KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD

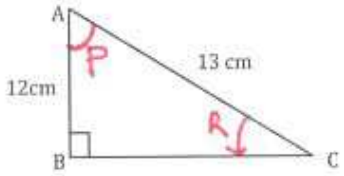
MODEL QUESTION PAPER – 2

Subject: MATHEMATICS – 2018 – 19

Total No. of questions : 40 | Subject Code – 81E
Time – 3 Hours | Max. Marks - 80

I **Four alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate choose the correct alternative and write the complete answer along with its alphabet.** **8x1=8**

1. In an arithmetic progression 3, 1, –1, –3 ..... the common difference is
   a) –2 b) 2 c) –5 d) 5
2. If the lines $3x+2ky=2$ and $2x+5y+1=0$ are parallel, then the value of 'k' is
   a) $-\frac{5}{4}$ b) $\frac{2}{5}$ c) $\frac{15}{4}$ d) $\frac{3}{2}$
3. A circle of radius 6 cm has two tangents AB and CD parallel to each other. The distance between the tangents is
   a) 10 cm b) 12 cm c) 13 cm d) 15 cm
4. When a dice is thrown, the probability of getting an odd number less than 3 is
   a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{3}{4}$ d) $\frac{1}{6}$
5. The sum of the zeroes of the polynomial $p(x)=Kx^2+2x+3K$ is equal to their product then the value of 'K' is
   a) $\frac{2}{3}$ b) $-\frac{2}{3}$ c) $\frac{3}{4}$ d) $-\frac{3}{4}$
6. The HCF of (12, 15) is 3. Then the LCM of (12, 15) is
   a) 60 b) 45 c) 36 d) 90
7. In the given figure $\tan p - \cot R$ is
   a) $\frac{5}{12}$ b) $\frac{12}{5}$ c) 0 d) $\frac{12}{13}$



8. The area of two congruent circles of radii 'r' cm in cm^2 is
   a) $2\pi r^2$ b) $2\pi r$ c) $\frac{1}{2}\pi r^2$ d) πr^2

II **Answer the following.** **6x1=6**

9. The radius of the base and slant height of a cone are 21 cm and 35 cm respectively. Find the height of the cone?
10. Express 0.375 as a fraction in its simplified form.
11. Write the degree of the polynomial $p(x)=3x^3-4x^2+5x^4-3x+4$
12. Write the Discriminant of the quadratic equation $px^2+qx-r=0$.

P.T.O

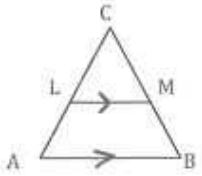
13. Write the general form of linear pair of equations in two variables 'x' and 'y'.

14. The median of the given set of scores is 40 and its mean is 39. Find the mode of the same scores.

III Answer the following.

15. Find the 15^{th} term of the Arithmetic progression 3, 6, 9 .... using suitable formula. [2]

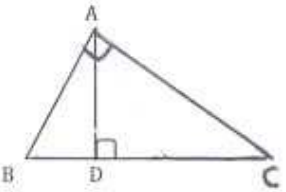
16. In the given figure $LM \parallel AB$. If $AB = x-3, AC = 2x, BM = (x-2)$ and $BC = 2x+3$ then find the value of 'x'. [2]



17. Prove that the line joining the mid-points of non-parallel sides of a Trapezium is parallel to the parallel sides". [2]

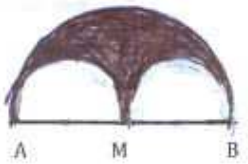
OR

In the Δ ABC $B\hat{A}C = 90^{\circ}$ and AD$\perp$BC prove that $AC^2 = BC.DC$



18. Solve for 'x'and 'y' $\begin{cases} 2x+3y+5=0 \\ 3x-2y-12=0 \end{cases}$ by any suitable method. [2]

19. In the figure AB = 36 cm. 'M' is the midpoint of AB. Three semi circles are drawn on AB AM and BM as diameters. Find the area of the shared region. [2]



20. Draw a circle of radius 4 cm Construct a pair of tangents from a point at a distance of 7 cm from the centre of the circle. [2]

21. Find the distance between the points $A(2,3)$ and $B(6,-8)$. [2]

22. Prove that $3+5\sqrt{2}$ is an irrational number. [2]

23. Find the zeroes of the polynomial $p(x) = 4x^2 - 4x - 3$. [2]

24. Divide the polynomial $p(x) = x^4 + 4x^3 - 2x^2 - 12x + 9$ by $g(x) = x^2 - 2x + 1$ and find the quotient and remainder. [2]

25. Solve by using the formula $4x^2 - 2x - 1 = 0$. [2]

26. If $\cos(A+B) = 0$ and $\sin(A-B) = \frac{1}{2}$. Find the value of 'A' and 'B' [2]

OR

Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta.\sin^2\theta$.

27. From a balloon vertically above a straight road, the angle of depression of two cars on the same side at an instant are found to be 45° and 60°. If the cars are 100 meters apart find the height of the balloon. $\left[\text{use}\sqrt{3} = 1.7\right]$ [2]

28. The Arithmetic mean of the following frequency distribution is 10. Find [2]

28. The Arithmetic mean of the following frequency distribution is 10. Find the missing frequency 'x'. [2]

CI	1 - 5	6 - 10	11 - 15	16 - 20
F	2	3	x	1

29. Cards numbered from 2 to 101 are placed in a box. A card is selected at random. Find the probability that the card has [2]

a) an even number b) a square number

30. A cylindrical copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18m of uniform thickness. Find the thickness of the wire. [2]

IV Answer the following.

31. Draw less than ogive curve for the following data. [3]

Daily wages	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of workers	3	9	15	30	18	5

32. An Arithmetic progression has 37 terms. The sum of the middle term and the two terms adjacent one on either side to it is 225. If the sum of the last three terms is 429. Find the first three terms of the Arithmetic progression. [3]

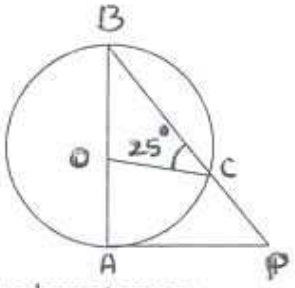
OR

The ratio of the 11th term to the 18th terms of an Arithmetic progression is 2 : 3. Find the ratio of the 5th term to 21st term and also the ratio of the sum of the first 5 terms to the sum of the first 21 terms.

33. Prove that 'the lengths of tangents drawn from an external point to a circle are equal'. [3]

OR

In the figure AB is the diameter with '0' as center, AP is a tangent. If $\angle OCB = 25^\circ$ find the $\angle APB$.



34. Drawn a right angle triangle in which the sides other than the hypotenuse are of lengths 4 cm and 3 cm, then construct another triangle similar to it whose sides are $\frac{5}{3}$ times the corresponding sides of the triangle. [3]

35. The mid points of the sides of the triangle AB, BC and CA are (3, 1) (5, 6) and (-3, 2) respectively. Find the vertices of the triangle ABC. [3]

OR

Find the area of the triangle formed by the points $(P+1, 1)$, $(2P+1, 3)$ and $(2P+2, 3P)$ and show that the points are collinear if $P = 2$ or $-\frac{1}{2}$.

36. If the roots of the equation $(a^2+b^2)x^2+2(bc-ad)x+c^2+d^2=0$ are real and equal show that $ac+bd=0$. [3]

OR

If twice the area of a smaller square is subtracted from the area of a larger square is equal to $14cm^2$. However, If twice the area of the larger square is added to 3 times the area of the smaller square the result is $203cm^2$. Determine the sides of the two squares.

V Answer the following.

37. A vessel is in the form of an inverted cone. Its height is 8 cm and radius is 5 cm. It is filled with water to the brim. When lead shots which is in the form of a sphere of radius 0.5 cm are dropped into the vessel one fourth of water flows out. Find the number of lead shots dropped into the vessel. [4]

OR

A solid metallic sphere of diameter 28 cm is melted and recast into a number of smaller cones of each diameter $4\frac{2}{3}$ cm and height 3 cm. Find the number of cones so formed.

38. Solve graphically. $\begin{cases} 2x-y-2=0 \\ 2x+y-6=0 \end{cases}$ [4]

39. Prove that "If a line is drawn parallel to one side of the triangle to interest the other two sides in distinct points the other two sides are divided in the same ratio." [4]

40. Prove that $\frac{\sin^2\theta}{\cos^2\theta}+\frac{\cos^2\theta}{\sin^2\theta}=\sec^2\theta-\operatorname{cosec}^2\theta-2$. [4]

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