

FIITJEE INTERNAL MOCK TEST-1

for

Mukhyamantri Vigyan Pratibha Pariksha

(All Class IX Batches)

(SAT)
QP CODE:

Time: 120 Minutes

Maximum Marks: 100

Please read the instructions carefully.

INSTRUCTIONS

- A: The question paper consists of **100** multiple choice questions divided into five sections.
Section – I contains **13** questions of **Physics**.
Section – II contains **13** questions of **Chemistry**.
Section – III contains **14** questions of **Biology**.
Section – IV contains **20** questions of **Mathematics**.
Section – V contains **40** questions of **SST**.
- For each question you will be **awarded 1 mark** if you darken the bubble corresponding to the correct answer and zero mark if no bubbles is darkened or your response is incorrect.
- Attempt **All** questions.
- Use of Calculator is **NOT PERMITTED**.
- All symbols have their usual meanings, if not mentioned in the question.
- The Question Paper contains blank spaces for your rough work.
No additional sheets will be provided for rough work.
- This booklet also contains **OMR** answer sheet.

Enrollment No. : Batch : _____

Name : _____

Candidate's Signature _____ Invigilator's Signature: _____

Section – I

Physics (1 – 13)

1. The area under a speed-time graph is represented by the unit
 (A) m (B) m²
 (C) m³ (D) m⁻¹

1. A
 Sol. Area under speed – time graph gives distance.

2. A car covers distance S₁ with velocity V₁ and distance S₂ with velocity V₂ between two cities P and Q. Its average velocity will be

(A) $\frac{V_1 + V_2}{2}$ (B) $\frac{V_1 - V_2}{2}$
 (C) $\frac{(S_1 + S_2)V_1V_2}{S_1V_2 + S_2V_1}$ (D) $\frac{S_1V_2 + S_2V_1}{(S_1 + S_2)V_1V_2}$

2. C

Sol. Average velocity = $\frac{S_1 + S_2}{\frac{S_1}{V_1} + \frac{S_2}{V_2}}$
 $= \frac{V_1V_2(S_1 + S_2)}{S_1V_2 + S_2V_1}$

3. A car, moving with a speed of 50 km/h, can be stopped by brakes after at least 6m. If the same car is moving at a speed of 100 km/h, the minimum stopping distance is

(A) 6 m (B) 12 m
 (C) 18 m (D) 24 m

3. D

Sol. $0 = u^2 - 2ax$
 $0 = (2u)^2 - 2ax_1$
 $x_1 = 4x$

4. If a particle starts from rest with acceleration 2 m/sec² find distance moved in 10th second.

(A) 18 m (B) 19 m
 (C) 20 m (D) None of these

4. B

Sol. $S_{10^{th}} = 0 + \frac{2}{2}(2 \times 10 - 1) = 19 \text{ m}$

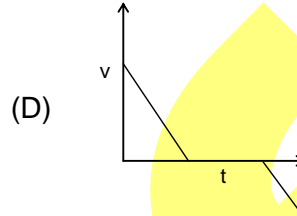
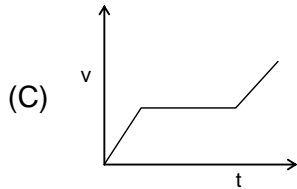
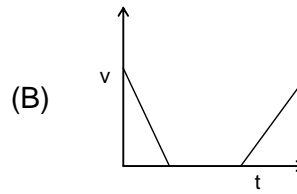
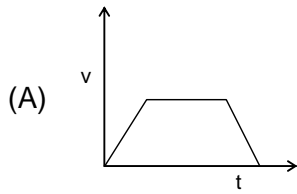
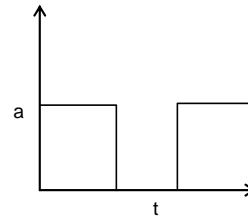
5. A ball is thrown in the vertically upward direction taking air resistance into account if t₁ is the time of ascent and t₂ the time of descent, how are t₁ and t₂ related to each other?

(A) t₁ = t₂ (B) t₁ > t₂
 (C) t₂ > t₁ (D) none of these

5. C

Sol. $t_1 = \sqrt{\frac{2h}{g+a}}$ and $t_2 = \sqrt{\frac{2h}{g-a}}$
 Hence, t₂ > t₁

6. Acceleration-time graph of a body is shown in figure. The velocity-time graph of the same body will be

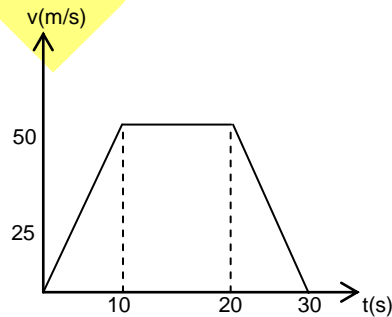


6. C
Sol. When acceleration is constant, velocity increases uniformly with time and when $a = 0$, velocity is constant.

7. A ball is thrown upwards. After leaving the hand, the acceleration of ball
(A) remains constant (B) increases
(C) decreases (D) is zero

7. A
Sol. Acceleration of ball remains constant which is equal to 9.8 m/s^2 .

8. Figure shows velocity time graph for a particle in rectilinear motion. Find the displacement covered by the object in thirty seconds
(A) 500 m
(B) 750 m
(C) 650 m
(D) 1000 m



8. D
Sol. Area under $v - t$ graph gives displacement

$$S = \frac{1}{2}(10 + 30) \times 50 = 1000 \text{ m}$$

9. A particle is moving in a circle of diameter 5 cm. The distance covered when it completes 3 revolutions is
(A) $10 \pi \text{ cm}$ (B) $15 \pi \text{ cm}$
(C) $5 \pi \text{ cm}$ (D) $30 \pi \text{ cm}$

9. B
Sol. $S = 3(2\pi r)$
 $= 6\pi \times 2.5 \Rightarrow 15 \pi \text{ cm}$

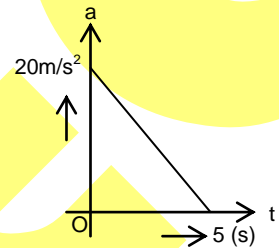
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10. A particle experiences constant acceleration for 20 seconds after starting from rest. If it travels a distance s_1 in the first 10 seconds and distance s_2 in the next 10 seconds, then
 (A) $s_2 = s_1$ (B) $s_2 = 2s_1$
 (C) $s_2 = 3s_1$ (D) $s_2 = 4s_1$

10. C

Sol. $s_1 = \frac{1}{2} \times a \times (10)^2 = 50 a$
 $s_1 + s_2 = \frac{1}{2} \times a \times (20)^2 = 200 a$
 $s_1 + s_2 = 4s_1$
 $s_2 = 3s_1$

11. A particle starts from rest. Its acceleration (a) versus time (t) varies as shown in the fig. The maximum speed of the particle will be
 (A) 50 m/s
 (B) 55 m/s
 (C) 60 m/s
 (D) 70 m/s



11. A

Sol. $v - u = \text{area under } a - t \text{ graph}$
 $= \frac{1}{2} \times 20 \times 5 = 50$
 $v = 50 \text{ m/s}$

12. A clock has a minute hand 10 cm long. Find the average velocity between 6.00 AM and to 6.30 am for the tip of the minute hand.
 (A) $\frac{22}{21} \text{ cm min}^{-1}$ (B) $\frac{2}{21} \text{ cm (min}^{-1})$
 (C) $\frac{12}{21} \text{ cm (min}^{-1})$ (D) $\frac{2}{3} \text{ cm (min}^{-1})$

12. D

Sol. $V_{(av)} = \frac{\text{Total displacement}}{\text{Total time}}$
 $V_{(av)} = \frac{20 \text{ cm}}{30 \text{ min}} = \frac{2}{3} \text{ cm / min}$

13. If a car covers $\frac{2}{5}$ of the total distance with speed v_1 & $\frac{3}{5}$ of distance with speed v_2 , then average speed is

(A) $\frac{1}{2} \sqrt{v_1 v_2}$ (B) $\frac{v_1 + v_2}{2}$
 (C) $\frac{2v_1 v_2}{v_1 + v_2}$ (D) $\frac{5v_1 v_2}{3v_1 + 2v_2}$

13. D

Sol. $\langle v \rangle = \frac{s}{\frac{2s}{5v_1} + \frac{3s}{5v_2}}$

Section – II

Chemistry (14 – 26)

14. Ice floats on the surface of water because
 (A) it is heavier than water
 (B) the density of both water and ice is the same
 (C) ice is lighter than water
 (D) none of these
14. C
 Sol. Due to presence of open spaces in the cage like structure of ice its density is less than water, hence ice is lighter than water.
15. Which of the following statements is not correct?
 (A) Matter is continuous in nature.
 (B) Interparticle spaces are maximum in the gaseous state of a substance.
 (C) Particles which constitute the matter follow a zig-zag path.
 (D) Solid state is the most compact state of a substance.
15. C
 Sol. Only in gaseous state the particles follow a zig-zag path.
16. A liquid is kept in a China dish. The evaporation of the liquid can be accelerated by
 (A) keeping the dish in the open (B) blowing air into the liquid
 (C) keeping the dish under a running fan (D) all of these
16. D
 Sol. The rate of evaporation increases by increasing the surface area, blowing of wind and increasing the temperature.
17. Which one of the following statements is wrong for gases?
 (A) Gases do not have a definite shape and volume.
 (B) Volume of the gas is equal to the volume of the container confining the gas.
 (C) Confined gas exerts uniform pressure on the walls of container in all directions.
 (D) Mass of the gas cannot be determined by weighing a container in which it is enclosed.
17. D
 Sol. The mass of gas can be determined by weighing the empty container first, then filling it with gas and again weighing the container filled with gas. The difference of two readings gives the mass of gas.
18. Which of the following states has the least energetic molecules?
 (A) Solid (B) Liquid
 (C) Gas (D) Plasma
18. A
 Sol. Due to lowest kinetic energy, the molecules of solid do not move from their positions.
19. At higher altitudes
 (A) boiling point of a liquid increases (B) boiling point of a liquid decreases
 (C) no change in boiling point (D) melting point of solid increases
19. B
 Sol. At high altitudes as the pressure decreases boiling point of a liquid decreases.

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20. Latent heat of fusion is used to
(A) overcome the forces of attraction between molecules in solid state
(B) increase the kinetic energy of molecules in liquid state
(C) overcome the forces of attraction between molecules in liquid state
(D) increase the kinetic energy of molecules in vapour state.

20. A
Sol. Latent heat of fusion is the heat used up in overcoming the forces of attraction between the particles of a solid during the change of solid to liquid without increasing their kinetic energy.

21. When liquid starts boiling, further heat energy which is supplied
(A) is lost to the surroundings as such
(B) increases the temperature of the liquid
(C) increases the kinetic energy of the particles in the liquid
(D) is absorbed as latent heat of vaporisation by the liquid

21. D
Sol. Heat energy is absorbed as latent heat of vaporisation, hence there is no change in temperature till the complete liquid is converted to vapours.

22. The high diffusibility of gases is due to
(A) high intermolecular forces of attraction
(B) high kinetic energy of molecules
(C) restricted translatory motion in upward direction
(D) all of the above.

22. B
Sol. The high diffusibility of gases is due to high kinetic energy of molecules.

23. The electric bulb on long use forms a black coating on its inner surface.
The process associated with this is
(A) melting of tungsten
(B) sublimation of tungsten
(C) oxidation of tungsten
(D) reduction of tungsten

23. B
Sol. Sublimation of tungsten is the process associated with the electric bulb on long use forms a black coating on its inner surface.

24. Which of the following factors are responsible for the change in state of solid carbon dioxide when kept exposed to air?
(i) increase in pressure
(ii) increase in temperature
(iii) decrease in pressure
(iv) decrease in temperature
(A) (i) and (ii)
(B) (i) and (iii)
(C) (ii) and (iii)
(D) (iii) and (iv)

24. C
Sol. Increase in temperature and decrease in pressure are responsible for the change in state of solid carbon dioxide when kept exposed to air.

25. Priya and Kartik wanted to study about diffusion among liquids. They took identical beakers and poured 100 mL in H₂O in both the beakers. Priya heated the water to 50°C but Kartik maintained the water at room temperature. They both added 5 drops of ink into the beaker, what will they notice?
(A) Colour of ink spreads faster in Priya's beaker.
(B) Colour of ink spreads faster in Kartik's beaker.
(C) Colour of ink spreads at the same rate in both beakers.
(D) In both the beakers, ink drops settle down at the bottom without spreading.

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25. A

Sol. On heating, the kinetic energy of the particles increases which increase the diffusion rate. Thus, colour of ink spreads faster in Priya's beaker.

26. High melting point of a compound indicates

(A) strong intermolecular forces

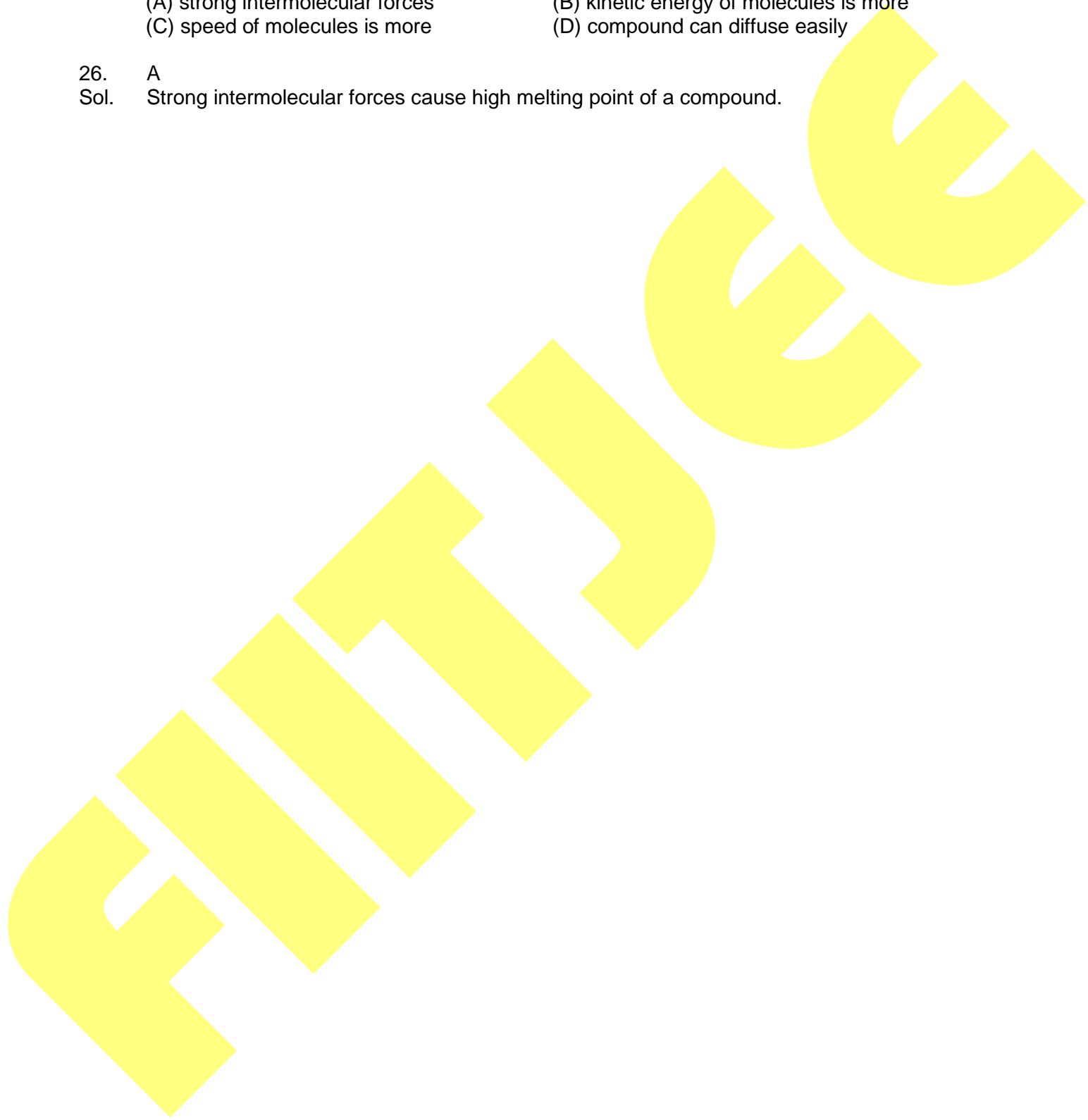
(B) kinetic energy of molecules is more

(C) speed of molecules is more

(D) compound can diffuse easily

26. A

Sol. Strong intermolecular forces cause high melting point of a compound.



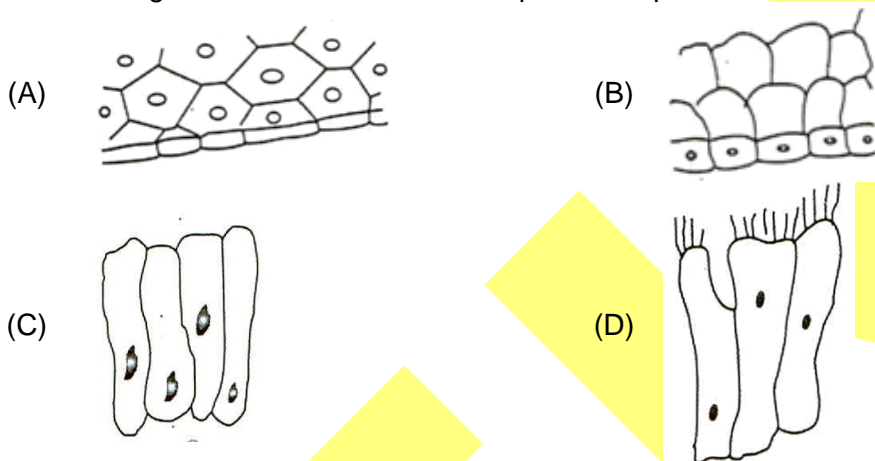
Section – III
Biology
(27 – 40)

27. Definite shape of cell is seen in case of:
 (A) Animal cells (B) Plant cells
 (C) Both animal and plants cells (D) Neither animal nor plant cells

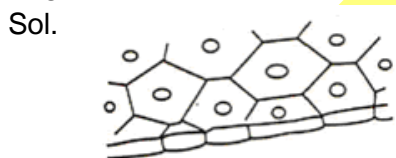
Ans. **B**

Sol. The definite shape of cell is seen in **plant cells** as plant cells have cell wall

28. Observe the shape of cells in the four drawings of the epithelium from lining of the mouth. The drawing that most resembles the squamous epithelium under the microscope is:



Ans. **A**



29. The process that involves the fusion of membrane of vesicle with the plasma membrane to extrude vesicle contents to the surrounding medium is called:
 (A) endocytosis (B) exocytosis
 (C) pinocytosis (D) phagocytosis

Ans. **B**

Sol. The process that involves the fusion of membrane of vesicle with the plasma membrane to extrude vesicle contents to the surrounding medium is called **exocytosis**.

30. Spinal cord and brain are made of:
 (A) Muscular tissue (B) Vascular tissue
 (C) Nervous tissue (D) Skeletal tissue

Ans. **C**

Sol. **Nervous tissue** is found in the brain, spinal cord, and nerves. It is responsible for coordinating and controlling many body activities.

31. Karyokinesis differs from cytokinesis as it involves division of:
 (A) nucleus (B) cytoplasm
 (C) both nucleus and cytoplasm (D) cell

Ans. **A**

MVPP-Mock Test-1-SAT

Sol. Karyokinesis is the process of division of **the nucleus of a cell** during the phase of division (mitosis or meiosis), while cytokinesis is the process of division of the cytoplasm of the cell.

32. Which one of the following is a simple permanent tissue found in the mesophyll of leaves?
 (A) Aerenchyma (B) Collenchyma
 (C) Chlorenchyma (D) Sclerenchyma

Ans. **C**

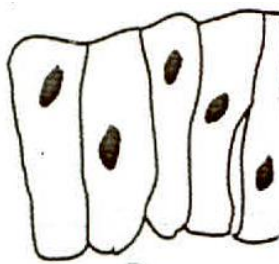
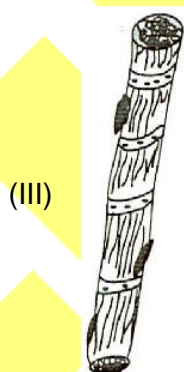
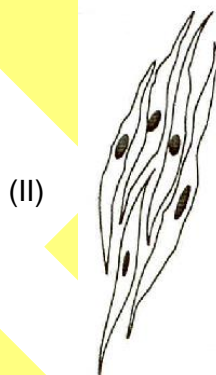
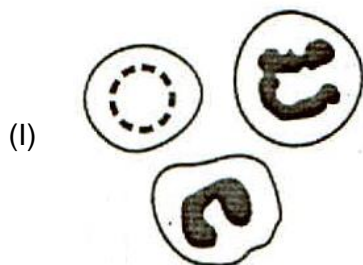
Sol. The ground tissue present between upper and lower epidermis of leaves is called mesophyll. Mesophyll tissue is made up of parenchyma cells and has chloroplasts. Such parenchyma with chloroplasts is called **chlorenchyma** and it performs photosynthesis.

33. Which of the following sets of organelles has DNA?
 (A) Nucleus, ribosomes, chloroplasts (B) Mitochondria, ribosomes, chloroplasts
 (C) Nucleus, ribosomes, mitochondria (D) Nucleus, mitochondrion, chloroplast

Ans. **D**

Sol. Although **most DNA is packaged in chromosomes within the nucleus**, mitochondria also have a small amount of their own DNA. This genetic material is known as mitochondrial DNA or mtDNA.

34. Four slides were observed under the microscope for spot test as shows below. The correct identification of the four spots is



- (A) III – striated muscle fibre
 (C) I - RBCs

- (B) II – skeletal muscle fibre
 (D) IV – Meristematic tissue

Ans. **A**

Sol.



35. Which of the following statements about Lysosomes is incorrect?
(A) they may be autophagic
(B) they are filled with acid hydrolase and other enzymes
(C) they are monomorphic and uniform in structure and function
(D) they can digest proteins, nucleic acids, lipids and polysaccharides

Ans. **C**

Sol. Lysosomes are not monomorphic in nature and do not have similar functions and structures. "Lysosomes are **sphere-shaped sacs filled with hydrolytic enzymes** that have the capability to break down many types of biomolecules." In other words, lysosomes are membranous organelles whose specific function is to breakdown cellular wastes and debris by engulfing it with hydrolytic enzymes.

36. A plant cell is placed in a solution whose solute concentration is twice as great as the concentration of the cell cytoplasm. The plasma membrane is selectively permeable, allowing water but not solutes to pass through. What will happen to the cell?
(A) the cell will swell because of endosmosis
(B) the cell will shrivel because of exosmosis
(C) no change will occur because it is a plant cell
(D) the cell will shrivel because of active transport of water

Ans. **B**

Sol. **The cell will shrivel** because of exosmosis. Exosmosis will occur as the concentration inside the cell is half than outside, hence, water will move from the cytoplasm to the surrounding medium causing the cell to shrivel.

37. The essential gene material is:
(A) deoxyribonucleic acid
(B) ribonucleic acid
(C) fats and proteins
(D) proteins

Ans. **A**

Sol. **DNA (deoxyribonucleic acid) is the cell's genetic material, contained in chromosomes within the cell nucleus and mitochondria.** Except for certain cells (for example, sperm and egg cells and red blood cells), the cell nucleus contains 23 pairs of chromosomes. Deoxyribonucleic acid (DNA) is a molecule that **encodes an organism's genetic blueprint.** In other words, DNA contains all of the information required to build and maintain an organism.

38. The fluid part of a cell known as cell sap is the:
(A) non-living content of cytosol
(B) living content of cytosol
(C) non-living content of vacuole of the cell
(D) living content of vacuole of the cell

Ans. **C**

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Sol. The fluid part of the cell called the cell sap is the non-living content of the vacuole of the cell. Vacuoles are the membrane-bounded organelle which plays an important role in storage and secretion. It helps in osmoregulation.

39. Match the following and choose the correct option:

Column-I		Column-II	
i	Muscle cells	p	Carry message
ii	Vascular tissue	q	Contract and relax of cause movement
iii	Blood	r	Conduct water minerals and organic solutes from one part of organisms to other
iv	Nerve cell	s	Transport O ₂ , food, hormone and waste material

(A) i – p, ii – q, iii – r, iv - s
(C) i – q, ii – s, iii – q, iv - r

(B) i – q, ii – r, iii – s, iv – p
(D) i – p, ii – q, iii – s, iv – r

Ans. **B**

Sol. i – q, ii – r, iii – s, iv – p

Column-I		Column-II	
i	Muscle cells	q	Contract and relax of cause movement
ii	Vascular tissue	r	Conduct water minerals and organic solutes from one part of organisms to other
iii	Blood	s	Transport O ₂ , food, hormone and waste material
iv	Nerve cell	p	Carry message

40. Catalase enzyme is carried out by:

(A) Lysosome
(C) Peroxisome

(B) Mitochondria
(D) Oxysome

Ans. **C**

Sol. Catalase (CAT) is a heme-containing enzyme that is one of the most potent catalysts known (Salin, 1988); it is found abundantly in a **cellular compartment called the peroxisome**.

Catalase is located in all major sites of **H₂O₂ production** in the **cellular environment (such as peroxisomes, cytosol and chloroplast)** of **higher plants**. Multiple molecular forms of catalase isozymes indicate its versatile role within the plant system.

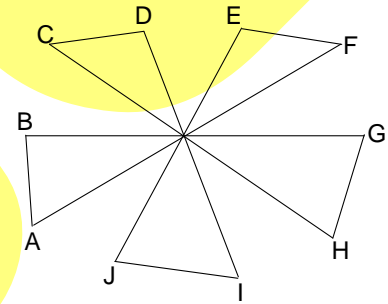
Section – IV
Mathematics
 (41 – 60)

41. The value of $\sqrt[3]{20+14\sqrt{2}} + \sqrt[3]{20-14\sqrt{2}}$ is
 (A) 20 (B) 14
 (C) 6 (D) 4

Ans. **D**

Sol.
$$\begin{aligned} &\sqrt[3]{20+14\sqrt{2}} + \sqrt[3]{20-14\sqrt{2}} \\ &= \sqrt[3]{8+3 \times 2 \times (\sqrt{2})^2 + 3 \times 2^2 \times \sqrt{2} + 2\sqrt{2}} + \sqrt[3]{8+3 \times 2 \times (\sqrt{2})^2 - 3 \times 2^2 \times \sqrt{2} - 2\sqrt{2}} \\ &= \sqrt[3]{2^3 + (\sqrt{2})^3 + 3 \times 2^2 \times \sqrt{2} + 3 \times 2 \times (\sqrt{2})^2} + \sqrt[3]{2^3 - (\sqrt{2})^3 - 3 \times 2^2 \times \sqrt{2} + 3 \times 2 \times (\sqrt{2})^2} \\ &= \sqrt[3]{(2 + \sqrt{2})^3} + \sqrt[3]{(2 - \sqrt{2})^3} \\ &= 2 + \sqrt{2} + 2 - \sqrt{2} = 4 \end{aligned}$$

42. In the given figure, AF, BG, CH, DI, EJ are straight lines. Then $\angle A + \angle B + \angle C + \dots + \angle J = ?$
 (A) 600° (B) 720°
 (C) 900° (D) 360°



Ans. **B**

Sol. Let centre point be O
 $\therefore \angle AOB = \angle FOG$ (vertically opposite angles)
 Similarly $\angle COD = \angle HOI$
 $\angle EOF = \angle JOA$
 $\angle GOH = \angle BOC$
 $\angle IOJ = \angle DOE$
 $\therefore 2(\angle AOB + \angle COD + \angle EOF + \angle GOH + \angle IOJ) = 360^\circ$
 $\therefore \angle AOB + \angle COD + \angle EOF + \angle GOH + \angle IOJ = 180^\circ$
 Now sum of all angles of $\Delta = 180^\circ$
 $\therefore (\angle A + \angle B + \angle AOB) + (\angle C + \angle D + \angle COD) + \dots + (\angle I + \angle J + \angle IOJ) = 5 \times 180^\circ$
 $\Rightarrow \angle A + \angle B + \angle C + \dots + \angle J = 900^\circ - (\angle AOB + \angle COD + \dots + \angle IOJ)$
 $= 900^\circ - 180^\circ$
 $= 720^\circ$

43. If $a^{1/m} = b^{1/n} = c^{1/p}$ and $abc = 1$, then the value of $m+n+p$ is
 (A) 1 (B) 2
 (C) -1 (D) 0

Ans. **D**

Sol. Let $a^{1/m} = b^{1/n} = c^{1/p} = k$
 $\therefore a = k^m, b = k^n$ and $c = k^p$
 Now since $abc = 1$

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$$\begin{aligned} \therefore k^m \times k^n \times k^p &= 1 \\ \Rightarrow k^{m+n+p} &= 1 = k^0 \\ \therefore m+n+p &= 0 \end{aligned}$$

44. Ascending order of magnitude of following surds $\sqrt[4]{3}, \sqrt[6]{7}, \sqrt[12]{48}$ is

- (A) $\sqrt[12]{48} < \sqrt[4]{3} < \sqrt[6]{7}$ (B) $\sqrt[4]{3} < \sqrt[12]{48} < \sqrt[6]{7}$
 (C) $\sqrt[6]{7} < \sqrt[12]{48} < \sqrt[4]{3}$ (D) $\sqrt[12]{48} < \sqrt[6]{7} < \sqrt[4]{3}$

Ans. **B**

Sol.
$$\begin{aligned} \sqrt[4]{3} &= 3^{\frac{1}{4}} = 3^{\frac{1}{4} \times \frac{3}{3}} = 3^{\frac{3}{12}} = 27^{\frac{1}{12}} \\ \sqrt[6]{7} &= 7^{\frac{1}{6}} = 7^{\frac{1}{6} \times \frac{2}{2}} = 7^{\frac{2}{12}} = 49^{\frac{1}{12}} \\ \sqrt[12]{48} &= 48^{\frac{1}{12}} = 48^{\frac{1}{12}} = 48^{\frac{1}{12}} \end{aligned}$$

 Clearly $27^{\frac{1}{12}} < 48^{\frac{1}{12}} < 49^{\frac{1}{12}}$
 $\therefore \sqrt[4]{3} < \sqrt[12]{48} < \sqrt[6]{7}$

45. A streamer goes downstream from one port to another in 4 hours. It covers the same distance up – stream in 5 hours. If the speed of the stream be 2 km/hr, find the distance between the two ports.

- (A) 60 km (B) 80 km
 (C) 40 km (D) 50 km

Ans. **B**

Sol. Let the speed of the streamer be x km/hr and distance covered = y km
 Speed of the stream = 2 km/hr.
 Speed of the stream downstream = $(x + 2)$ km/hr.
 Speed of the stream upstream = $(x - 2)$ km/hr.

$$\frac{\text{Distance}}{\text{Speed}} = \text{time or distance} = \text{speed} \times \text{time}$$

According to questions:

During downstream the distance covered is

$$\begin{aligned} y &= (x + 2) \times 4 \\ &= (4x + 8) \text{ km.} \end{aligned}$$

Also during upstream, the distance covered is

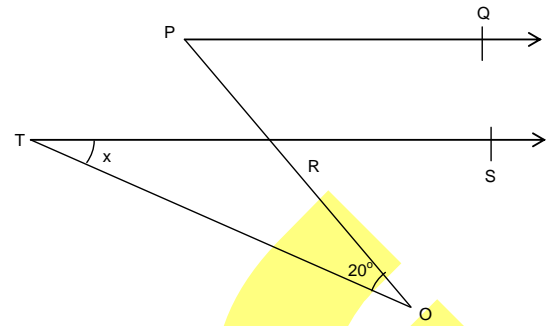
$$\begin{aligned} y &= (x - 2) \times 5 \\ &= (5x - 10) \text{ km} \end{aligned}$$

But distance covered is the same

$$\begin{aligned} 4x + 8 &= 5x - 10 \\ 4x - 5x &= -18 \\ x &= 18 \text{ km/hr.} \end{aligned}$$

$$\therefore \text{Distance between the two ports} = y = (18 + 2) \times 4 = 80 \text{ Km}$$

46. In the given figure
 $PQ \parallel RS$, $\angle QPR = 70^\circ$ $\angle ROT = 20^\circ$. Then find the value of x
 (A) 20°
 (B) 70°
 (C) 110°
 (D) 50°



Ans. D
 Sol. Since $PQ \parallel RS$
 $\therefore \angle QPR = \angle PRT = 70^\circ$ (alternate interior angles)
 Now $\angle PRT = x + 20^\circ$ (exterior angle property)
 $\therefore x = 70^\circ - 20^\circ = 50^\circ$

47. The product of two positive integers is twice their sum, the product is also equal to six times the difference between the two integers. The sum of these integers is
 (A) 6 (B) 7
 (C) 8 (D) 9

Ans. D
 Sol. $a \times b = 2(a + b) = 6(a - b)$
 $\Rightarrow 2a + 2b = 6a - 6b$
 $8b = 4a$
 $a = 2b$
 again $a \times b = 2(a + b)$
 $2b^2 = 2(3b)$
 $b = 3$
 $\therefore a = 6$
 $\therefore a + b = 9$

48. Simplify $\left| \sqrt[3]{6\sqrt{a^9}} \right|^4 \left[\sqrt[6]{3\sqrt{a^9}} \right]^4$; the result is:
 (A) a^{16} (B) a^{12}
 (C) a^8 (D) a^4

Ans. D
 Sol. $\left| \sqrt[3]{6\sqrt{a^9}} \right|^4 \left[\sqrt[6]{3\sqrt{a^9}} \right]^4$
 $= \left[\left[(a^9)^{\frac{1}{6}} \right]^{\frac{1}{3}} \right]^4 \left\{ \left[(a^9)^{1/3} \right]^{1/6} \right\}^4$
 $= \left| a^{\frac{1}{2}} \right|^4 \times a^2$
 $= a^2 \times a^2 = a^4$

49. If $x = (27)^{1/3}$ and $y = (28)^{1/3}$, then the value of $x + y - \frac{1}{x^2 + xy + y^2}$ is
- (A) 1 (B) 3
(C) 6 (D) $\frac{1}{3}$

Ans. **C**

Sol.
$$x + y - \frac{1}{x^2 + xy + y^2} = x + y - \frac{(x - y)}{(x - y)(x^2 + xy + y^2)}$$

$$= x + y - \frac{(x - y)}{x^3 - y^3}$$

Since $x = (27)^{1/3} \Rightarrow x^3 = 27$ and $y = (28)^{1/3} \Rightarrow y^3 = 28$

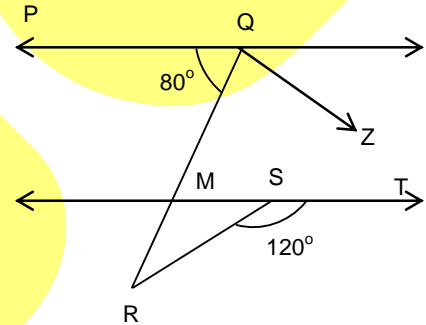
$$\therefore x + y - \frac{(x - y)}{27 - 28} = x + y - \frac{(x - y)}{(-1)}$$

$$= x + y + x - y$$

$$= 2x$$

$$= 2 \times 3 = 6$$

50. In the given figure, if $\angle RQZ = 2\angle QRS$ and $PQ \parallel ST$ then find $\angle RQZ$
- (A) 20° (B) 30°
(C) 40° (D) 50°



Ans. **C**

Sol. Since $\angle RST + \angle RSM = 180^\circ$ (Linear pair)

$$\therefore \angle RSM = 60^\circ$$

Now $\angle PQM = \angle QMT = 80^\circ$ (alternate interior angles)

also $\angle QMT$ is exterior angle of $\triangle RMS$

$$\therefore \angle QMT = \angle MRS + \angle MSR$$

$$\Rightarrow \angle MRS = 80^\circ - 60^\circ = 20^\circ$$

$$\therefore \angle RQZ = 2\angle QRS = 2\angle MRS = 2 \times 20^\circ = 40^\circ$$

51. If $x = 2^{2/3} + 2^{1/3}$, then
- (A) $x^3 - 6x - 6 = 0$ (B) $x^3 + 6x - 6 = 0$
(C) $x^3 - 6x + 6 = 0$ (D) $x^3 + 6x + 6 = 0$

Ans. **A**

Sol.
$$x = 2^{2/3} + 2^{1/3}$$

$$\Rightarrow x^3 = \left(2^{2/3} + 2^{1/3} \right)^3$$

$$\Rightarrow x^3 = \left(2^{2/3} \right)^3 + \left(2^{1/3} \right)^3 + 3 \times 2^{2/3} \times 2^{1/3} \left(2^{2/3} + 2^{1/3} \right)$$

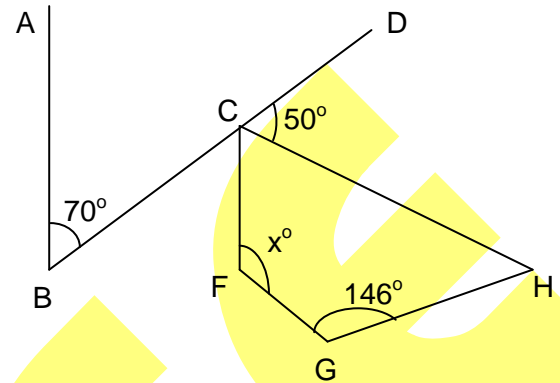
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$$\Rightarrow x^3 = 4 + 2 + 3 \times 2 \times x$$

$$\Rightarrow x^3 = 6 + 6x$$

$$\Rightarrow x^3 - 6x - 6 = 0$$

52. Calculate x° , if $AB \parallel CF$ and $BD \parallel GH$
- (A) 104° (B) 106°
 (C) 50° (D) 146°



Ans. A
 Sol. Since $AB \parallel CF$

$\therefore \angle ABC = \angle BCF = 70^\circ$ (Alternate interior angles)
 $\therefore \angle FCH = 180^\circ - 70^\circ - 50^\circ = 60^\circ$ (Sum of angles on straight line = 180°)
 Also $BD \parallel GH$
 $\therefore \angle HCD = \angle CHG = 50^\circ$ (alternate interior angles)
 Now $x + 60^\circ + 50^\circ + 146^\circ = 360^\circ$ (angle sum property of quadrilateral)
 $\therefore x = 104^\circ$

53. The length of a room exceeds its breadth by 5 metres. If the length be increased by 5 m and breadth decreased by 3m, the area remains the same. Then the length and breadth (in m) of the room are:
- (A) (20, 15) (B) (25, 20)
 (C) (16, 11) (D) (15, 10)

Ans. A
 Sol. Let length be l and breadth be b

$\therefore l - b = 5$ (i)
 Also $(l + 5)(b - 3) = lb$
 $\Rightarrow lb - 3l + 5b - 15 = lb$
 $\Rightarrow -3l + 5b = 15$ (ii)
 Solving equation (i) and (ii) $l = 20m$ and $b = 15m$

54. If $\frac{4 + 3\sqrt{3}}{\sqrt{7 + 4\sqrt{3}}} = A + \sqrt{B}$, then $B - A$ is :
- (A) -13 (B) $2\sqrt{13}$
 (C) 13 (D) $3\sqrt{3} - \sqrt{7}$

Ans. C

Sol. $\frac{4 + 3\sqrt{3}}{\sqrt{7 + 4\sqrt{3}}} = \frac{4 + 3\sqrt{3}}{\sqrt{4 + 3 + 2 \times 2 \times \sqrt{3}}}$
 $= \frac{4 + 3\sqrt{3}}{\sqrt{(2)^2 + (\sqrt{3})^2 + 2 \times 2 \times \sqrt{3}}}$

$$\begin{aligned}
 &= \frac{4 + 3\sqrt{3}}{\sqrt{(2 + \sqrt{3})^2}} \\
 &= \frac{(4 + 3\sqrt{3}) \times (2 - \sqrt{3})}{(2 + \sqrt{3}) \times (2 - \sqrt{3})} \\
 &= \frac{8 - 4\sqrt{3} + 6\sqrt{3} - 9}{1} = A + \sqrt{B} \\
 &= -1 + 2\sqrt{3} = A + \sqrt{B} \\
 &= -1 + \sqrt{12} = A + \sqrt{B} \\
 \therefore A &= -1 \text{ and } B = 12 \\
 \therefore B - A &= 12 - (-1) = 13
 \end{aligned}$$

55. Consider the equation $\frac{7x}{2} - a = \frac{5x}{3} + 9$. The least positive 'a' for which the solution of x to the equation is a positive integer is

- (A) 1 (B) 2
(C) 3 (D) 4

Ans. B

Sol. $\frac{7x}{2} - a = \frac{5x}{3} + 9$

$$\frac{7x}{2} - \frac{5x}{3} = a + 9$$

$$\frac{11x}{6} = a + 9$$

$$x = \frac{6}{11}(a + 9) \text{ for } a = 2$$

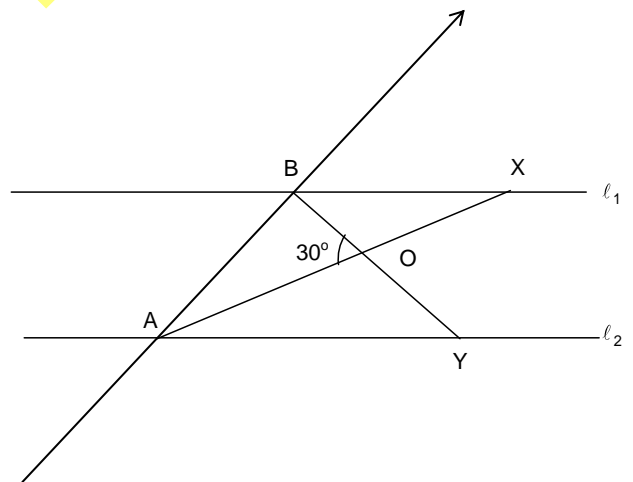
$$x = 6 \text{ (integer)}$$

56. In the figure if $l_1 \parallel l_2$,

$$\angle BAX = \frac{1}{2} \angle BAY, \angle AOB = 30^\circ \text{ and } BO = OX,$$

find $\angle ABX$.

- (A) 155°
(B) 150°
(C) 152°
(D) 154°



Ans. B

Sol. $\therefore \angle AOB = 30^\circ$

$$\Rightarrow \angle BXO = \frac{30^\circ}{2} = 15^\circ \text{ (exterior angle property)}$$

$$\therefore \angle OAY = \angle OXB = 15^\circ \text{ (alternate interior angles)}$$

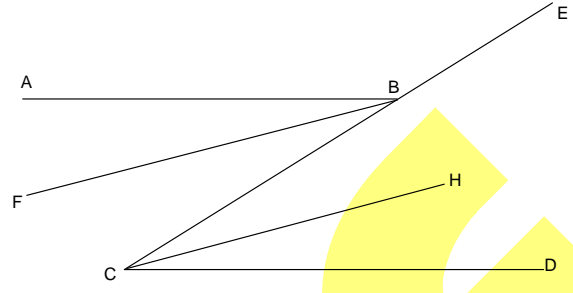
$$\therefore \angle BAO = 15^\circ$$

$$\Rightarrow \angle BAY = 30^\circ$$

$$\therefore \angle ABX = (180^\circ - 30^\circ) = 150^\circ \text{ (co - interior angles)}$$

$\therefore (\ell_1 \parallel \ell_2)$

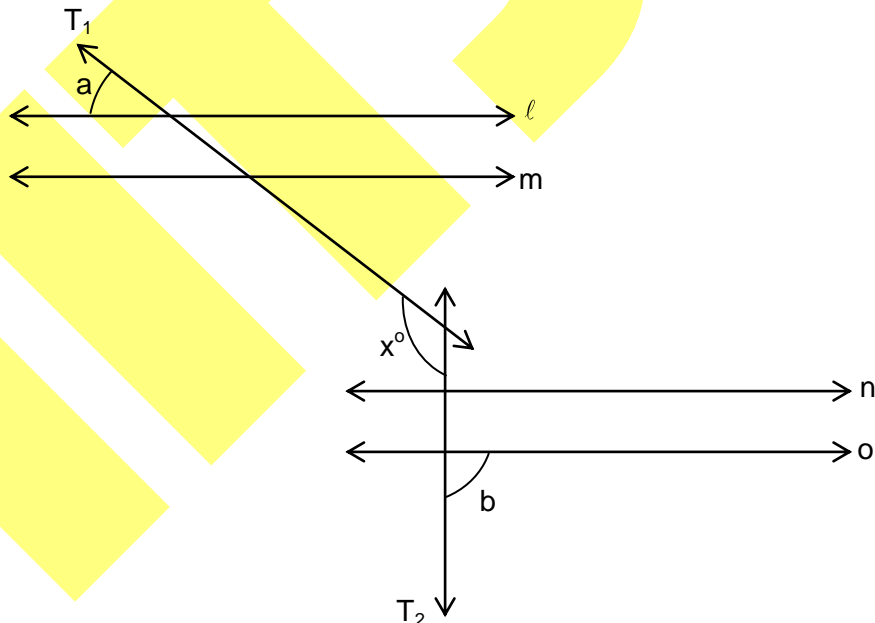
57. In the given figure, $AB \parallel CD$ and transversal CE intersects AB and CD respectively at points B and C . $BF \parallel CH$ such that $\angle FBC = \angle HCD = 30^\circ$, then value of $\angle ABE$ is
 (A) 120°
 (B) 30°
 (C) 150°
 (D) 60°



Ans. A

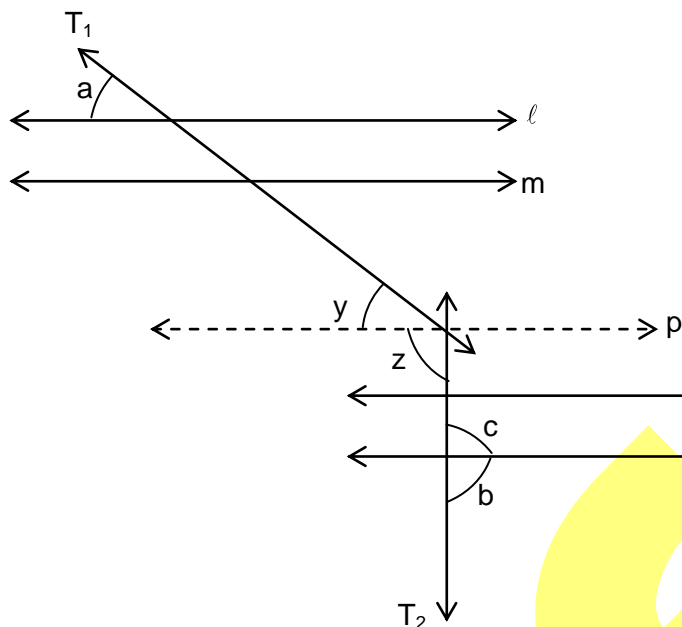
Sol. Since $\angle FBC = \angle HCD = 30^\circ$
 and $\angle FBC = \angle BCH = 30^\circ$ (Alternate interior angles)
 $\therefore \angle ABC = \angle BCD$
 $= \angle BCH + \angle HCD$
 $= 30^\circ + 30^\circ = 60^\circ$
 $\angle ABC + \angle ABE = 180^\circ$ (linear pair)
 $\therefore \angle ABE = 180^\circ - 60^\circ$
 $= 120^\circ$

58. T_1 is the transversal to two parallel lines ℓ and m and T_2 is the transversal to two parallel lines n and o also $m \parallel n$. Express x in terms of a and b .



- (A) $180 + a + b$
 (B) $180 + a - b$
 (C) $180 - a + b$
 (D) $180 - a - b$

Ans. B
 Sol.



Construct a line 'p' parallel to l, m, n & o

Now, $a = y$ (corresponding triangles)

Also $b + c = 180^\circ$ (Linear pair)

$$\therefore c = 180^\circ - b \quad \dots\dots(i)$$

Now $p \parallel o$

$\therefore c = z$ (alternate interior angles)

$$\therefore z = 180^\circ - b \quad [\text{From equation (i)}]$$

Now $x = y + z$

$$\therefore x = a + 180 - b \quad (\because y = a \text{ and } z = 180^\circ - b)$$

$$\therefore x = 180 + a - b$$

59. There were 35 students in a hostel. If the number of students increases by 7, the expenses of the mess increase by Rs. 42 per day while the average expenditure per head diminishes by Re. 1 per day. Find the original expenditure of the mess per day.
- (A) Rs. 12 (B) Rs. 400
(C) Rs. 420 (D) Rs. 200

Ans. C

Sol. Suppose the average initial expenditure was Rs. x and new average expenditure is Rs. y.

Then total initial expenditure = $35x$

When 7 more students join the mess, total expenditure = $35x + 42$

$$\therefore (35 + 7)y = 35x + 42$$

$$\Rightarrow y = \frac{35x + 42}{42}$$

But $y = x - 1$

$$\text{Now, we have } \frac{35x + 42}{42} = x - 1$$

$$\text{or, } 35x + 42 = 42x - 42$$

$$\text{or, } 7x = 84$$

$$\therefore x = 12$$

Thus the original expenditure of the mess per day = $35 \times 12 = \text{Rs. } 420$

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60. The value of x for which $4^{x+2} = 4^x + 480$

(A) $\frac{1}{2}$

(B) $\frac{3}{2}$

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

(D) 3

Ans. **C**

Sol. $4^{x+2} = 4^x + 480$

$$\Rightarrow 4^x \times 4^2 - 4^x = 480$$

$$\Rightarrow 4^x (16 - 1) = 480$$

$$\Rightarrow 2^{2x} = \frac{480}{15} = 32$$

$$\Rightarrow 2^{2x} = 2^5$$

$$\Rightarrow 2x = 5$$

$$\Rightarrow x = \frac{5}{2}$$

Section – V
Social Science
(61 – 100)

61. India has total geographical area of million square km.
(A) 3.258 (B) 2.22
(C) 4.55 (D) 3.50
61. A
62. Choose the right answer from the four alternatives given below: If you intend to visit the island Kavarati during your summer vacation which one of the following Union Territories of India you will be going to:
(A) Pondicherry (B) Andaman and Nicobar
(C) Lakshadweep (D) Diu and Daman
62. C
63. The southernmost latitude of India is
(A) 5° 4' N (B) 6° 4' N
(C) 8° 4' N (D) 10° 5' N
63. C
64. The north to south distance of India is
(A) 2933 km (B) 3214 km
(C) 2944 km (D) 3512 km
64. B
65. Which is the largest state in terms of area?
(A) Maharashtra (B) Uttar Pradesh
(C) Rajasthan (D) Gujarat
65. C
66. Where is Kanchenjunga located?
(A) Nepal (B) Tibet
(C) China (D) India
66. D
67. Which latitude divides India in to almost two equal parts?
(A) Tropic of Cancer (B) Tropic of Capricorn
(C) Equator (D) Arctic Circle
67. A
68. Which is the smallest Indian state (Area wise)?
(A) Sikkim (B) Manipur
(C) Mizoram (D) Goa
68. D

MVPP-Mock Test-1-SAT

69. Where does India exist?
(A) South hemisphere (B) Equator
(C) Northern hemisphere (D) None of these
69. C
70. Where does Majuli Island situate?
(A) Bay of Bengal (B) Arabian Sea
(C) Ganga River (D) Brahmaputra River
70. D
71. Which one of the following countries is not a part of the Indian sub-continent?
(A) Pakistan (B) Turkey
(C) Nepal (D) Bhutan
71. B
72. Which of the following countries is not a neighbouring country of India?
(A) Bangladesh (B) Sri Lanka
(C) Kenya (D) Myanmar
72. C
73. Identify one of the following states through which Tropic of Cancer does not pass
(A) Haryana (B) Tripura
(C) West Bengal (D) Gujarat
73. A
74. Which of the following states of India has the longest coast line?
(A) Andhra Pradesh (B) West Bengal
(C) Maharashtra (D) Gujarat
74. D
75. Which of the following neighbouring countries of India shares its boundary with maximum number of Indian states?
(A) Nepal (B) Pakistan
(C) Bhutan (D) Myanmar
75. A
76. Who was the editor of the paper called 'Ami due peuple'?
(A) Roget de L'Isle (B) Jean Paul Marat
(C) Abbe Sieyès (D) Mirabeau
76. B
77. What does a 'Sceptre' stand for?
(A) A symbol of royal power (B) A symbol of eternity
(C) Knowledge (D) Unity in strength
77. A
78. What is the national anthem of France?
(A) The Marseillaise (B) The Marseillaise
(C) Both A and B (D) None of these

MVPP-Mock Test-1-SAT

78. B
79. What was the name of the assembly which was called in France in 1792?
(A) The Convention (B) The General Assembly
(C) The Directory (D) The National Assembly
79. A
80. Which period is referred to as the Reign of Terror?
(A) 1791-1792 (B) 1793-1794
(C) 1800-1802 (D) 1814-1815
80. B
81. When did the French Revolution take place/start?
(A) 14 July, 1786 (B) 14 July, 1785
(C) 14 July, 1791 (D) 14 July, 1789
81. D
82. Who was the king of France during the French revolution?
(A) Louis XII (B) Louis XVII
(C) Louis XVI (D) Louis I
82. C
83. What is the percentage sharing of peasants in France during 1790?
(A) Approx 80% (B) Approx 90%
(C) Approx 72% (D) None of these
83. B
84. Who charged "Tithes" in France?
(A) King (B) Nobility
(C) Church (D) None of them
84. C
85. What was "Taille"?
(A) An army of the king (B) A type of tax
(C) A group of farmers (D) None of these
85. B
86. Bastille symbolised
(A) Armed might of France (B) Prestige & power
(C) benevolence of the king (D) Despotic power of the king
86. D
87. The most important privileges enjoyed by clergy and nobility?
(A) Right to collect dues (B) Participate in wars
(C) Ownership of land (D) Exemption from taxes to state
87. D

MVPP-Mock Test-1-SAT

88. In context of France, what was 'Tithes'?
- (A) A tax levied by Church
(B) A tax levied on articles of everyday's consumption
(C) Direct tax levied by state
(D) Directly paid to king
88. C
89. The National Assembly of France voted in April 1792, to declare war against
- (A) Britain & Germany (B) Russia & Prussia
(C) Prussia & Austria (D) Italy & Germany
89. C
90. Who was the leader of Jacobins?
- (A) Robespierre (B) Rousseau
(C) Montesquieu (D) Locke
90. A
91. In which year was the Universal Adult franchise granted in India?
- (A) 1947 (B) 1950
(C) 1948 (D) 1949
91. B
92. The number of republics into which the soviet union broke down in 1991 was
- (A) 20 (B) 15
(C) 18 (D) 12
92. B
93. In which country of Africa, democracy was replaced by military in 1966?
- (A) South Africa (B) Ghana
(C) Uganda (D) Bolivia
93. B
94. Which one of the following terms means 'a sudden overthrow of government illegally'?
- (A) Martial law (B) Revolution
(C) Referendum (D) Coup
94. D
95. Which is the most common form of democracy?
- (A) Representative democracy (B) People's democracy
(C) Revolutionary democracy (D) Responsive democracy
95. A
96. The word 'Democracy' is derived from which of the following language?
- (A) Latin (B) Arabic
(C) Greek (D) Farsi
96. C

MVPP-Mock Test-1-SAT

97. Which among the following is not a required basis for Democracy?
(A) Equality (B) Liberty
(C) Secularism (D) Freedom of speech

97. C

98. Who had defined democracy as a government of the people, for the people and by the people?
(A) Plato (B) Aristotle
(C) Socrates (D) Abraham Lincoln

98. D

99. When did General Pervez Mushrraf hold a referendum in Pakistan?
(A) 2001 (B) 2002
(C) 2003 (D) 2004

99. B

100. Who has the power to appoint the president in China?
(A) National people's Congress (B) National Labour Party
(C) Congress party of China (D) None of these

100. A