

# Instruction for MCQ tagged questions

## Sample Question

6. Which of the following are prime numbers ?

**MCQ :** +5, -0

- (A) 2
- (B) 4
- (C) 7
- (D) 9

All MCQ questions are tagged as shown.

The correct answers are (A) and (C), then you should darken the circles for options (A) and (C) on the OMR sheet.

<b>✓</b> Correct only when both (A) and (C) circles are dark	<b>✗</b> Correct only when both (A) and (C) circles are dark	<b>✗</b> Incorrect if only circle (C) is dark.
5 (A) (B) (C) (D)	5 (A) (B) (C) (D)	5 (A) (B) (C) (D)
6 (A) (B) (C) (D)	6 (A) (B) (C) (D)	6 (A) (B) (C) (D)
7 (A) (B) (C) (D)	7 (A) (B) (C) (D)	7 (A) (B) (C) (D)
8 (A) (B) (C) (D)	8 (A) (B) (C) (D)	8 (A) (B) (C) (D)

**PART I : PHYSICS**

This section contains **10 Questions (Q : 01 to Q : 10)**. Each question has four choices **(A), (B), (C) and (D)**.

1. A student finds that she has to apply a horizontal force of 12 N to a wooden block to just start it moving across a floor. However, once it is moving, she only needs to apply a force of 8 N to keep it moving at a constant speed. This experiment demonstrates that:

**SCQ : +3, -1**

- (A) Rolling friction is less than sliding friction.
- (B) Sliding friction is less than static friction.
- (C) Static friction is less than sliding friction.
- (D) Friction is independent of the applied force.

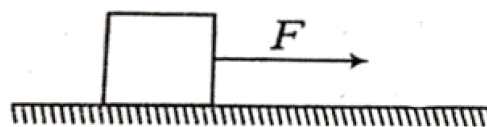
2. A skydiver jumps from a plane. Initially, she accelerates downwards due to gravity. However, after some time, she reaches a constant speed known as terminal velocity. Why does she stop accelerating?



**SCQ : +3, -1**

- (A) The force of gravity on her becomes zero at that speed.
- (B) The buoyant force of the air balances the force of gravity.
- (C) The upward force of air resistance becomes equal in magnitude to the downward force of gravity.
- (D) She has fallen out of the Earth's gravitational field.

3. A horizontal force of 20 N is used to pull a 4 kg block across a level surface, causing it to accelerate at 3 m/s<sup>2</sup>. What is the coefficient of kinetic friction ( $\mu_k$ ) between the block and the surface? (Assume  $g = 10 \text{ m/s}^2$ )



**SCQ : +3, -1**

- (A) 0.1
- (B) 0.2
- (C) 0.3
- (D) 0.5

*Space for rough work*

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4. A heavy 20 kg crate rests on a rough horizontal floor. The coefficient of static friction ( $\mu_s$ ) between the crate and the floor is 0.4, and the coefficient of kinetic friction ( $\mu_k$ ) is 0.3. A person pushes the crate horizontally with a constant force of 50 N. What is the magnitude of the frictional force acting on the crate? (Assume  $g = 10 \text{ m/s}^2$ )

**SCQ : +3, -1**

- (A) 0 N
- (B) 50 N
- (C) 60 N
- (D) 80 N

5. Which of the following statement/s is/are **True(T)** or **False(F)** ?

**T/F SCQ : +4, -1**

- (i) The pressure exerted by a liquid at the bottom of a container depends on the total volume of liquid in the container.
- (ii) A sharp knife cuts better than a blunt one because it exerts more pressure for the same applied force.
- (iii) Atmospheric pressure at sea level is approximately 101,000 Pascals, which is equivalent to the pressure exerted by a weight of about 10,000 kg on a 1 square meter area.

**Code :**

- (i) (ii) (iii)
- (A) F F T
- (B) F T T
- (C) T T F
- (D) T F T

6. Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

**MTC SCQ : +4, -1**

Column - I	Column - II
<b>P.</b> Using a straw to drink a beverage	<b>1.</b> Pascal's Principle
<b>Q.</b> The wide straps on a heavy backpack	<b>2.</b> High pressure due to a very small area of contact
<b>R.</b> A thumbtack easily piercing a board	<b>3.</b> Low pressure due to a large area of contact
<b>S.</b> The operation of a car's hydraulic brakes	<b>4.</b> Action of atmospheric pressure

**Code :**

- P Q R S**
- (A) 1 2 3 4
- (B) 4 3 2 1
- (C) 3 1 4 2
- (D) 2 1 4 3

*Space for rough work*

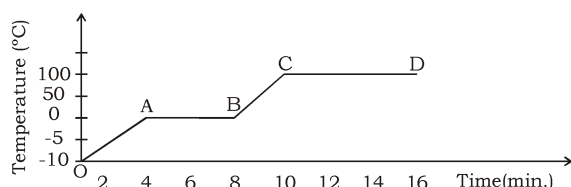
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**Paragraph for Questions 07 & 08**

Read the paragraph and the associated graph, then answer the two questions that follow.

A 50g block of ice is taken from a freezer at  $-10^{\circ}\text{C}$ . It is placed in a beaker and heated by a burner that supplies heat at a constant rate. The graph below shows the temperature of the contents of the beaker as a function of time.



7. What process is occurring during the segment AB, where the temperature remains constant at  $0^{\circ}\text{C}$ ?

**SCQ : +3, -1**

- (A) The ice is getting colder.
- (B) Heat is not being supplied during this time.
- (C) The ice is melting into liquid water.
- (D) The water is starting to boil.

8. The segment CD (boiling) is much longer than the segment AB (melting). What does this imply?

**SCQ : +3, -1**

- (A) The burner's power was increased during segment CD.
- (B) It takes more energy to melt ice than to boil the same mass of water.
- (C) It takes more energy to turn 1 g of water into steam than to melt 1 g of ice.
- (D) Water loses heat to the surroundings faster when it is boiling.

9. An object is submerged in a liquid. Select all the correct statements regarding the buoyant force acting on it.

**MCQ : +5, -0**

- (A) The buoyant force will be greater if the object is submerged in mercury (density =  $13,600\text{ kg/m}^3$ ) than in water (density =  $1000\text{ kg/m}^3$ ).
- (B) An object will float if the buoyant force acting on it is equal to its weight.
- (C) Once an object is fully submerged, the buoyant force on it remains constant even if it is pushed deeper into the liquid.
- (D) The magnitude of the buoyant force depends on the mass of the submerged object.

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*Space for rough work*

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10. A physicist is reviewing fundamental principles of kinematics. Four statements are proposed to describe the motion of a particle, represented by its velocity 'v' and acceleration 'a'.

You are tasked with identifying the only statement that represents a universal truth, holding for any possible physical motion without exception.

Which of the following statements is always true?

Which of the following statements about motion are physically possible and correct?

**MCQ : +5, -0**

- (A) An object can have zero velocity at a particular instant but still be accelerating.
- (B) An object's speed can be constant while its velocity is changing.
- (C) The average velocity of an object over a period of time can be zero, even if its average speed is not zero.
- (D) If an object has a constant, non-zero acceleration, its speed must always be increasing.

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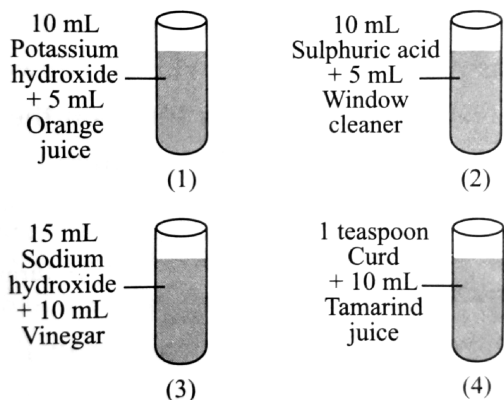
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**PART II : CHEMISTRY**

This section contains **10 Questions (Q : 11 to Q : 20)**. Each question has four choices **(A), (B), (C) and (D)**.

**11.** A class 7 science teacher arranged the following set of test tubes.



**SCQ : +3, -1**

Which of the following observations is correct when these solutions were tested with different indicators?

- (A) In test tubes 1 and 3, turmeric solution remains yellow.
- (B) In test tubes 2 and 4, China rose indicator turns magenta.
- (C) Methyl orange turns red in test tubes 1 and 3.
- (D) Phenolphthalein turns pink in test tubes 2 and 4.

**12.** A few solutions were tested with different indicators and results were noted down in the given table.

S.No.	Solution	Colour with China rose indicator	Colour with methyl orange indicator
1	V	Dark pink	Red
2	W	Dark pink	Red
3	X	Light pink	Orange
4	Y	Green	Yellow
5	Z	Light pink	Orange

**SCQ : +3, -1**

Study the given table carefully and fill in the blanks by choosing an appropriate option.

Solutions (i) will have no effect on blue litmus paper while solution(s) (ii) will turn blue litmus red. Phenolphthalein remains colourless in solution(s) (iii) while it changes to pink colour in solution(s) (iv).

- (A) (i)-X, Y (ii)-V (iii)-W, Z (iv)-Z
- (B) (i)-X, Y, Z (ii)-V, W (iii)-V, W, X, Z (iv)-Y
- (C) (i)-V, W, X, Z (ii)-V, W (iii)-Y (iv)-X, Y, Z
- (D) (i)-X,Y, Z (ii)-V, W (iii)-V, W (iv)-Y, Z

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13. When superheated steam is passed through white hot coke, it gets reduced to a mixture of X and Y. Y is a highly inflammable gas. The mixture of X and Y is named as Z.

**SCQ : +3, -1**

- (A) X = CO<sub>2</sub>, Y = H<sub>2</sub>, Z = Producer gas
- (B) X = CO, Y = H<sub>2</sub>, Z = Water gas
- (C) X = CO, Y = CH<sub>2</sub>, Z = Natural gas
- (D) X = CO<sub>2</sub>, Y = N<sub>2</sub>, Z = Biogas

14. Hydrogen satisfies the conditions of an ideal fuel but cannot be used freely because :

- (i) it has high calorific value.
- (ii) it is difficult to store and transport.
- (iii) it is soluble in water.
- (iv) it is highly inflammable.

Select the correct statements.

**SCQ : +3, -1**

- (A) (i) and (iii)
- (B) (i) and (ii)
- (C) (ii) and (iv)
- (D) (iii) and (iv)

15. Which of the following statement/s is/ are **True(T)** or **False(F)** ?

**T/F SCQ : +4, -1**

- (i) Coal and petroleum are considered renewable sources of energy because they are found abundantly in nature.

(ii) Petroleum refining is done to separate its different useful components like petrol, diesel, kerosene etc.

(iii) Formation of coal occurs from dead plants buried deep inside the earth under high temperature and pressure for millions of years.

**Code :**

**(i) (ii) (iii)**

- (A) F F T
- (B) T F T
- (C) T T F
- (D) F T T

16. Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

**MTC SCQ : +4, -1**

Column - I	Column - II
<b>P.</b> Carbonised fossil fuel	<b>1.</b> Dark zone
<b>Q.</b> Ideal fuel	<b>2.</b> Non-luminous zone
<b>R.</b> Invisible zone of candle flame	<b>3.</b> LPG
<b>S.</b> The coolest zone of candle flame	<b>4.</b> Coal

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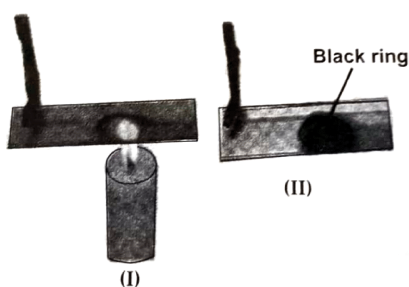
**Code :**

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	1	2	3	4
(B)	4	3	2	1
(C)	3	1	4	2
(D)	2	1	4	3

**Paragraph for Questions 17 & 18**

During a classroom experiment, a glass plate was carefully placed in a certain part of a candle flame for a few seconds, after which some visible change appeared on its surface. In another activity, while working with alcohol in the laboratory, the teacher reminded the students to follow safety precautions and avoid placing it directly over a flame, warning that it might lead to unexpected consequences.

17. When you introduce a glass plate into the luminous zone of a candle flame for a few seconds, the observation is as shown in figure (II). What does the observation indicate?



**SCQ : +3, -1**

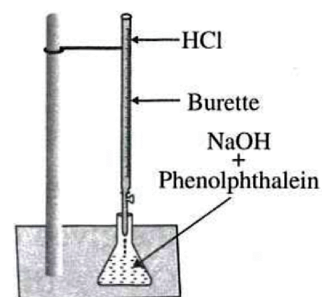
- (A) Deposition of burnt CO<sub>2</sub> particles present in the air around the flame.
- (B) Deposition of unburnt carbon particles in the luminous zone of the flame.
- (C) Deposition of molten wax.
- (D) All of these.

18. The teacher strictly instructed the students not to heat alcohol directly on flame. Why do you think the teacher gave such an instruction?

**SCQ : +3, -1**

- (A) The temperature of the flame is not high enough to heat alcohol.
- (B) Alcohol is highly inflammable.
- (C) The heat of the flame is sufficient enough to overcome the ignition temperature of alcohol and it can easily catch fire.
- (D) Both (B) and (C)

19. Observe the given figure carefully and the correct statements.



**MCQ : +5, -0**

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- (A) Heat is evolved in this reaction.
- (B) The colour of the mixture in the conical flask is pink in the beginning.
- (C) It represents a neutralisation reaction.
- (D) No new substance is formed in the reaction.

20. Which of the following is an amorphous form of carbon?

**MCQ : +5, -0**

- (A) Charcoal
- (B) Coke
- (C) Coal
- (D) Graphite

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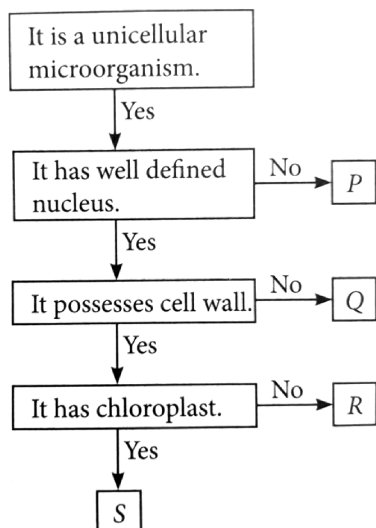
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**PART III : BIOLOGY**

This section contains **10 Questions (Q : 21 to Q : 30)**. Each question has four choices **(A), (B), (C) and (D)**.

**21.** Refer to the given flow chart and select the correct option.



**SCQ : +3, -1**

- (A) P-Trypanosoma, R-Giardia
- (B) Q-Paramecium, S-Chlamydomonas
- (C) P-Lactobacillus, Q-Sargassum
- (D) R-Fucus, S-Rhizopus

**22.** Which among the given pairs of microorganisms is involved in the production of cheese?

**SCQ : +3, -1**

- (A) Penicillium, Gelidium
- (B) Nostoc, Lactobacillus
- (C) Streptococcus, Anabaena
- (D) Lactobacillus, Streptococcus

**23.** Mosquito P is the carrier of virus that spreads disease Q. Another mosquito R is the carrier of protozoan S that spreads disease T.

**SCQ : +3, -1**

Select the option which correctly identifies P, Q, R, S and T

- (A) P-Aedes, Q-Dengue, R-Anopheles, S-Plasmodium, T-Malaria
- (B) P-Tse-tse fly, Q-Dengue, R-Anopheles, S-Plasmodium, T-Malaria
- (C) P-Aedes, Q-Dengue, R-Tse-tse fly, S-Entamoeba, T-Amoebic dysentery
- (D) P-Tse-tse fly, Q-Dengue, R-Aedes, S-Entamoeba, T-Amoebic dysentery

**24.** Study the given table and select the correct option for P, Q, R and S.

Food preservation method	Based on the concept
Deep freezing	P
Q	Removes moisture from food item.
R	Heating followed by quick cooling.
Packing in air tight containers.	S

**SCQ : +3, -1**

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- (A) P-Growth of food spoiling micro-organisms is prevented  
Q-Adding sodium benzoate
- (B) Q-Dehydration  
R-Pasteurisation
- (C) P-Removes moisture from the food item  
Q-Adding salt
- (D) R-Pickling  
S-Microorganisms get killed

**25.** Which of the following statement/s is/are **True(T)** or **False(F)** ?

**T/F SCQ : +4, -1**

- (i)** Mixed cropping means growing two or more crops on the same field in alternate rows to reduce chances of pests.
- (ii)** Irrigation by canals is suitable in regions where rainfall is very high and rivers remain full throughout the year.
- (iii)** Green manure crops such as Sesbania and Sunhemp are ploughed back into the soil to increase nitrogen content.

**Code :**

- |     |            |             |              |
|-----|------------|-------------|--------------|
|     | <b>(i)</b> | <b>(ii)</b> | <b>(iii)</b> |
| (A) | F          | F           | T            |
| (B) | T          | F           | F            |
| (C) | T          | T           | F            |
| (D) | T          | F           | T            |

**26.** Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

**MTC SCQ : +4, -1**

Column - I	Column - II
<b>P.</b> Inorganic substances that are produced in factories.	<b>1.</b> Humus
<b>Q.</b> Adding manure in the soil improves the quality of soil.	<b>2.</b> Fertilisers
<b>R.</b> Manure provides huge amount of this organic substances to the soil.	<b>3.</b> Nitrogen
<b>S.</b> This nutrient is replenished by growing legumes and wheat alternately.	<b>4.</b> Water retaining capacity

**Code :**

- |     |          |          |          |          |
|-----|----------|----------|----------|----------|
|     | <b>P</b> | <b>Q</b> | <b>R</b> | <b>S</b> |
| (A) | 1        | 2        | 3        | 4        |
| (B) | 4        | 3        | 2        | 1        |
| (C) | 3        | 1        | 4        | 2        |
| (D) | 2        | 4        | 1        | 3        |

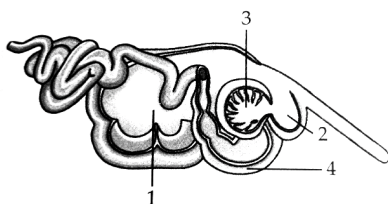
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**Paragraph for Questions 27 & 28**

The given diagram represents alimentary canal of a ruminant which possess a unique digestive system that allows them to better use energy from fibrous plant material than other herbivores. Stomach of these animals consists of four chambers.



27. Arrange the following steps in the process of digestion of food in ruminants in correct order.

**SCQ : +3, -1**

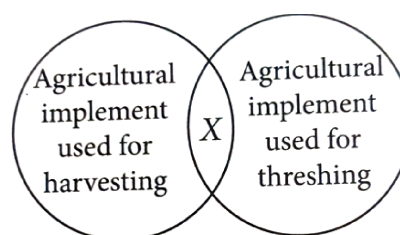
- (I) Cud is pushed to '2'.
  - (II) Food is sent to '3' and '4'.
  - (III) Partial digestion of food is carried out by anaerobic bacteria that harbour in '1'.
  - (IV) Cud is brought back into the mouth for chewing.
  - (V) Food is partially chewed and mixed with saliva.
  - (VI) Food moves towards the intestine for complete digestion.
- (A) III → II → IV → VI → V → I  
 (B) V → III → I → IV → II → VI  
 (C) I → IV → II → VI → III → V  
 (D) III → V → I → IV → VI → II

28. Enzyme produced by the microorganisms harbouring in '1' helps in-

**SCQ : +3, -1**

- (A) Digestion of hemicellulose
- (B) Digestion of pectin
- (C) Digestion of cellulose
- (D) Digestion of glycogen

29. Refer to the given venn diagram.



**MCQ : +5, -0**

Identify X and select the incorrect option regarding it.

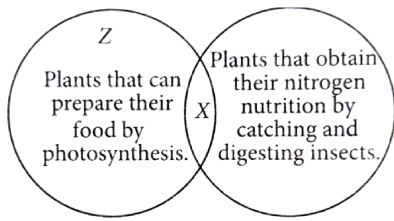
- (A) X could be a sickle or a harvester.
- (B) X could be a thresher or a trowel.
- (C) X could be combine which cuts standing crop in fields and separates the chaff from grain.
- (D) X could be a plough or a hoe.

*Space for rough work*

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30. Study the given Venn diagram:



**MCQ : +5, -0**

Select the incorrect option regarding plants X and Z.

- (A) Plant X could be a Venus flytrap.
- (B) Plant X could be categorised as a total stem parasite.
- (C) Plant Z could be a rose plant or sundew plant.
- (D) Plant X could be Rafflesia.

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**PART IV : MATHEMATICS**

This section contains 20 Questions (Q : 31 to Q : 50). Each question has four choices (A), (B), (C) and (D).

31. The fraction  $\frac{B}{3x-1}$  is subtracted from the fraction  $\frac{A}{2x+3}$ . The resulting fraction is  $\frac{-11}{(2x+3)(3x-1)}$ . Then A + B is:

**SCQ : +3, -1**

- (A) 11
- (B) -11
- (C) 5
- (D) -5

32. There are three cell phones A, B, C. A is 50% costlier than C and B is 25% costlier than C. A is a% costlier than B. Then the value of a is :

**SCQ : +3, -1**

- (A) 25
- (B) 20
- (C) 12
- (D) 10

33. Simplify :  $\sqrt{\frac{(2022)^3 - (2020)^3 - 2}{6}}$

**SCQ : +3, -1**

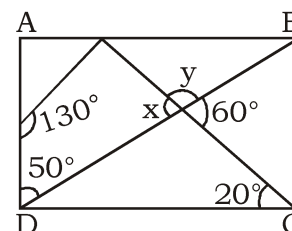
- (A) 2021
- (B) 1
- (C) 3
- (D) (2021)<sup>2</sup>

34. A sold a watch to B at 10% profit, B sold it to C at 20% profit. If C paid Rs. 396 for it, what was the cost price of the watch for A ?

**SCQ : +3, -1**

- (A) Rs. 300
- (B) Rs. 500
- (C) Rs. 800
- (D) Rs. 1200

35. In the given figure, if ABCD is a rectangle, then the value of x + y (in degrees) is :



**SCQ : +3, -1**

- (A) 150°
- (B) 180°
- (C) 165°
- (D) 155°

Space for rough work

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36. Simplify :

$$\frac{0.777\dots\times 0.333\dots\times 0.222\dots}{0.777\dots+0.333\dots+0.222\dots}$$

**SCQ : +3, -1**

- (A)  $\frac{7}{162}$   
 (B)  $\frac{162}{7}$   
 (C)  $\frac{163}{7}$   
 (D)  $\frac{7}{163}$

37. Find the probability of getting the product of a perfect square (square of a natural number), when two dice are thrown together.

**SCQ : +3, -1**

- (A)  $\frac{2}{9}$   
 (B)  $\frac{23}{36}$   
 (C)  $\frac{19}{36}$   
 (D)  $\frac{25}{36}$

38. Simplify :  $\sqrt[3]{2+\frac{10}{3\sqrt{3}}} + \sqrt[3]{2-\frac{10}{3\sqrt{3}}}$

**SCQ : +3, -1**

- (A)  $\frac{2}{\sqrt{3}}$   
 (B)  $2\sqrt{3}$   
 (C)  $\sqrt{3}$   
 (D) 2

39. Which of the following statement/s is/ are **True(T)** or **False(F)** ?

**T/F SCQ : +4, -1**

- (i) If  $\sqrt{(0.16 \times 0.4x)} = 0.4 \times 0.2\sqrt{y}$ , then the value of  $\frac{x}{y}$  is 0.01.  
 (ii) If  $3a = 4b$  and  $a + b = 7\sqrt{29}$ , then the value of  $\sqrt{a^2 + b^2}$  is  $5\sqrt{29}$ .  
 (iii) If  $\sqrt{13 - a\sqrt{10}} = \sqrt{8} + \sqrt{5}$ , then the value of a is -4.

**Code :**

- |     |            |             |              |
|-----|------------|-------------|--------------|
|     | <b>(i)</b> | <b>(ii)</b> | <b>(iii)</b> |
| (A) | F          | T           | T            |
| (B) | T          | F           | F            |
| (C) | T          | T           | F            |
| (D) | T          | F           | T            |

40. Which of the following statement/s is/ are **True(T)** or **False(F)** ?

**T/F SCQ : +4, -1**

- (i) If  $\sqrt[3]{\sqrt{x+0.000009}} = 0.3$ , then the value of  $\sqrt{x}$  is 18.  
 (ii) If  $\sqrt[3]{\frac{x}{729}} + \sqrt[3]{\frac{8x}{729}} + \sqrt[3]{\frac{27x}{5832}} = 1$ , then the value of x is 8.  
 (iii) The cube root of a rational number

$$\frac{x}{y} \text{ is } \frac{\sqrt[3]{x}}{\sqrt{y}}$$

**Code :**

- |     |            |             |              |
|-----|------------|-------------|--------------|
|     | <b>(i)</b> | <b>(ii)</b> | <b>(iii)</b> |
| (A) | F          | T           | F            |
| (B) | T          | F           | F            |

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(C) T T F

(D) T F T

**41.** Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

**MTC SCQ : +4, -1**

**Column - I**

**Column - II**

**P.** Sum of all interior angle of a polygon, when no. of side is x.

**1.**  $360^\circ$

**Q.** Sum of all exterior angle in a polygon:

**2.**  $\frac{(x-2) \times 180^\circ}{x}$

**R.** Each exterior angle in a regular polygon:

**3.**  $\frac{360^\circ}{x}$

**S.** Each interior angle in a regular polygon:

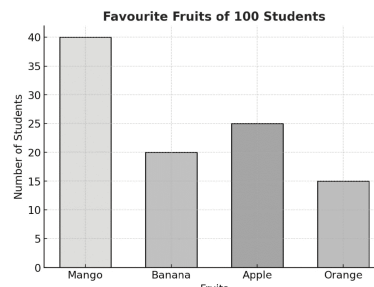
**4.**  $(x-2) \times 180^\circ$

**Code :**

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	1	2	3	4
(B)	4	1	3	2
(C)	3	1	4	2
(D)	2	1	4	3

**42.** Match **Column - I** with **Column - II** and select the correct answer using the codes given below.

A bar graph shows the favourite fruits of 100 students :



Mango = 40

Banana = 20

Apple = 25

Orange = 15

**MTC SCQ : +4, -1**

**Column - I**

**Column - II**

**P.** Probability of Choosing a student who like mango

**1.** 0.40

**Q.** Probability of choosing a student who like banana

**2.** 0.20

**R.** Probability of choosing a student who does not like orange

**3.** 0.85

**S.** Probability of choosing a student who like apple or orange

**4.** 0.40

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*Space for rough work*

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**Code :**

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	1	2	3	4
(B)	4	3	2	1
(C)	3	1	4	2
(D)	2	1	4	3

**Paragraph for Questions 43 & 44**

Ramesh wanted to buy a laptop online. The website shows the laptop marked price as Rs. 50,000. During the festival sale. The company announced a 15% discount on all electronic items. Further a coupon code gave an extra 10% discount on the already discounted price. After applying both discount, 18% GST was charged on the selling price. Ramesh paid the final bill using his credit card.

- 43.** Find the final price Ramesh paid for the laptop after both discounts but before GST.

**SCQ : +3, -1**

- (A) Rs. 38250  
 (B) Rs. 43158  
 (C) Rs. 48515  
 (D) Rs. 46815

- 44.** Find the total amount he paid after including 18% GST.

**SCQ : +3, -1**

- (A) Rs. 45153  
 (B) Rs. 45351  
 (C) Rs. 45135  
 (D) None of these

**Paragraph for Questions 45 & 46**

Rationalisation is a process of removing the root ( $\sqrt{\quad}$ ) from the denominator of a fraction. It is useful in simplifying expressions. For example, if a student needs to simplify :  $\frac{1}{\sqrt{3}}$ .

He multiplies numerator and denominator by  $\sqrt{3}$ .

$$\frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

In daily life, rationalisation appears in calculation of diagonals, distance and trigonometric values. To rationalise denominator like  $\frac{1}{\sqrt{5}+2}$ , we multiple numerator and denominator with its conjugate  $\sqrt{5}-2$ .

$$\frac{1}{\sqrt{5}+2} \times \frac{\sqrt{5}-2}{\sqrt{5}-2} = \frac{\sqrt{5}-2}{(\sqrt{5})^2-(2)^2} = \frac{\sqrt{5}-2}{5-4} = \sqrt{5}-2$$

thus, rationalisation helps us get rid of irrational number in the denominator.

*Space for rough work*

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45. Rationalise :  $\frac{1}{\sqrt{7} + \sqrt{3} - \sqrt{2}}$

**SCQ : +3, -1**

(A)  $\frac{3\sqrt{3} + 4\sqrt{2}}{10}$

(B)  $\frac{-\sqrt{7} - 3\sqrt{3} + 4\sqrt{2} - \sqrt{42}}{10}$

(C)  $-\frac{\sqrt{7} - 3\sqrt{3} + 4\sqrt{2} - \sqrt{42}}{10}$

(D)  $\frac{\sqrt{7} - 3\sqrt{3} + 4\sqrt{2}}{10}$

46. If  $\frac{5 + \sqrt{3}}{7 - 4\sqrt{3}} = 94a + 3\sqrt{3}b$ , then find the value of  $2(a + b)$ .

**SCQ : +3, -1**

(A) 19

(B) 21

(C) 17

(D) 20

47. A coin is tossed 10 times and outcomes are observed as T, H, T, T, H, H, T, H, H and H. Find the probability of getting a tail.

**MCQ : +5, -0**

(A)  $\frac{4}{10}$

(B)  $\frac{2}{5}$

(C) 0.4

(D) All of these

48. In a triangle, two exterior angles are  $110^\circ$  and  $120^\circ$ . Which statements are correct ?

**MCQ : +5, -0**

(A) The third exterior angle is  $130^\circ$

(B) The third interior angle is  $50^\circ$

(C) The sum of all three interior angle is  $180^\circ$ .

(D) The triangle is obtuse angled.

49. The marks of 10 students are : 12, 15, 18, 20, 22, 25, 30, 30, 35, 20. Which statements are correct.

**MCQ : +5, -0**

(A) The mean is 22.7.

(B) The mode is 25.

(C) The median is 21.

(D) The range is 23.

50. A sum of Rs. 12000 is invested at 10% per annum. Which of the following are correct ?

**MCQ : +5, -0**

(A) Simple interest in 2 years is Rs. 2400.

(B) Compound interest in 2 years (compounded annually) is Rs. 2520.

(C) Difference between C.I. and S.I. is Rs. 120.

(D) Simple interest in 3 years is Rs. 3600.

*Space for rough work*

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**PART V : LOGICAL REASONING & IQ**

This section contains **10 Questions (Q : 51 to Q : 60)**. Each question has four choices **(A), (B), (C) and (D)**.

**51.** There is one wrong element in given series. Find out that element :

27, 28, 32, 59, 315, 3450

**SCQ : +3, -1**

- (A) 28
- (B) 3450
- (C) 59
- (D) 315

**52.** Find the next term of given letter series :

ZBA, YDC, XFE, WHG, VJI, ?

**SCQ : +3, -1**

- (A) KLU
- (B) HIJ
- (C) URS
- (D) ULK

**53.** A unique sequence of letters and numbers is presented. Find the missing term:

A2Z, C6X, F21V, J88T, ?

**SCQ : +3, -1**

- (A) P440R
- (B) O275S
- (C) O445R
- (D) P225S

**54.** If a means '+', b means '-', c means '×' and d means '÷', then

18 c 14 a 6 b 16 d 4 = ?

**SCQ : +3, -1**

- (A) 63
- (B) 254
- (C) 288
- (D) 1208

**55.** In this question, relationship between different elements is shown in the statements. These statements are followed by two conclusions.

**Statements:**  $I > W > T > N$ ,

$I = F = G = C$

**Conclusions:** I.  $G > N$

II.  $F > T$

**SCQ : +3, -1**

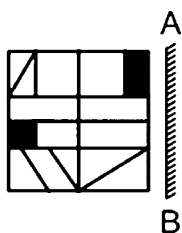
- (A) Only conclusion I is true.
- (B) Only conclusion II is true.
- (C) Neither conclusion I nor II is true.
- (D) Both conclusions I and II are true

*Space for rough work*

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56. Find the mirror-image of given figure (AB is a mirror) :



**SCQ : +3, -1**

- (A)
- (B)
- (C)
- (D)

57. In a row, Tanuj is 15th from the left end. Naina is 56th from the right end and 16th to the right of Rohit. If all facing towards North, then find out the total number of persons in the row?

**SCQ : +3, -1**

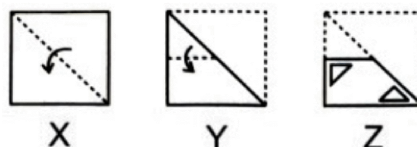
- (A) 70
- (B) 86
- (C) 91
- (D) Can't be determined

58. Rama is 17th from the left end and 13th to the right of Kapil who is 37th from the right end. If all of them are facing North. Find out the total number of persons in the row?

**SCQ : +3, -1**

- (A) 41
- (B) 40
- (C) 44
- (D) 43

59. Choose a figure which would most closely resemble the unfolded form of figure (Z).



**SCQ : +3, -1**

- (A)
- (B)
- (C)
- (D)

60. A person walks 12 km towards North, then walks 15 km towards East, after that walks 19 km towards West and then walks 15 km towards South. How far is the from the starting point?

**SCQ : +3, -1**

- (A) 5 km
- (B) 9 km
- (C) 37 km
- (D) 61 km

*Space for rough work*

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