and then tag her in the post. Likely, your mother's maiden name will be associated with that tag now. A popular security question is "What is your mother's maiden name?" and if you share that online, you run the risks of identity thieves getting the answer to this commonly used question. We can also use a fake location or make one up from another city and state. You may even be able to leave this information blank. Be cautious and never use a city and state where you live. Hackers love social networking, going right to the source to interject malicious code.

The codes hackers use can steal your identity, inject viruses to your computer, and obstruct bank account information, to name a few. Shortened URLs, such as those created on bit.ly, are especially susceptible to hackers. Shortened URLs can trick users into visiting harmful sites where personal information can be compromised because the full URL is not seen. The best advice is to never click on a link until you are sure of the source. Telling the online world where you're going and when you aren't at home is inviting burglars to your house. Did you know that a run-of-the-mill burglar can break into your home in less than 60 seconds and spend less than 10 minutes stealing your possessions? By telling the world you are on vacation in Europe, you're letting potential thieves know where you are, how long you'll be gone, and where you live. Burglars are fond of constant updates, especially about your travel plans. You wouldn't stand up in the middle of a crowd and announce you're going on vacation for a week, would you? Of course not, but that's what you do when you post your vacation pictures and plans online. One of the biggest threats to online security is overconfidence. Whether at home or at work, many users believe as long as they have a firewall

and an antivirus installed, there is no threat to security. Many people also believe that they don't have anything worth hacking so there's no need to worry about security. With today's technology, we are more connected to each other than ever before. When you neglect security, you not only put yourself at risk, but others are at risk as well.

Question 1

What is the main purpose of the passage?

1. To discuss the potential threats to Facebook and LinkedIn.
2. To discuss on the big social networking sites.
3. To portray the importance of security in social networking
4. To discuss the potential threats to networking sites.
5. To suggest the security measure for using social networking site.

Solution: Option 3

The passage is talking about the various threats in using social networking sites and what preventive steps we can take. This reflects the need of security in social networking site.

All options except 3 are only a part or idea but not the main purpose.

Question 2

What can be inferred on reading the second paragraph?

1. It is discussing on identity thieves.
2. It is discussing the threat of losing identity information to the hacker.
3. It is suggesting measures on how to safeguard our identity from being stolen.
4. It is warning the social media user for their casual approach.
5. It is talking about breach of social contacts.

Solution: Option 2

The paragraph is nowhere talking about option 3 and 5. Option 1 is only a part of the paragraph.

The essence of the paragraph is how we are losing our identity and personal information to the identity thieves.

As it can be cleared from these few lines **'Most social network sites have information that is required, such as email address or birthday. It's common for an identity thief to hack an email account by using social information'.**

Question 3

What can be inferred on reading the third paragraph?

1. It is trying to warn us on the various malicious attack.
2. It is talking about our lack of knowledge on the potential impact of hacking.
3. It is suggesting ways to prevent our loss of identity and information to the identity thieves.
4. It is talking about the overconfidence of the social network users.
5. It is discussing on the mind-set of the hackers.

Solution: Option 3

The third paragraph is the preventive measure based on the threats of identity thieves that has been well discussed in the preceding paragraph. It is suggesting ways varying from high security password to fake locations. The only option that catches the essence is Option 3. The rest add no relevant meaning.

Question 4

What according to the passage has been regarded 'susceptible to the hackers'?

1. Protocol
2. Bit
3. TCP/IP
4. Shortened URL
5. Location

Solution: Option 4

It is clearly given in the passage that "Shortened URLs, such as those created on bit.ly, are especially susceptible to hacker."

Question 5

What according to the passage invites burglars to the house?

1. Using short Password
2. Unprotected URL
3. Shortened URL
4. Sharing Files online
5. Sharing your movement online

Solution: Option 5

It is clearly given in the passage that **"Telling the online world where you're going and when you aren't at home is inviting burglars to your house."**

Question 6

What has been regarded as the biggest threat to security as per the passage?

1. Hacking
2. Invasion
3. Forgery
4. Overconfidence
5. Superiority complex

Solution: Option 4

It is clearly given in the passage that "**One of the biggest threats to online security is overconfidence. Whether at home or at work, many users believe as long as they have a firewall and an antivirus installed, there is no threat to security."**

Question 7

According to the passage, who is fond of constant updates?

1. Hackers
2. Burglars
3. Identity thief
4. Poachers
5. Malware

Solution: Option 2

It is clearly given in the passage that **"Burglars are fond of constant updates, especially about your travel plans."**

Reading Comprehension # 2

Directions: Read the passage given below and then answer the questions given below the passage. Some words may be highlighted for your attention. Pay careful attention

The aisles at Lotte Mart in Beijing's Wangjing district were strangely quiet early this week. A few elderly shoppers pushed trolleys; shop assistants tidied the super market's shelves. Customers have been scarce since "something happened" a few weeks ago, says one cashier. That event was a deal signed on February 28th by Lotte, a South Korean firm, allowing America to build an anti-missile system on land the company owns in South Korea. China's government has responded by