

Sample Paper

2 Year (JEE)

Duration: 2 Hrs

Maximum Marks: 205

For Students Presently in Class 10 (Stream: Engineering)

PAPER SCHEME:

- This paper contains **40 Objective Type Questions** divided into four sections: **Section - I, Section – II, Section - III and Section - IV**
- **Section I** contains **5 Multiple Choice Questions (1-5)** based on **Mental Aptitude**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE CHOICE** is correct.
- **Section II** contains **10 Multiple Choice Questions (6-15)** based on **Science**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE CHOICE** is correct.
- **Section III** contains **15 Multiple Choice Questions (16-30)** based on **Mathematics**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE CHOICE** is correct.
- **Section IV** contains **10 Numerical Value Type Questions (1-10)**. The answer to each of these questions ranges from 0 to 99.

MARKING SCHEME:

- **Section I:** For each question, **4 marks** will be awarded for correct answer and **–1 negative marking** for incorrect answer.
- **Section II & III:** For each question, **5 marks** will be awarded for correct answer and **–1 negative marking** for incorrect answer.
- **Section IV:** For each question, **6 marks** will be awarded for correct answer and **–1 negative marking** for incorrect answer.

SECTION - I [MENTAL APTITUDE]

Direction for (1 – 2)

Some groups of letters are given, all of which except one, share a common similarity while one is different. Choose the odd one out.

1. Choose the odd one out.
 (A) HSRI (B) MVUN (C) OLKP (D) PJQX
2. Choose the odd one out.
 (A) YDWB (B) TKRI (C) QNOM (D) HLFJ
3. ABCDEFGHIJKLMNOPQRSTUVWXYZ
 If 1st half of the English alphabet is written in backward order, then what will be the 7th letter to the left of the 10th letter from your right?
 (A) C (B) E (C) D (D) J
4. One morning Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing?
 (A) East (B) West (C) North (D) South
5. If – means $\div$, + means $\times$, $\div$ means $-$, $\times$ means $+$, then which of the following is correct?
 (A) $36 - 12 \times 6 \div 3 + 4 = 60$ (B) $52 \div 4 + 5 \times 15 - 3 = 37$
 (C) $36 \times 4 - 12 + 5 \div 3 = 420$ (D) $43 \times 7 + 5 + 4 - 8 = 25$

SECTION - II [SCIENCE]

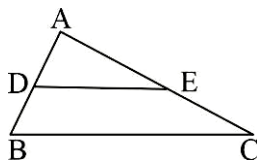
6. The rate of change of displacement is called:
 (A) Momentum (B) Speed (C) Velocity (D) Acceleration
7. The SI unit of momentum is:
 (A) Newton (B) Newton - Second (C) Dyne (D) Dyne - Second
8. When unbalanced forces act on a body, the body?
 (A) Must move with uniform velocity (B) Must remain at rest
 (C) Must experience acceleration (D) Must move in a curved path
9. Work done is always:
 (A) Scalar quantity (B) Vector quantity (C) Positive (D) Negative
10. The unit of relative density is:
 (A) g cm^{-3} (B) kg m^{-3} (C) kgF m^{-3} (D) No unit

11. When magnesium ribbon is burnt in air, the ash formed is:
(A) White (B) Green (C) Yellow (D) Black
12. Baking powder contains sodium hydrogen carbonate and
(A) Tartaric acid (B) Washing soda (C) Calcium chloride (D) Acetic acid
13. ${}^{78}_{35}\text{X}^{2-}$, the number of electrons in this ion is:
(A) 35 (B) 78 (C) 37 (D) 33
14. How many moles of hydroxyl ion present in a sample of 3 moles of aluminium hydroxide?
(A) 1 mole (B) 3 moles (C) 6 moles (D) 9 moles
15. Which of the following shows the electronic configuration of Ca^{2+} ?
(A) He (B) Ne (C) Ar (D) F^-

SECTION - III [MATHEMATICS]

16. If $x, x+2$ and $x+4$ are positive prime numbers, then $10x$ is equal to:
(A) 30 (B) 50 (C) 70 (D) Can have many values
17. Select the correct order:
(A) $\frac{7}{8} < \frac{15}{16} < \frac{9}{10} < \frac{39}{40}$ (B) $\frac{7}{8} < \frac{39}{40} < \frac{9}{10} < \frac{15}{16}$
(C) $\frac{7}{8} < \frac{9}{10} < \frac{15}{16} < \frac{39}{40}$ (D) $\frac{7}{8} < \frac{9}{10} < \frac{39}{40} < \frac{15}{16}$
18. If $2^{x+3} - 2^x = 56$, then $(x+5) =$ _____.
(A) 3 (B) 8 (C) 7 (D) 10
19. A person sells a T.V. at Rs. 10000 making a profit of 25% and a fridge at Rs. 20000 making a loss of 20%, then overall.
(A) Profit is Rs. 3000 (B) Loss is Rs. 5000
(C) Loss is Rs. 3000 (D) Profit is Rs. 5000
20. A successive discount of 70% and 20% is equal to an overall discount of:
(A) 90% (B) 24% (C) 74% (D) 76%
21. If $(x-1)$ divides $ax^2 + x + 3$ completely, then 'a' is equal to:
(A) 4 (B) -4 (C) 3 (D) -3
22. If $x + y - 1 = 0$ and $\alpha x + 2\beta y - 3 = 0$ represent coincident lines, then $6(\alpha + \beta)$ is equal to:
(A) 18 (B) 54 (C) 27 (D) 9
23. The sum of interior angles of a hexagon is equal to:
(A) 1080° (B) 540° (C) 360° (D) 720°
24. Select the incorrect statement for two congruent triangles.
(A) Areas are equal (B) Corresponding altitudes are not equal
(C) Corresponding angles are equal (D) Corresponding medians are equal

25. D and E are mid points of sides AB and AC respectively. If $ar(DECB) = 6k$ square units, then $ar(ABC)$ is equal to:

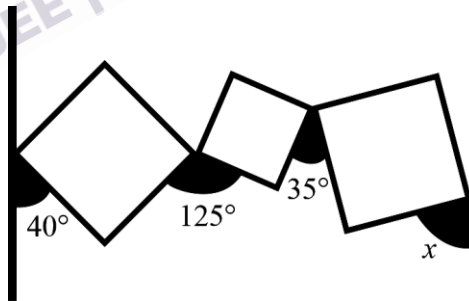


- (A) $8k$ square units (B) $12k$ square units
(C) $10k$ square units (D) $9k$ square units
26. Sides of a triangle are 13, 14 and 15, then altitude on side of length 13 is equal to:
(A) $\frac{168}{13}$ (B) $\frac{84}{13}$ (C) 7 (D) $\frac{126}{13}$
27. The first and last term of an A.P. are a and l respectively. If S is the sum of all the terms of A.P. and the common difference is given by $\frac{l^2 - a^2}{k - (l + a)}$, then:
(A) $\frac{k}{S} = 1$ (B) $\frac{k}{S} = 2$ (C) $3S = k^2$ (D) $k^2 + 4S^2 = 3kS$
28. The volume of a cube is V and diagonal is ' d ', then:
(A) $d^3 = 27V$ (B) $d^3 = 9\sqrt{3}V$ (C) $d^3 = 6\sqrt{3}V$ (D) $d^3 = 3\sqrt{3}V$
29. If α and β are zeroes of quadratic polynomial $f(x) = ax^2 + bx + c$, ($a \neq 0$), then find the value of $\alpha^3 + \beta^3 - 10\alpha^2 - 12\beta^2 + 31\alpha + 41\beta - 60$. Given that α and β satisfy the pair of linear equations $131x + 217y = 827$ and $217x + 131y = 913$.
(A) 31 (B) 41 (C) 12 (D) 60
30. If $\sin \theta + \cos \theta = \sqrt{2}$, then $\tan \theta$ is equal to: $[0^\circ < \theta < 90^\circ]$
(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) 1 (D) 2

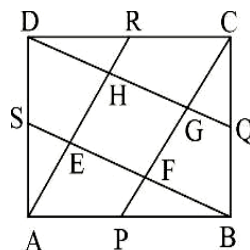
SECTION - IV [NUMERICAL VALUE TYPE QUESTIONS]

This Section contains 10 Integer-Type Questions. Each question has an integer answer between 0 and 99. Enter the correct Numerical Value.

- Let $P(x) = x^4 + ax^3 + bx^2 + cx + d$. $P(1) = 1, P(2) = 2, P(3) = 3$ and $P(4) = 4$, then $P(5)$ is equal to _____.
- If a, b and c are positive numbers such that $x^3 - 6x^2 - 37x - 30 = (x+a)(x+b)(x-c)$, then value of $a+b+c$ is equal to _____.
- If $\alpha^2 = 10\alpha - 12, \beta^2 = 15\beta - 27$ and $\alpha > \beta$, then the value of $3\left(\frac{2\beta + 3\alpha}{\alpha\beta}\right)$ is _____.
- If $5 \leq x \leq 10$, then the value of $\sqrt{x+3-4\sqrt{x-1}} + \sqrt{x+8-6\sqrt{x-1}}$ is equal to _____.
- As shown in the diagram below, there lie 3 squares between 2 parallel lines such that each pair (line, square) or (square, square) just meet at a vertex. Find the measure of angle x in degrees.

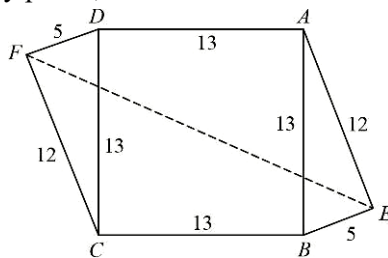


- The perimeter and area of an isosceles triangle are 50 cm and 60 cm^2 . If equal sides of triangle are smaller than the third side, then largest side of triangle is equal to _____.
(All sides of triangle are integers)
- $ABCD$ is a square of side length 20 m. P, Q, R and S are mid points of sides of $ABCD$ as shown. Joining PC, QD, RA and SB we get a new quadrilateral $EFGH$, then the area of $EFGH$ is equal to _____.

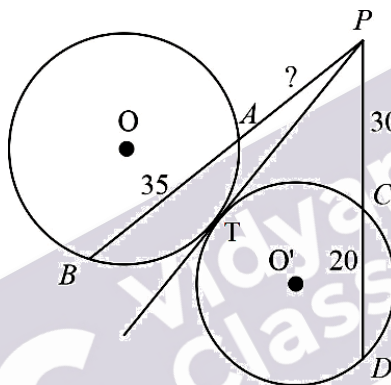


- If $\frac{\sin^4 x}{3} + \frac{\cos^4 x}{2} = \frac{1}{5}$, then $6(\operatorname{cosec}^2 x + \sec^2 x)$ is equal to _____.

9. $ABCD$ is a square with $AB = 13$. Points E and F are exterior to $ABCD$ such that $BE = DF = 5$ and $AE = CF = 12$. If the length EF can be represented as $a\sqrt{b}$, where a and b are positive integers and b is not divisible by the square of any prime, then find ab .



10. In the diagram, line segment PT is tangent to both circle O and circle O' . Given the following three lengths: $AB = 35$, $PC = 30$, $CD = 20$, what is PA ?



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