SAMPLE QUESTION PAPER

1. **If A = 2n + 13, B = n + 7, where n is a natual number then HCF of A and B is**
   (A) 2
   (B) 1
   (C) 3
   (D) 4
   (E) None of these

2. **Find the least number that when divided by 16, 18 and 20 leaves a remainder 4 in each case, but is completely divisible by 7.**
   (A) 365
   (B) 2884
   (C) 2774
   (D) 2974
   (E) None of these

3. **An AP of common multiples of 54 and 36 is**
   (A) 36, 90, 144, ...
   (B) 108, 216, 324, ...
   (C) 54, 108, 162, ...
   (D) none of these
   (E) None of these

4. **If α and β are the roots of the equation $2x^2 - 5x - 7 = 0$, then the equation whose roots are $2\alpha + 3\beta$ and $3\alpha + 2\beta$ is _____.**
   (A) $2x^2 + 25x - 68 = 0$
   (B) $x^2 + 25x + 68 = 0$
   (C) $2x^2 - 25x - 68 = 0$
   (D) $2x^2 - 25x + 68 = 0$
   (E) None of these

5. **If α and β are the zeroes of the polynomial $f(x) = x^2 + px + q$, then the polynomial having $\dfrac{1}{\alpha}$ and $\dfrac{1}{\beta}$ as its zeroes is _____.**
   (A) $x^2 + qx + p$
   (B) $x^2 - px ++ q$
   (C) $qx^2 + px + 1$
   (D) $px^2 + qx+1$
   (E) None of these

6. When $3x^2 - x^3 - 3x + 5$ is divided by $x - 1 - x^2$, the quotient and remainder are _____.
    (A) $x + 2, 3$ (B) $x - 2, -3$ (C) $x - 2, 3$ (D) $x + 2, -3$
    (E) None of these

7. Graphically $ax + by + c = 0$ represents a line. Every solution of the equation is a point
    (A) on the line representing it   (B) not on the line representing it
    (C) on the x-axis   (D) on the y-axis
    (E) None of these

8. Aseem went to a stationery shop and purchased 3 pens and 5 pencils for Rs. 40. His cousin Manik bought 4 pencils and 5 pens for Rs. 58. If cost of 1pen is Rs. x and 1 pencil is ₹ y, then which of the following represent the situation algebraically?
    (A) $3x + 5y = 40, 4x + 5y = 58$ (B) $3x + 4y = 40, 5x + 5y = 58$
    (C) $3x + 5y = 40, 5x + 4y = 58$ (D) $3x + 5y = 40, 4x + 3y = 58$
    (E) None of these

9. The difference between a two digit number and the number obtained by interchanging the digits is 27. What is the difference between the two digits of the number ?
    (A) 9   (B) 6   (C) 12   (D) 3
    (E) None of these

10. The roots of the equation $x^2 - 2x = 0$ can be obtained graphically by finding the absciassas of the points of intersection of each of the following pairs of equation except _____.
    (A) $y = x, y = x - 2$ (B) $y = x^2, y = 2x$
    (C) $y = x^2 - 2x + 1, y = 1$ (D) $y = x^2 - 2x, y = 0$
    (E) None of these

11. If $x^2 + 4ax + 3 = 0$ and $2x^2 + 3ax - 9 = 0$ have a common root, then the value of 'a' is _____.
    (A) ± 3 (B) ± 1 (C) Only 1   (D) ± 2
    (E) None of these

12. The positive value of k for which the equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots, is _____.
    (A) 4   (B) 8
    (C) 12   (D) 13
    (E) None of these

13. Let $a_1, a_2, ...$ and $b_1, b_2, ...$ be the arithmetic progressions such that $a_1 = 25$, $b_1 = 75$ and $a_{100} + b_{100} = 100$. The sum of the first one hundred terms of the progressions $(a_1 + b_1), (a_2 + b_2), ...$ is _____.
    (A) 0   (B) 100   (C) 10,000   (D) 5,05,000
    (E) None of these

14. If p, q, r are three consecutive natural numbers, then what must be true for M if M = (q + r – p) (p + r – q) (p + q – r) ?
    (A) Positiive   (B) Negative
    (C) Either positive or zero   (D) Zero
    (E) None of these

15. If $b_1, b_2, b_3, ...$ belongs to an A.P. such that $b_1 + b_4 + b_7 + ... + b_{28} = 220$, then the value of $b_1 + b_2 + b_3 + ... + b_{28}$ equals _____.
    (A) 616   (B) 308   (C) 2,200   (D) 1,232
    (E) None of these

16. If the origin is the mid-point of the line segment joined by the points (2, 3) and (x, y), then the value of (x, y) is
    (A) (2, 3)   (B) (–2, 3)   (C) (–2, –3)   (D) (2, –3)
    (E) None of these

17. The area of triangle whose sides are along the lines $x = 0$ and $y = 0$ and $4x + 5y = 20$ is
    (A) 20   (B) 10   (C) 1/10   (D) 1/20
    (E) None of these

18. If the orthocentre and centroid of a triangle are (–3, 5) and (3, 3) respectively, then the circumcentre is
    (A) (6, 2)   (B) (0, 8)   (C) (6, –2)   (D) (0, 4)
    (E) None of these

19. $\triangle ABC \sim \triangle PQR$. Area of $\triangle ABC = 81$ cm^2 and area of $\triangle PQR = 121$ cm^2. If altitude AD = 9 cm, then PM =
    (A) 10 cm
    (B) 11 cm
    (C) 12 cm
    (D) 15 cm
    (E) None of these
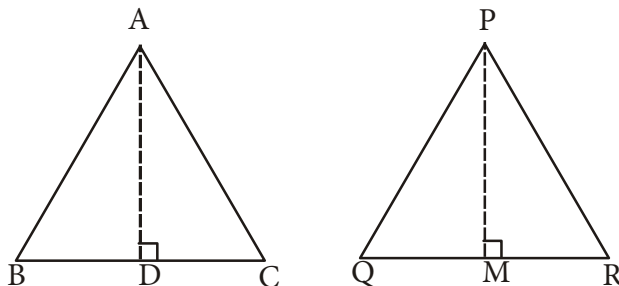
20. In given figure, AD = 3 cm, AE = 5 cm, BD = 4 cm, CE = 4 cm, CF = 2 cm, BF = 2.5 cm, then
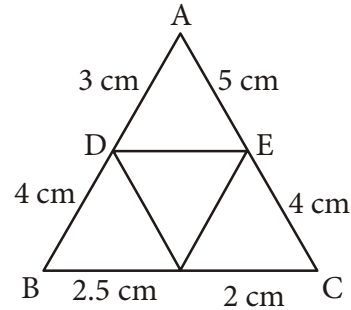
(A) DE || BC
(B) DF || AC
(C) EF || AB
(D) All of these

21. The height of mountains is found out using the idea of indirect measurement which is based on the
(A) principal of congruent figures
(B) principal of similarity of figures
(C) principal of equality of figures
(D) All of these
(E) None of these

22. A line touches a circle of radius 4 cm. Another line is drawn which is tangent to the circle. If the two lines are parallel then distance between them is
(A) 4 cm (B) 6 cm
(C) 7 cm (D) 8 cm
(E) None of these

23. A circle is inscribed in a triangle with sides 8, 15 and 17 cm. The radius of the circle is
(A) 6 cm (B) 5 cm
(C) 4 cm (D) 3 cm
(E) None of these

24. Two parallel lines touch the circle at points A and B respectively. If area of the circle is 25π cm^2, then AB is equal to
(A) 5 cm (B) 8 cm
(C) 10 cm (D) 25 cm
(E) None of these

25. The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. The area of the sector is _____.
(A) 15.1 cm^2 (B) 15.5 cm^2
(C) 15.6 cm^2 (D) 15.9 cm^2
(E) None of these

26. AB is a line segment of lenggth 4 cm. P is the mid-point of AB. Circles are drawn with A, P and B as centres and radii AP = PB (see figure). The area of the shaded portion (in cm^2) is_____.

    (A) $6\sqrt{3}$

    (B) $2\pi - 6\sqrt{3}$

    (C) $2\pi - 3\sqrt{3}$

    (D) $3\sqrt{3}$

    (E) None of these
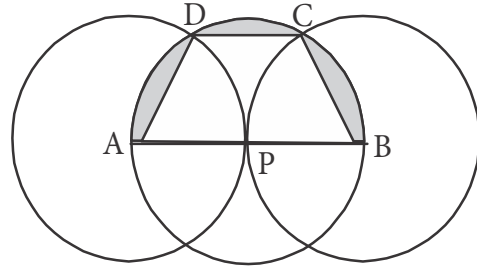
27. If the radii of the circular ends of a bucket of height 40 cm are of lengths 35 cm and 14 cm, then the volume of the bucket in cubic centimetres, is _____.
   (A) 60060   (B) 80080   (C) 70040   (D) 80160
    (E) None of these

28. A cuboidal metal of dimensions 44 cm × 30 cm × 15 cm was melted and cast into a cylinder of height 28 cm. Its radius is _____.
    (A) 20 cm   (B) 15 cm
    (C) 10 cm   (D) 25 cm
    (E) None of these

29. The decorative block shown in the figure is made of two solids, a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemishpere fixed on the top has a diameter of 4.2 cm. The total surface area of the block is _____.

    (A) 150 cm^2

    (B) 160.86 cm^2

    (C) 162.86 cm^2

    (D) 163.86 cm^2

    (E) None of these
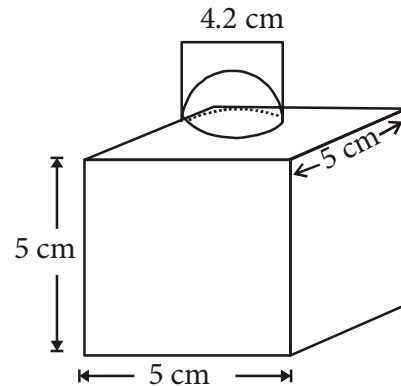
30. A hemispherical bowl is made of steel of 0.25 cm thickness. The inner radius of the bowl is 5 cm. The volume of steel used is _____. ($\pi = 3.141$)
    (A) 42.15 cm^3 (B) 41.52 cm^3
    (C) 41.25 cm^3 (D) 40 cm^3
    (E) None of these

31. **The median from the table is**

Value	7	8	9	10	11	12	13
Frequency	2	1	4	5	6	1	3

(A) 11   (B) 10

(C) 12   (D) 11.5

(E) None of these

32. **Find the missing frequencies in the following frequency distribution if it is given that the mean is 1.46.**

Variables	0	1	2	3	4	5	Total
Frequency	46	?	?	25	10	5	200

(A) 76, 36   (B) 37, 38

(C) 76, 38   (D) 70, 38

(E) None of these

33. **Mode and mean of a data are $12k$ and $15k$. Median of the data is**

(A) $12k$ (B) $14k$

(C) $15k$ (D) $16k$

(E) None of these

34. **A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought ?**

(A) 40   (B) 240

(C) 480   (D) 750

(E) None of these

35. **An event is very unlikely to happen. Its probability is closest to**

(A) 0.0001   (B) 0.001

(C) 0.01   (D) 0.1

(E) None of these

36. **If an event cannot occur, then its probability is**

(A) 1   (B) $\dfrac{3}{4}$

(C) $\dfrac{1}{2}$ (D) 0

(E) None of these

37. A portion of a 60 m long tree is broken by tomando and the top struck up the ground making an angle of 30° with the ground level. The height of the point where the tree is broken is equal to
(A) 30 m
(B) 35 m
(C) 40 m
(D) 20 m
(E) None of these

38. A 6 feet tall man finds that the angle of elevation of a 24 feet high pillar and the angle of depression of its base are complementary angles. The distance of the man from the pillar is
(A) $4\sqrt{3}$ m
(B) $6\sqrt{3}$ m
(C) $8\sqrt{3}$ m
(D) $10\sqrt{3}$ m
(E) None of these

39. The angle of elevation of the top of an incomplete vertical pillar at a horizontal distance of 100 m from its base is 45°. If the angle of elevation of the top of the complete pillar at the same point is to be 60°, then the height of the incomplete pillar is to be increased by
(A) $50\sqrt{2}$ m
(B) 100 m
(C) $100\sqrt{3}$ m
(D) $100\left(\sqrt{3}-1\right)$ m
(E) None of these

40. A person standing on the bank of a river find that the angle of elevation of the top of a tower on the opposite bank is 45°. Then which of the following statements is correct.
(A) breadth of the river is twice the height of the tower.
(B) breadth of the river is half of the height of the tower.
(C) breadth of the river is equal to the height of the tower.
(D) All of these.
(E) None of these

41. The Gurgaon office of Microsoft has 1500 executives. Of these 900 subscribe to the Hindustan Times and 750 subscribe to The Hindu. 150 subscriibe to both Hndustan Times and The Hindu. If an executive is picked at random, what is the probability that he has subscribed to Hindustan Times?
(A) 2/5
(B) 3/5
(C) 4/5
(D) 1/5
(E) None of these

42. Divide ₹ 600 among A, B and C so that ₹ 40 more than $\left(\frac{2}{5}\right)^{th}$ of A's share, ₹ 20 more than $\left(\frac{2}{7}\right)^{th}$ of B's share and ₹ 10 more tan $\left(\frac{9}{17}\right)^{th}$ of C's share may all be equal. What is A's share ?

(A) ₹ 280   (B) ₹ 150

(C) ₹ 170   (D) ₹ 200

(E) None of these

43. A boy was asked to multiply a given number by $\left(\frac{8}{17}\right)$. Instead, he divided the given number by $\left(\frac{8}{17}\right)$ and got tthe result 225 more than what he should have got if he had multiplied the number by $\left(\frac{8}{17}\right)$. The given number was _____.

(A) 8   (B) 17

(C) 64   (D) 136

(E) None of these

44. One year ago the ratio between Laxman's and Gopal's salary was 3 : 4. The ratios fo their individual salaries between last year's and this eyar's salaries are 4 : 5 and 2 : 3 respectively. At present the total of their salary is ₹ 4160. The salary of Laxman now, is _____.

(A) ₹ 1040   (B) ₹ 1600

(C) ₹ 2560   (D) ₹ 3120

(E) None of these

45. A train 100 metres long moving at a speed of 50 km/hr crosses a train 120 metres long coming from opposite direction in 6 seconds. The speed of second train is _____.

(A) 132 km/hr

(B) 82 km/hr

(C) 60 km/hr

(D) 50 km/hr

(E) None of these

46. **Which of the following is true ?**

    (A) $\cos\theta.\sin\theta - \dfrac{\sin\theta\cos(90°-\theta)\cos\theta}{\sec(90°-\theta)} - \dfrac{\cos\theta.\sin(90°-\theta)\sin\theta}{\csc(90°-\theta)} = 0$

    (B) If A and B are complementary angles, then $\sin A = \sqrt{\dfrac{\cos A}{\sin B} - \cos A.\sin B}$

    (A) Only (A)   (B) Only (B)
    (C) Neither (A) nor (B)   (D) Both (A) and (B)
    (E) None of these

47. **A man repays a loan of ₹ 3250 by paying ₹ 20 in first month and then increases the payment by ₹ 15 every month. How long will it take him to clear the loan ?**
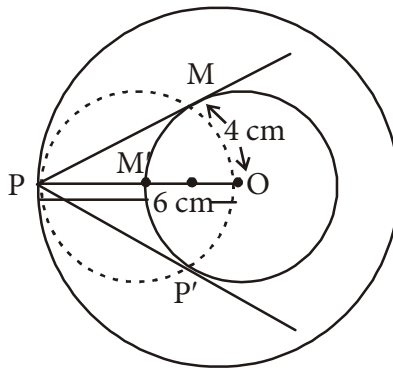   (A) 20 months   (B) 21 months
    (C) 15 months   (D) 17 months
    (E) None of these

48. **Which of the following steps is INCORRECT while constructing a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm? The measure of its length will be 4.47 cm.**

    1. Draw two concentric circles with centre O and radii 4 and 6 cm. Take an point P on outer circle. Join OP
    2. Now, bisect OP. Let M' be th emid point of OP.
    3. Taking M' as centre and OM' as radius, draw a circle (dotted) which cuts the inner circle at M and P'.
    4. Join PM and PP'. Thus, PM and PP' are required tangents. On measureing PM and PP', we get PM = PP'
    (A) 1 and 2   (B) Only 2
    (C) 3 and 4   (D) Only 1 and 3
    (E) None of these

49. A dice is numbered in such a way that its faces show the numbers 1, 2, 2, 3, 3, 6. It is thrown two times and the total score in two throws is noted.
    What is the probability that the total score is
    (i) Even ?   (ii) 6 ?   (iii) Atleast 6 ?

	(i)	(ii)	(iii)
(A)	5/6	1/2	2/3
(B)	1/12	3/4	7/9
(C)	1/2	1/9	5/12
(D)	2/7	2/7	5/11
(E)	None of these		

50. The dimensions of a model of a hall in a building complex are 1 m, 60 cm and 1.20 m. If the scale factor is 1 : 50, find
    (A) The length of the hall.
    (B) The area of the four walls of the hall
    (C) The volume of air enclosed in the model of a room if the space inside a corresponding room in the building is 90 m^3.

	(A)	(B)	(C)
(A)	50 m	9600 m^2	720 cm^3
(B)	58 m	9560 m^2	680 cm^3
(C)	36 m	9640 m^2	724 cm^3
(D)	61 m	8960 m^2	664 cm^3
(E)	None of these		

Note: The actual question paper will transclated in Hindi at the time of exam.