FIITJEE INTERNAL MOCK TEST-1
PART TEST – I
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: _____

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Section – I
Physics (1 – 13)

1. A body starts from rest and moves with uniform acceleration of 5 m/s² for 8 sec. From that time the acceleration ceases. The distance covered in a 12 sec starting from rest would be
   (A) 160 m   (B) 320 m
   (C) 200 m   (D) zero

1. **B**
Sol. $s_1 = ut + \dfrac{at^2}{2}$; v = u + at

   $s_2 = 4v$ (as body moves with constant velocity for last 4 sec).

2. Velocity-time graph for a body moving in a straight line is given. What is the displacement of the body?
   (A) 43.2 m
   (B) 28.8 m
   (C) 36.0 m
   (D) 72.0 m
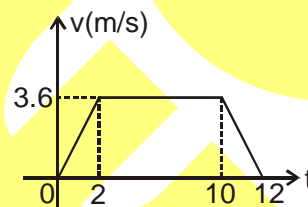
2. **C**
Sol. Area under velocity time graph gives displacement.

3. A scooter generally slips on an oily road, because
   (A) friction between tyres and road is large.
   (B) friction between tyres and road is not sufficient.
   (C) inertia between tyres and road is large.
   (D) tyres of a scooter cannot rotate.

3. **B**
Sol. If the friction between tyres and road is not sufficient scooter generally slips.

4. The frictional force due to air resistance on a body of mass 0.25 kg falling downwards with acceleration 9.2 m/s^2 is:
   (A) 2.45 N   (B) 2.3 N   (C) 4.75 N   (D) 0.15 N

4. **D**
Sol. $ma = mg - f_f$

5. A particle has an initial velocity 11 m/s due east and a constant acceleration of 2 m/s^2 due west. The displacement covered by the particle in sixth second is
   (A) Zero   (B) 0.5 m
   (C) 1 m   (D) 2 m
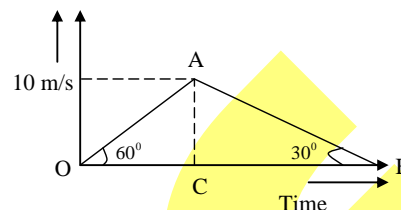
5. **A**
Sol. $s = ut + \dfrac{at^2}{2}$

6. A train 100 m long traveling at 40 ms^{-1} overtakes another train 200 m long traveling at 30 ms^{-1}. The time taken by the first train to pass the second train is:
   (A) 30 s   (B) 40 s
   (C) 50 s   (D) 60 s

6. **A**

Sol. $t = \dfrac{300}{10} = 30$ s

7.   The velocity time graph of a body is shown in figure. The ratio of the average velocity during the interval OA and AB is
(A) $3:1$ (B) $1:5$
(C) $1:1$ (D) $5:1$

7.   **C**
Sol.   Average velocity = $\dfrac{(v_f - v_i)}{2}$

8.   Two bodies A and B of mass 100 g and 200 g respectively are dropped near the earth's surface. Let the accelerations of A and B be a_1 and a_2 respectively. Now these two bodies are tied together and the joint body is dropped near the earth surface and falls with an acceleration, a_3, then
(A) $a_1 = a_2 = a_3$ (B) $a_1 < a_2 > a_3$
(C) $a_1 > a_2 > a_3$ (D) $a_1 \neq a_2 \neq a_3$

8.   **A**
Sol.   Each mass will experience acceleration equal to g.

9.   A body of mass 100 g is dropped form height 20 m it rebounce back in same medium and goes up to height 0.8 m. It contact time is 0.04 second then the force exerted by earth on body is
(A) 200 N   (B) 400 N
(C) 600 N   (D) 60 N

9.   **D**
Sol. $F = \dfrac{\Delta p}{t} = \dfrac{m(v - u)}{t}$; $u = \sqrt{(2gh)} = 20$ m/s ; $v = 4$ m/s

10.   If the earth stops rotating about its own axis, g remains unchanged at:
(A) equator   (B) poles   (C) latitude 45^0 (D) no where

10.   **B**
Sol.   If the earth stops rotating about its own axis, g remains unchanged at pole.

11.   A body of mass 2 kg moving on a horizontal surface with an initial velocity of 4 m/s comes to rest after 2 sec. If one wants to keep this body moving one the same surface with a velocity of 4 m/s, the force required is
(A) 8 N   (B) 4 N
(C) zero   (D) 2

11.   **B**
Sol. $F = 2\,\dfrac{(0 - 4)}{2}$

12.   An athlete runs some distance before taking a long jump because
(A) he gains energy to take him through long distance.
(B) it helps him to apply large force.
(C) by running action and reaction forces increases.
(D) by running the athletes gives himself larger inertia of motion.

12.   **D**

Sol.   Inertia of motion

13.   The net force acting on a body of mass 1 kg moving with uniform velocity 5 m/s is
(A) 5 N   (B) 0.2 N
(C) 0 N   (D) 10 N

13.   **C**
Sol.   Body is moving with constant velocity so acceleration is zero.

Section – II
Chemistry (14 – 26)

14.   Which one is a surface phenomenon?
(A) Evaporation   (B) Boiling
(C) Both (A) and (B)   (D) None of these
14.   A
Sol.   Boiling is a bulk phenomenon

15.   A sample contains two substances and has uniform properties. The sample is
(A) a compound   (B) a heterogeneous mixture
(C) an element   (D) a homogeneous mixture
15.   D
Sol.   A sample contains two substances and has uniform properties. The sample is a homogeneous mixture.

16.   The one, in which interparticle forces are strongest, is
(A) sodium chloride   (B) hydrogen
(C) ether   (D) carbon dioxide
16.   A
Sol.   As sodium chloride is a ionic solid.

17.   The melting point of the solid state of a substance is 40°C. The freezing point of the liquid state of the same substance will be
(A) 35°C   (B) 40°C
(C) 45°C   (D) can't predict
17.   B
Sol.   The freezing point of the liquid state of the same substance will be $40^{\circ}C$.

18.   Which one will help to accelerate the process of evaporation of a liquid kept in an open china dish?
(A) Keeping dish in open   (B) Blowing air into the liquid
(C) Keeping the dish under a running fan   (D) All of the above
18.   D
Sol.   Keeping dish in open, blowing air into the liquid & keeping the dish under a running fan.

19.   When a gas is compressed keeping temperature constant, it results in
(A) increase in speed of gaseous molecules
(B) increase in collision among gaseous molecules
(C) decrease in speed of gaseous molecules
(D) decrease in collision among gaseous molecules
19.   B
Sol.   On compression number of molecules of a gas per unit volume increase thereby increasing intermolecular collision.

20. Which of the following will yield a mixture?
    (A) Crushing of marble tile
    (B) Breaking of ice-cubes
    (C) Addition of sodium metal to water in a china dish
    (D) Agitating a detergent with water in a washing machine.
20. D
Sol. Agitating a detergent with water in a washing machine will yield a mixture.

21. The cause of Brownian movement is
    (A) convection current
    (B) heat changes in liquid state
    (C) impact of molecules of dispersion medium on colloidal particles.
    (D) attractive forces between particles of dispersed phase and dispersion medium.
21. C
Sol. The cause of Brownian movement is impact of molecules of dispersion medium on colloidal particles

22. Which one is a sublime substance?
    (A) Table salt   (B) Sugar
    (C) Iodine   (D) Potassium Iodide
22. C
Sol. Iodine is a sublime substance.

23. Butter is a colloid formed when
    (A) water is dispersed in fat   (B) milk is dispersed in fat
    (C) fat is dispersed in water   (D) milk is dispersed in water
23. A
Sol. Water dispersed in fat in butter.

24. 10 K is equal to
    (A) 283°C   (B) −263°C
    (C) 263°C   (D) −283°C
24. B
Sol. 10 K is equal to −263°C.

25. The process of change of liquid state into gaseous state at constant temperature is known as
    (A) boiling   (B) melting
    (C) fusion   (D) evaporation
25. A
Sol. The process of change of liquid state into gaseous state at constant temperature is known as boiling

26. S.I. unit of temperature is
    (A) Celcius   (B) Fahrenheit
    (C) Kelvin   (D) None of these
26. C
Sol. S.I. unit of temperature is Kelvin

Section – III
Biology
(27 – 40)

27. Amoeba acquires its food through a process termed as
    (A) exocytosis
    (B) endocytosis
    (C) plasmolysis
    (D) ecocytosis and endocytosis both
Ans. **B**
Sol. Amoeba acquires its food through a process termed as **endocytosis**.

28. A Plasmodesmata are located in narrow areas of _____.
    (A) Cell walls
    (B) Protoplasm
    (C) Cellulose
    (D) None of the above
Ans. **A**
Sol. A Plasmodesmata is located in narrow areas of **cell walls**.

29. Cell wall of which one of these is not made up of cellulose?
    (A) bacteria
    (B) hydrilla
    (C) mango tree
    (D) cactus
Ans. **A**
Sol. Cell wall of **bacteria** is not made up of cellulose.

30. Chromosomes are made up of:–
    (A) DNA
    (B) protein
    (C) DNA and protein
    (D) RNA
Ans. **C**
Sol. Chromosomes are made up of **DNA** and **protein**.

31. _____ are cemented to one another, forming an irregular layer. These form the outer protective layer of the skin in an animal's body.
    (A) Connective tissues
    (B) Muscular tissues
    (C) Nervous tissues
    (D) Compound epithelium cells
Ans. **D**
Sol. **Compound epithelium cells** are cemented to one another, forming an irregular layer. These form the outer protective layer of the skin in an animal's body.

32. Epithelial tissue always has an exposed outer surface and an inner surface anchored to connective tissue by a thin, non cellular structure called the:
    (A) non stratified layer
    (B) stratified layer
    (C) basement membrane
    (D) fibroblast
Ans. **C**
Sol. Basement membranes are **thin layers of a specialized extracellular matrix** that form the supporting structure on which epithelial and endothelial cells grow, and that surround muscle and fat cells and the Schwann cells of peripheral nerves.

33. Lipid molecules in the cell are synthesized by
    (A) Smooth Endoplasmic Reticulum
    (B) Rough Endoplasmic Reticulum
    (C) Golgi apparatus
    (D) Plastids
Ans. **A**
Sol. Lipid molecules in the cell are synthesized by **Smooth Endoplasmic Reticulum**.

34. Rapid elongation of a bamboo stem is due to:
    (A) Lateral meristem
    (B) Intercalary meristem
    (C) Apical meristem
    (D) Cambium
Ans. **B**
Sol. Rapid elongation of a bamboo stem is due to **Intercalary meristem**.

35. Which type of tissue forms the inner lining of blood vessel?

(A) epithelial   (B) connective
(C) nervous   (D) muscle

Ans. **A**

Sol. **Epithelial** tissue forms the inner lining of blood vessel.

36. Lysosomes arise from:–
(A) endoplasmic reticulum   (B) Golgi apparatus
(C) nucleus   (D) mitochondria

Ans. **B**

Sol. Lysosomes arise from **Golgi apparatus**.

37. Cardiac muscle fibres are:
(A) branched   (B) striated
(C) involuntary   (D) all the above

Ans. **D**

Sol. Cardiac muscle fibres are **branched**, **striated** and **involuntary**.

38. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?
(A) Golgi apparatus   (B) Lysosomes
(C) Smooth Endoplasmic Reticulum   (D) Vacuoles

Ans. **C**

Sol. **Smooth Endoplasmic Reticulum** plays a crucial role in detoxifying many poisons and drugs in a cell.

39. A cell will swell up if:
(A) the concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium
(B) the concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell
(C) the concentration of water molecules is same in the cell and in the surrounding medium
(D) concentration of water molecules does not matter

Ans. **B**

Sol. A cell will swell up if the concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell.

40. Find out the false statement
(A) Golgi apparatus is involved with the formation of lysosome
(B) Nucleus, mitochondria and plastid have DNA, hence they are able to make their own structural proteins
(C) Mitochondria is said to be the power house of the cell as ATP is generated in them
(D) Cytoplasm is called as protoplasm

Ans. **D**

Sol. Cytoplasm is called as protoplasm.

Section – IV
Mathematics
(41 – 60)

41. Given a and b are real numbers such that $2^{\frac{a}{b}+1} - 2^{\frac{a}{b}-1} = 12$ then find value of $\dfrac{12ab}{a^2 + 27b^2}$

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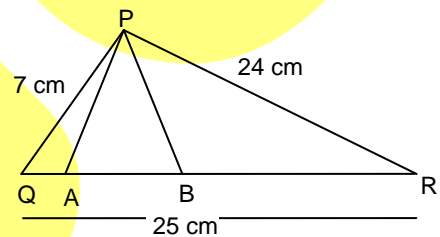(C) 3   (D) 4

Ans. A

Sol. $2^{a/b} = 8 \Rightarrow \dfrac{a}{b} = 3$

$\dfrac{12ab}{a^2 + 27b^2} = \dfrac{36b^2}{36b^2} = 1$

42. The value of $\sqrt{42 + \sqrt{42 + \sqrt{42 + \ldots \infty}}}$ is ………………

(A) 5   (B) 6
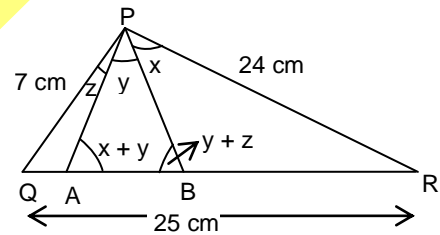(C) 7   (D) 8

Ans. C

Sol. Let $\sqrt{42 + \sqrt{42 + \sqrt{42 + \ldots \infty}}} = x$

$x = \sqrt{42 + x}$

$x^2 = 42 + x$

$x^2 - x - 42 = 0$

$x^2 - 7x + 6x - 42 = 0 \Rightarrow (x - 7)(x + 6) = 0$

$x = 7 \qquad x = -6$

But x = –6 is not possible.

43. PQR is a triangle with sides 7 cm, 25 cm & 24 cm as shown is figure. If A and B are two points on QR such that QA = 1 cm, AB = 6 cm the $\angle APB =$

(A) 30°
(B) 40°
(C) 45°
(D) 60°

Ans. C

Sol. ΔPQB and ΔPRA are isosceles and ΔQPR is right angled triangle

∴ $x + y + z = 90°$ and

$x + y + y + z + y = 180°$ (in ΔABP)

$\Rightarrow y = 45°$

44. If $x = \dfrac{1}{2 - \sqrt{3}}$, then the value of $x^2 - 4x - \sqrt{3}$ will be:

(A) $1 - \sqrt{3}$ (B) $-1 + \sqrt{3}$
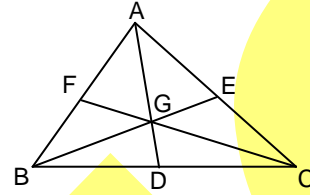(C) $-1 - \sqrt{3}$ (D) $2 + \sqrt{3}$

Ans. **C**

Sol. $x = \dfrac{1}{2 - \sqrt{3}}$

$x = \dfrac{2 + \sqrt{3}}{1}$

$x - 2 = \sqrt{3}$

Squaring both side

$x^2 - 4x + 4 = 3$

$x^2 - 4x = -1$

$x^2 - 4x - \sqrt{3} = -1 - \sqrt{3}$

45.　An acute angled ΔABC has centroid 'G' such that $AG = BC$ then $\angle BGC$ is
　　(A) Acute
　　(B) Obtuse
　　(C) Right angle
　　(D) cannot be determined

Ans.　C

Sol.　Let $AG = 2x$
　　then $GD = x$
　　Given $AG = BC$
　　$\therefore BD = GD = DC$
　　$\angle BGC = 90^{\circ}$

46.　Let x be a four digit positive integer such that the unit digit of x is prime and the product of all digits of x is also prime. How many such integers are possible?
　　(A) 4　　　　　　　　　　　　　　　　(B) 8
　　(C) 3　　　　　　　　　　　　　　　　(D) 5

Ans.　A

Sol.　Since the product is prime number leaving unit digit, all other digits should be 1. The number would be of the form 111x. x can take 2, 3, 5, 7 values so total integer = 4.
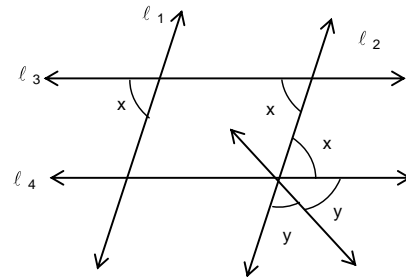
47.　In the given figure, if $\ell_1 \| \ell_2$ and $\ell_3 \| \ell_4$ then which of the following is true?

　　(A) $y = 90 - \dfrac{x}{2}$

　　(B) $y = \dfrac{x}{2}$

　　(C) $y = 90 + \dfrac{x}{2}$

　　(D) $y = 2x$
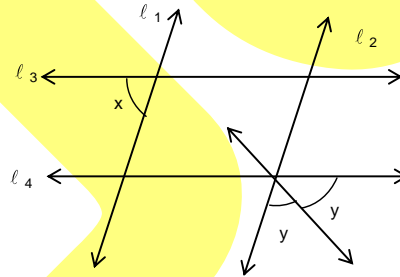
Ans.　A

Sol.　From the figure we have
　　$x + 2y = 180^{\circ} \Rightarrow 2y = 180 - x$
　　$\Rightarrow y = 90 - \dfrac{x}{2}$
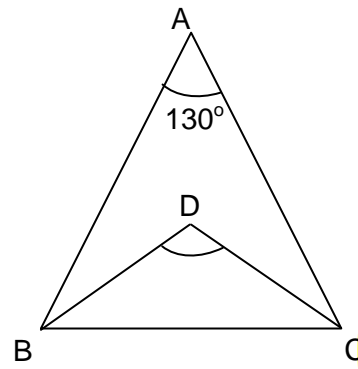

48.　If one angle of a triangle is 130°, then the angle between the angle bisectors of the other two angles is
　　(A) 145°　　　　　　　　　　　　(B) 155°
　　(C) 135°　　　　　　　　　　　　(D) 95°

Ans.　B

Sol. $\angle BDC = 90^{\circ} + \dfrac{130^{\circ}}{2}$

$= 90^{\circ} + 65^{\circ}$

$= 155^{\circ}$

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          A
         /\
        /  \
       / 130°\
      /      \
     /   D    \
    /    /\    \
   /    /  \    \
  B─────────────C
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49.   If $x = \dfrac{2\sqrt{6}}{\sqrt{3}+\sqrt{2}}$, then the value of $\dfrac{x+\sqrt{2}}{x-\sqrt{2}} + \dfrac{x+\sqrt{3}}{x-\sqrt{3}}$ is

(A) 0   (B) 1

(C) 2   (D) $\sqrt{6}$

Ans.   **C**

Sol. $x = \dfrac{2\sqrt{6}}{\sqrt{3}+\sqrt{2}}$

$\dfrac{x}{\sqrt{2}} = \dfrac{2\sqrt{3}}{\sqrt{3}+\sqrt{2}}$

By componendo – dividendo,

$\dfrac{x+\sqrt{2}}{x-\sqrt{2}} = \dfrac{3\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ Again, $\dfrac{x}{\sqrt{3}} = \dfrac{2\sqrt{2}}{\sqrt{3}+\sqrt{2}}$

By componendo – dividendo

$\dfrac{x+\sqrt{3}}{x-\sqrt{3}} - \dfrac{3\sqrt{2}+\sqrt{3}}{\sqrt{2}-\sqrt{3}}$

$\therefore$ given expression $= \dfrac{2\sqrt{3}-2\sqrt{2}}{\sqrt{3}-\sqrt{2}} = 2$

50.   If $x^a = y^b = z^c$ and $y^2 = zx$, then the value of $\dfrac{1}{a} + \dfrac{1}{c}$ is

(A) $\dfrac{b}{2}$ (B) $\dfrac{c}{2}$

(C) $\dfrac{2}{b}$ (D) $\dfrac{2}{a}$
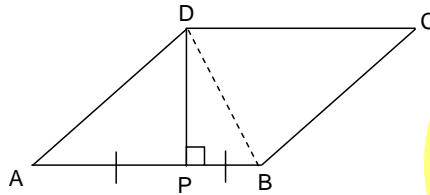
Ans.   **C**

Sol. $x^a = y^b = z^c$

$z = y^{\frac{b}{c}}$ and $x = y^{\frac{b}{a}}$

Now, $y^2 = zx$

$\Rightarrow y^2 = y^{\frac{b}{c}+\frac{b}{a}}$

$\Rightarrow y^2 = y^{b\left(\frac{1}{a}+\frac{1}{c}\right)}$

$\Rightarrow 2 = b\left(\dfrac{1}{a} + \dfrac{1}{c}\right)$

$\Rightarrow \dfrac{1}{a} + \dfrac{1}{c} = \dfrac{2}{b}$

51. ABCD is a rhombus in which altitude from D to side AB bisects AB. Then $\angle D$ of the rhombus is:

(A) 60° (B) 90°

(C) 120° (D) 135°

Ans. **C**

Sol. Join D to B

Now $\Delta DAP \cong \Delta DBP$

$\Rightarrow AD = DB$

$\Rightarrow \Delta ABD$ is equilateral

$\Rightarrow \angle A = 60^\circ \Rightarrow \angle D = 120^\circ$

52. If $x^2 - 3x + 2$ is a factor of $x^4 - px^2 + q$ then which of the following is not true?

(A) $p + q = 9$ (B) $pq = 14$

(C) $pq = 20$ (D) $p - q = 1$

Ans. B

Sol. $x^2 - 3x + 2 = (x - 1)(x - 2)$

then $x^4 - px^2 + q$ will be satisfied by x = 1 and 2

$\Rightarrow$ $1 - p + q = 0 \Rightarrow p = 1 + q \Rightarrow p - q = 1$ (i)

$\Rightarrow$ $16 - 4p + q = 0 \Rightarrow 16 + q = 4p = 4p - q = 16$ (ii)

By equation (i) and (ii)

$\Rightarrow$ $3p = 15 \Rightarrow p = 5$

$\therefore$ $q = 4$

53. If a, b and c are natural numbers such that $a + b + c + ab + bc + ca + abc = 1308$ and $a < b < c$ then find value of $a(b + c)$

(A) 156   (B) 164

(C) 184   (D) None of these

Ans. A

Sol. $a + b + c + ab + bc + ca + abc = 1308$

$\Rightarrow a + b + c + ab + bc + ca + abc + 1 = 1309$

$\Rightarrow (a + 1)(b + 1)(c + 1) = 1309 = 7 \times 11 \times 17$

$\Rightarrow a = 6, b = 10, c = 16.$ So, $a(b + c) = 156$

54. The points (3, 2), (–2, –3) and (2, 3) form a triangle name the type of triangle formed.

(A) equilateral   (B) isosceles

(C) right angle   (D) None of these

Ans. C

Sol. Let the points are A (3, 2), B (–2, - 3) and C (2, 3)

Then, $AB = \sqrt{(-2 - 3)^2 + (-3 - 2)^2}$

$\left[\because dis\,tan\,ce = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \right]$

$= \sqrt{(-5)^2 + (-5)^2} = \sqrt{25 + 25} = \sqrt{50}$

$= 7.07$ units (Approx).

$BC = \sqrt{(2 + 2)^2 + (3 + 3)^2} = \sqrt{(4)^2 + (6)^2}$

$= \sqrt{16 + 36} = \sqrt{52} = 7.21$ units (approx)

and $CA = \sqrt{(3 - 2)^2 + (2 - 3)^2}$

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$$= \sqrt{(1)^2 + (-1)^2} = \sqrt{1+1}$$

$$= \sqrt{2} = 1.41 \text{ (approx)}$$

Also, $\left(\sqrt{52}\right)^2 = \left(\sqrt{50}\right)^2 + \left(\sqrt{2}\right)^2$

$\Rightarrow \quad BC^2 = AB^2 + CA^2$

So, by converse of Pythagoras theorem, $\angle A = 90^o$

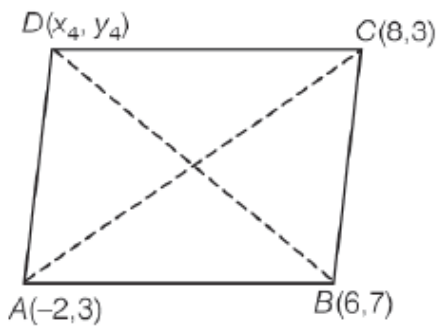Hence, $\triangle BAC$ is a right angled triangle.

55. The fourth vertex D of a parallelogram ABCD, whose three vertices are A (–2, 3), B (6, 7) and C (8, 3) is

(A) (0, 1) (B) (0, –1)
(C) (–1, 0) (D) (1, 0)

Ans. B

Sol. Let the fourth vertex of parallelogram,

$D \equiv (x_4, y_4)$ and L, M be the middle points of AC and BD, respectively.

Then, $L \equiv \left(\dfrac{-2+8}{2}, \dfrac{3+3}{2}\right) \equiv (3, 3)$

and $M \equiv \left(\dfrac{6+x_4}{2}, \dfrac{7+y_4}{2}\right)$

Since, ABCD is parallelogram, therefore diagonals AC and BD will bisect each other.

Hence, L and M are the same points.

$\therefore \quad 3 = \dfrac{6+x_4}{2}$ and $3 = \dfrac{7+y_4}{2}$

$\Rightarrow \quad 6 = 6 + x_4$ and $6 = 7 + y_4$

$\Rightarrow \quad x_4 = 0$ and $y_4 = 6 - 7$

$\therefore \quad x_4 = 0$ and $y_4 = -1$

Hence, the fourth vertex of parallelogram is $D \equiv (x_4, y_4) \equiv (0, -1)$

56. The value of $\log_5 \left[\dfrac{(125)(625)}{25}\right]$ is equal to:

(A) 7 (B) 6
(C) 3125 (D) 5

Ans. D

Sol. $\log_5 \left(\dfrac{5^3 \cdot 5^4}{5^2}\right) = \log_5 5^5 = 5 \log_5 5 = 5$

57. The value of $10^{\log_{10} 7}$ is:

(A) 7 (B) 1

(C) 10   (D) $\log_{10} 7$

Ans.   A

Sol.   In general, $a^{\log_a N} = N$, with suitable restrictions on a and N.

58.   If $\dfrac{xy}{x+y} = a$, $\dfrac{xz}{x+z} = b$ and $\dfrac{yz}{y+z} = c$, where a, b and c are other than zero, then x equals

(A) $\dfrac{abc}{ab + ac + bc}$ (B) $\dfrac{2abc}{ab + bc + ac}$

(C) $\dfrac{2abc}{ab + ac - bc}$ (D) $\dfrac{2abc}{ac + bc - ab}$

Ans.   D

Sol.   Inverting each of the expressions, we have the set of equations;

$$\frac{1}{y} + \frac{1}{x} = \frac{1}{a}, \frac{1}{z} + \frac{1}{x} = \frac{1}{b}, \frac{1}{y} + \frac{1}{z} = \frac{1}{c}$$

$$\Rightarrow \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{1}{2}\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$$

$$\therefore \frac{2}{x} = \frac{1}{a} + \frac{1}{b} - \frac{1}{c}.$$

$$\therefore \ x = \frac{2abc}{ac + bc - ab}.$$

59.   The sum of the numerical coefficients in the expansion of the $(a+b)^6$ is:

(A) 32   (B) 16
(C) 64   (D) 48

Ans.   C

Sol.   Let $a = b = 1$

Then $(1+1)^6 = 2^6 = 64$

60.   If $f(x) = ax^4 - bx^2 + x + 5$ and $f(-3) = 2,$ then $f(3) =$

(A) –5   (B) –2
(C) 1   (D) 8

Ans.   D

Sol.   Since $f(3) = a(3)^4 - b(3)^2 + 3 + 5$ and $f(-3) = a(-3)^4 - b(-3)^2 - 3 + 5$, it follows that

$f(3) - f(-3) = 6$. Thus, $f(3) = f(-3) + 6 = 2 + 6 = 8$

Section – V
Social Science
(61 – 100)

61.   Identify one of the following states which is not land-locked.
(A) Maharashtra   (B) Arunachal Pradesh   (C) Nagaland (D) Bihar
61.   A

62.   Name one of the states which is not a Union Territory.
(A) Pondicherry   (B) Chandigarh   (C) Delhi   (D) Rajasthan
62.   D

63.   Choose the right answer from the four alternatives given below: The Tropic of Cancer does not pass through
(A) Rajasthan   (B) Chhattisgarh   (C) Orissa   (D) Tripura

63.   C

64.   Choose the right answer from the four alternatives given below: The eastern most longitude of India is:
        (A) 97" 25'   (B) 37" 6'   (C) 68" 7'   (D) 82" 32'
64.   A

65.   Choose the right answer from the four alternatives given below: Uttranchal, Uttar Pradesh, Bihar, West Bengal and Sikkim have common frontiers with:
        (A) China   (B) Nepal   (C) Bhutan   (D) Myanmar
65.   B

66.   Which of the following is incorrect regarding Yamuna river?
        (A) It is the largest tributary of the Ganga   (B) It meets the Ganga at Allahabad
        (C) It flows parallel to the Ganga   (D) It originates from the Gangotri glacier
66.   **D**

67.   Which of the following rivers does not rise from the Nepal Himalaya?
        (A) the Yamuna   (B) the Kosi
        (C) the Gandak   (D) the Ghaghra
67.   **A**

68.   Which of the followings is incorrect regarding the features of the Sundraban Delta?
        (A) It is formed by the Ganga river system   (B) It is the world's largest delta
        (C) it's growth has stopped now   (D) It is also the home of Royal Bengal Tiger
68.   **C**

69.   Which city of Punjab is located on the water divide between the Indus and the Ganga river system?
        (A) Firozpur   (B) Ambala
        (C) Chandigarh   (D) Amritsar
69.   **B**

70.   From where does the Brahmaputra river takes 'U' turn?
        (A) Shipka la   (B) Nathula   (C) Zozila   (D) Namcha Barwa
70.   **D**

71.   Which force was not responsible for shaping the present landform features of India?
        (A) Internal movements below the earth's crust
        (B) External forces operating on the surface of the earth
        (C) Forces operating in the atmosphere
        (D) Weathering Forces
71.   **C**

72.   Which one of the following is not a mountain range of the Purvanchal?
        (A) Patkai and Naga hills   (B) The Karakoram
        (C) The Jaintia   (D) The Mizo hills
72.   **B**

73.   What is Lagoon?
        (A) A saltwater lake separated from the sea by sandbars
        (B) Movements of the different plates of the earth
        (C) A plain formed by the sediments deposited by the rivers year after year
        (D) A Lake formed by the river in its last course of action.
73.   **A**

74.   What is Perennial River?
        (A) A river which flows throughout the year

(B) A river which stops flowing in some months of the year
(C) A river which flows through high mountains
(D) A river which does not reach the sea

74. **A**

75. Which one of the following is not a river of the North India?
(A) The Mahanadi (B) The Ravi
(C) The Ganga (D) The Yamuna

75. **A**

76. In what year the French Revolution took place in France?
(A) 1914 (B) 1939 (C) 1789 (D) 1815

76. **C**

77. Which event gave the ideas of Liberty, Freedom and Equality?
(A) The American Revolution (B) The French Revolution
(C) The Russian Revolution (D) The Rise of Nazism

77. **B**

78. Which dynasty was ruling in France when the French Revolution took place?
(A) The Tudor dynasty (B) the Bourbon family
(C) The Mughals (D) The Czar family

78. **B**

79. Who was the ruler of France in 1789?
(A) Louis XIV (B) Louis XV (C) Louis XVI (D) Louis XVII

79. **C**

80. Which Estate of the French society paid all the taxes?
(A) The First Estate (B) The Second Estate
(C) The Third Estate (D) The Fourth Estate

80. **C**

81. Who was the editor of the paper called 'Ami due peuple'?
(A) Roget de L'Isle (B) Jean Paul Marat (C) Ablue Sieyes (D) Mirabeau

81. **B**

82. What does a 'Sceptre' stand for?
(A) A symbol of royal power (B) A symbol of eternity
(C) Knowledge (D) Unity in strength

82. **A**

83. What is the national anthem of France?
(A) The Thileries (B) The Marseillaise (C) Both A and B (D) None of these

83. **B**

84. When was the Socialist Revolutionary party formed in Russia?
(A) 1908 (B) 1918
(C) 1900 (D) 1950

84. C

85. What was the main demand of the Union of Unions formed by lawyers, doctors, engineers, middle – class people and the workers?
(A) To give them jobs (B) To check the prices of goods
(C) To establish the Constituent Assembly (D) To give them right to vote

85. C

86. What was the elected Consultative Parliament in Russia called?

(A) The Duma   (B) The Senate
(C) The Congress   (D) The Lok Sabha
86.   A

87.   Which one country of the following was not a member of the Central Powers?
(A) Germany   (B) England
(C) Austria   (D) Turkey
87.   B

88.   Which one country out of the following was not a member of the Allies?
(A) Britain   (B) France
(C) Japan   (D) Russia
88.   C

89.   Marx argued that industrial society was ....
(A) Capitalist   (B) Clergy
(C) Farmer   (D) none of these
89.   A

90.   Who wrote "Das Capital"?
(A) Karl Marx   (B) Mirabeau
(C) John Locke   (D) Rousseau
90.   A

91.   Direct democracy is that government in which:
(A) All the citizens cannot participate in administration
(B) All the citizens directly take part in administration
(C) All the citizens indirectly participate in administration
(D) The representatives of the public run the administration
91.   **B**

92.   Which one of the following is the main characteristic of indirect democracy?
(A) People themselves run the administration
(B) The representatives elected by the people run the administration
(C) Every citizen takes part in making laws
(D) The power of administration is rested with the scheduled castes
92.   **B**

93.   Nelson Mandela remained in jail for:
(A) 18 years   (B) 26 years
(C) 38 years   (D) 28 years
93.   D

94.   In 1936 the Indian National Congress demanded a Constituent Assembly to be set up at session held at:
(A) Kanpur   (B) Kolkata
(C) Delhi   (D) Fezpur
94.   D

95.   The elections to the Constituent Assembly were held in:
(A) January 1945   (B) July 1946
(C) August 1946   (D) December 1946
95.   B

96.   The division of labour between men and women is due to
(A) Historical and cultural reasons   (B) Geographical reasons
(C) Political reasons   (D) Religions reasons
96.   **A**

97. Unemployment is said to exist when people who are
    (A) Willing to work at the going wages can not find jobs
    (B) Not willing to work at the going wages
    (C) Willing to work at higher wages
    (D) None of the above
97. **A**

98. About three fourth of farmers in India are poor because
    (A) They believe in fate.
    (B) They live in thatched houses.
    (C) They are short of capital.
    (D) They live far from cities.
98. **A**

99. One non-farm activity suited for small farmers is
    (A) Dairy   (B) Making Soaps
    (C) Carpentry   (D) Block Smithy
99. **A**

100. Which one of the following is non-farm activity?
    (A) Sowing Seeds   (B) Pot making
    (C) Harvesting   (D) None of these
100. **B**