DEPARTMENT OF SCHOOL EDUCATION

OFFICE OF DDPI, KOLAR DISTRICT, KOLAR

Model Question Paper 2024-25 SET -1

Class-10 Mathematics

TIME-3 .15 HOURS **MAXIMUM 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 alternatives and write the complete answer along with its letter of alphabet. **8x1=8**

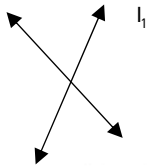
1. The value of 'x' if 7, x, 23 are in A.P is

A) 30 B) 18 C) 15 D) 9

2. Co-ordinates of Origin are

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

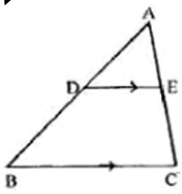
3. The figure represents the lines of pair of two linear equations.



The number of solutions they have

A) No solution B) 1 C) 2 D) Infinite

4. In triangle ABC, DE||BC then $\frac{AD}{DB}$ =



A) $\frac{AE}{AC}$ B) $\frac{AD}{AB}$ C) $\frac{DE}{BC}$ D) $\frac{AE}{EC}$

5. The maximum number of tangents that can be drawn from an external point to a circle

A) Many B) 2 C) 1 D) 0

6 The degree of the polynomial $2x^4 + x^3 - 3$ is

A) 4 B) 3 C) 17 D) 0

7. The prime factors of 156 is

A) 3 x 2 x 13 B) 39 x 2 x 2 C) 2 x 3 x 13 D) 2^2x 3x 13

8. If P(E) = 0.05 then, the probability of 'not E' is

A) 0.5 B) 0.05 C) 0.005 D) 0.95

II) Answer the following questions **8X1=8**

9. Write the zeros of the polynomial $x^2 - 4$.

10. If $sin\theta = \frac{3}{5}$ then the value of $cosec\theta$.

11. HCF (56,49) =7 find the LCM (56,49)

12. Write the standard form of Quadratic equation with one variable.

13. What is the formula to find the sum of first n natural numbers?

14. Write the lower limit of the class interval (20-30).

15. If the radius of a semicircle is 7cm, find the length of its arc.

16. Find the volume of a cone of height 10cm and area of the base is 30 cm^2.

III. Answer the following questions **8X2=16**

17. Solve the equations using elimination method: x + y = 8 and x – y = 2

18. Find the value of 'k' if the quadratic equation $x^2 - kx + 4 = 0$ has equal roots.

OR

The sum of the squares of two consecutive positive integers is 13. Find the numbers.

19. Find the value of $sin60^o cos30^o + cos60^o + sin30^o$.

20. Find the co-ordinates of the points which divides the line segment joining the points (4,-3) and (8,5) internally in the ratio 3:1.

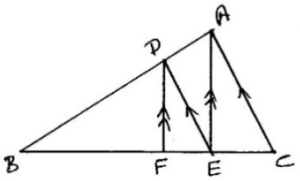
OR

Find the distance between the points (3,2) and (-5,8).

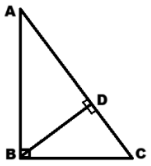
21. Solve using the factor method $x^2 - x + 12 = 0$

22. Find the 20th term of the A.P -2, 1, 4, 7, ---------

23. In the adjoining figure, DE||AC and DF||AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



24. In the adjoining figure, in ΔABC, ∠B = 90^0 and BD ⊥ AC. Show that BC^2=AC.CD



IV) Answer the following questions. **9X3=27**

25. Find the mode of the given data.

C.I	1-3	3-5	5-7	7-9	9-11
f	6	9	15	9	1

OR

Find the mean for the given distribution by direct method.

C.I	1-5	5-9	9-13	13-17	17-21
f	4	3	5	7	1

26. Prove that "the length of tangents drawn from an external point to a circle are equal".

27. Find the area of a quadrant of a circle, where the circumference of circle is 44cm

28. Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$ **OR** Prove that $\frac{\cos\theta - 2\cos^3\theta}{2\sin^3\theta + \sin\theta} = \cot\theta$

29. Prove that $\sqrt{5}$ is an irrational number.

30. In what ratio does the point$(-4, 6)$divide the line segment joining the points $(-6, 10)$ and $(3, -8)$

31. In an Arithmetic progression the sum of first 8 terms is 136 and sum of first 15 terms is 465. Find the sum of first 25 terms of the A.P.

OR

In an Arithmetic progression the sum of 5^{th} and 9^{th} terms is 40 and the sum of 8^{th} and 14^{th} term is 64. Find the sum of first 20 terms of the A.P.

32. Find the quadratic polynomial having zeroes 5 and 3.

33. Two dice, numbered from 1 to 6 on its each face are together rolled once. Find the probability of getting the numbers whose sum is greater than 8.

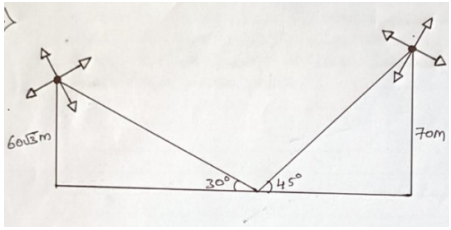
V) Answer the following questions **4X4=16**

34. Find the solution for the pair of linear equations by graphical method. $2x + y = 8$ and $x - y = 1$

35. The angle of depression obtained when an object on the ground is observed from the top of a building of height $30\sqrt{3}$ m is 60^0. Find the distance of object from the foot of the building.

OR

There are two wind fans of height 70m and $60\sqrt{3}$ m on either side of a land. A person standing between them and observes their tips. The angles of elevations formed are 45^0 and 30^0. Find the distance between the wind fans.

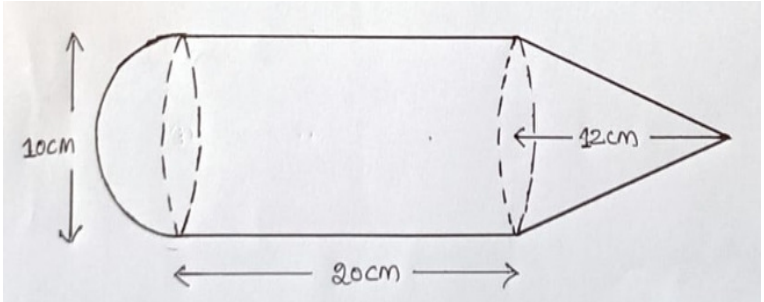


36. A motor boat whose speed in still water is 18km/hr, takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

37. Prove that "If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (proportion) and hence the two triangles are similar".

VI) Answer the following question. **1X5=5**

38. A Toy is made in the shape of a cylinder with one hemisphere stuck to one end and a cone to the other end. The length of the cylindrical part of the toy is 20cm and its diameter is 10 cm. If the height of the cone is 12 cm. Find the surface area of the toy.



DEPARTMENT OF SCHOOL EDUCATION

OFFICE OF DDPI, KOLAR DISTRICT, KOLAR

Model Question Paper 2024-25 SET - 2

Class-10 Mathematics

TIME-3 .15 HOURS **MAXIMUM 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 alternatives and write the complete answer along with its letter of alphabet. **8x1=8**

1) The 10^{th} term of an A.P 3,7,11,15…… is

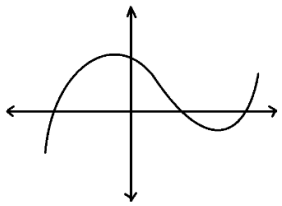
A. 35 B. 39 C. 43 D. 47

2) The lines represented by x + 2y – l4 = 0 and 2x + 4y – 12=0 are

A. Intersecting lines B. Perpendicular lines

C. Coincident lines D. Parallel lines

3) In the given graph y= p(x) the number of zeros are

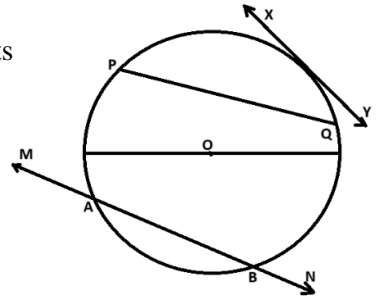


A. 4 B.2 C. 3 D.7

4) The distance of the co-ordinate P(4,3) from the x-axis is

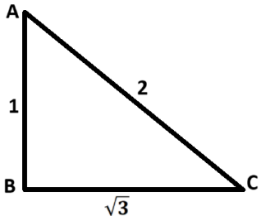
A. 5units B. 3units C. 4units D. 2units

5) In the given figure the secant is



A. XY B. PQ C. MN D. AD

6) In the given figure the value of sin A is



A. $\frac{1}{\sqrt{3}}$ B. $\frac{\sqrt{3}}{2}$ C. $\frac{2}{\sqrt{3}}$ D. $\frac{1}{2}$

7) The mean of 50, 20, 10, 15 and 5 is

A.10 B. 5 C. 15 D. 20

8) The probability of getting head is 0.6 then the probability of not getting head is

A. 0.2 B. 0.6 C. 0.4 D. 1.0

II) Answer the following questions. **1x8=8**

9) In an A.P if $a_n = 3n+1$ then, find the third term.

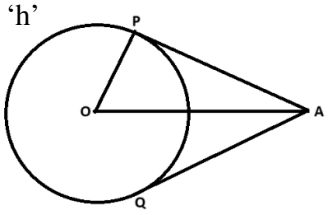
10) How many solutions have the pair of linear equations 2x + 3y – 9 = 0 and 4x + 3y –18=0 have?

11) Write the zero of the polynomial 2x + 7

12) If $x^2 – 6 = 0$ then write the value of x.

13) Write the formula to find the volume of the cone of base radius 'r' and height 'h'

14) In the figure 'O' is the centre of circle. AP and AQ are tangents from external point A. If $\angle PAQ=80^0$ then find $\angle AOP$.



15) If sec $\theta = \frac{4}{3}$ then find the value of cos θ

16) Find the mode of scores 1, 2, 5, 2, 3, 2, 5, 4

III) Answer the following questions. **2x8=16**

17) Solve the equations by elimination method x + 3y= - 2 and 3x + y = 2

18) Find the roots of the equation $x^2 - 7x + 6 = 0$ by factor method.

OR

Find the nature of roots of the equation $2x^2 - 5x - 1=0$

19) The altitude of a right angled triangle is 7cm less than its base. If the hypotenuse is 13 cm then find the other two sides.

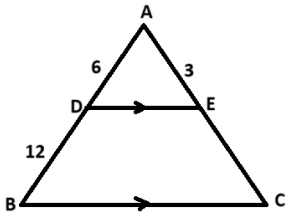
20) Find the distance between the points (2,4) and (3, -2) using distance formula.

OR

Find the co-ordinates of the midpoint of the line segment joining the points (3,5) and (1,3)

21) Find the H.C.F. and L.C.M of 18 and 45.

22) In the given triangle ABC, if AD = 6cm, BD = 12cm and AE= 3cm then find the measure of CE.



23) The curved surface area of a right circular cylinder is 440cm^2 and its radius is 7cm. Then find its height.

24) There are 6 red, 5 blue and 4 green balls in a box. A ball is drawn at random from the box. What is the probability that the ball drawn is blue.

IV) Answer the following questions. **3x9=27**

25) Find the A.P whose third term is 16 and its 7^{th} term exceeds the 5^{th} term by 12

26) Find the zeroes of the quadratic polynomial $p(x)= x^2 + 7x + 10$ and verify the relationship between zeroes and coefficients.

27) The length of the minute hand of a clock is14cm. Find the area swept by the minute hand in 5 minutes.

OR

A chord of a circle of radius 12cm subtends an angle of 120^0 at the centre. Find the area of the corresponding segment of the circle. (use π=3.14 and $\sqrt{3}$=1.73)

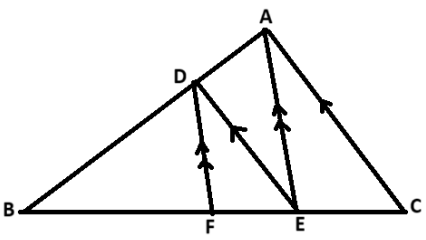
28) Find the ratio in which the line segment joining the points (- 3, 10) and (6, -8) is divided by (-1,6).

29) Prove that $\sqrt{3}$ is an irrational number.

OR

Find LCM if HCF (306, 657) is 9

30) In the figure DE||AC and DF||AE prove that $\frac{BF}{FE} = \frac{BE}{EC}$



31) Prove that "the lengths of tangents drawn from an external point to a circle are equal".

32) Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

OR

Prove that $\sec A(1 - \sin A)(\sec A + \tan A) = 1$

33) Find the mean for the following data.

CI	0-20	20-40	40-60	60-80	80-100
f	12	14	8	6	10

OR

Find the median for the following grouped data.

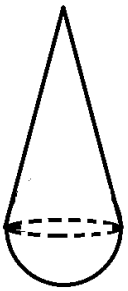
CI	0-10	10-20	20-30	30-40	40-50	50-60
f	5	8	20	15	7	5

V)Answer the following questions. **4x4=16**

34) The third term of an A.P is 8 and its ninth term exceeds three times the third term by 2. Find the sum of the first 19 terms.

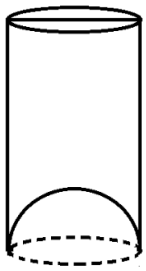
35) Solve graphically $2x + y = 6$ and $2x - y = 2$

36) A toy is in the form of a cone of radius 3.5cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total area of the toy.



OR

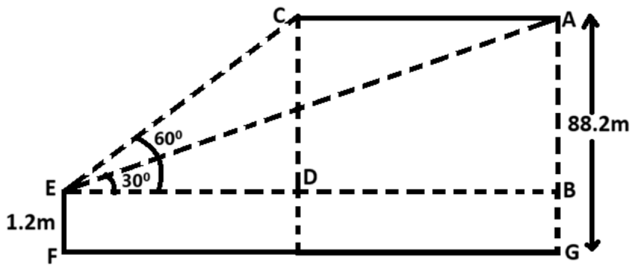
A juice seller was serving his customers using glasses as shown in figure. The inner diameter of the cylindrical glass was 5cm, but the bottom of the glass had a hemispherical raised portion which reduced capacity of the glass. If the height of the glass was 10cm, find the apparent capacity of the glass and its actual capacity ($\pi = 3.14$)



37) Prove that "in two triangles, sides of one triangle are proportional to the sides of the other triangle, then their corresponding angles are equal and hence the two triangles are similar".

VI. Answer the following question. **5x1=5**

38) A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60^0. After some time the angle of elevation reduces to 30^0. Find the distance travelled by the balloon during the interval



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Model Question Paper 2024-25 SET -3

Class-10 Mathematics

TIME-3 .15 HOURS **MAXIMUM 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 alternatives and write the complete answer along with its letter of alphabet. **8x1=8**

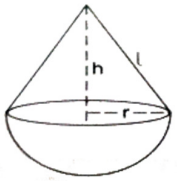
1) 7, 11, 15, 19, ……. Common difference in this arithmetic progression is

A) 5 B) 23 C) - 4 D) 4

2) If roots of quadratic equation, $ax^2 + bx + c = 0$, are equal then

A) $b^2+4ac = 0$ B) $b^2= -4ac$ C) $b^2= 4ac$ D) $b = \sqrt{2ac}$

3) Total Surface area of the given solid figure is



A) $\pi r(2r+l)$ B) $\pi r^2+\pi rl$ C) $2\pi r^2+\pi rh$ D) $2\pi r(r+l)$

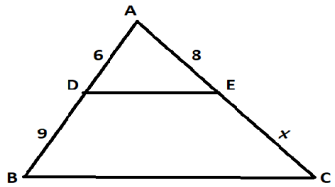
4) Co-ordinates of the midpoint of line joining points A(a, b) and B(c, d) is

A) $\left(\frac{b+d}{2}, \frac{a+c}{2}\right)$ B) $\left(\frac{a+c}{2}, \frac{b+d}{2}\right)$ C) $\left(\frac{a+b}{2}, \frac{c+d}{2}\right)$ D) $\left(\frac{c+d}{2}, \frac{a+b}{2}\right)$

5) If 'p' and 'q' are prime numbers then their H.C.F is

A) 1 B) pq C) 2 D) $p + q$

6) Find the value of EC in the given figure, if DE||BC



A) 11 B) 17 C) 10 D) 12

7) The value of $\sin 60^0$ is

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) 1 D) $\frac{1}{\sqrt{2}}$

8) Median of 8, 5, 3, 9, 7

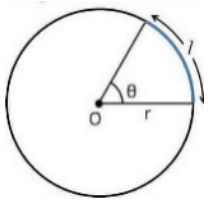
A) 3 B) 5 C) 8 D) 7

II Answer the following questions: **8 X 1 = 8**

9) Find the solution of pair of linear equations, $x + y = 10$ & $x - y = 4$.

10) Write the standard form of quadratic polynomial in one variable 'x'.

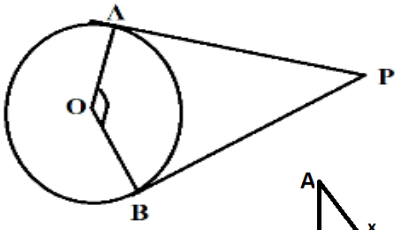
11) Observe the given figure and write the formula to find arc length 'l'.



12) A cylinder is mounted on a hemisphere of same radius as that of its base, if radius of base of the hemisphere is 1cm and height of the cylinder is same as that of its radius of base. Find its outer surface area in terms of π.

13) Write 280 as the product of its prime factors.

14) In the given figure, O is the center of the circle & $\angle AOB = 130^0$.

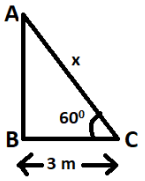


Find the value of $\angle BPA$.

15) If $cotA = \frac{3}{5}$ then, find the value of $tanA$.

16) A ladder leaning against a wall, makes an angle of 60^0 with the horizontal.

If the foot of the ladder is 3 m away from the wall, find the length of the ladder.



III Answer the following questions: **8 X 2 = 16**

17) In an arithmetic progression, the first term is 2, the last term is 29 and sum of all the terms is 155. Find the 10^{th} term of the AP.

OR

An Arithmetic progression consists of 21 terms. Its middle term is 34 and its 9^{th} terms is 12 more than its 6^{th} term. Find its first term.

18) Find the zeroes of the polynomial $4x^2 - 8x - 5$.

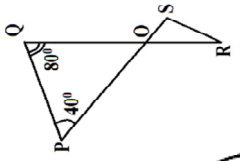
OR

Find a quadratic polynomial with $\frac{1}{2}$ and $\frac{3}{4}$ as the sum and product of its zeroes respectively.

19) If the product of two consecutive odd numbers is 195. Frame a quadratic equation for the given statement and find the given numbers.

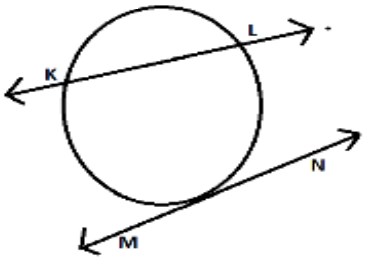
20) Find the distance between the points A(-3,4) and B(3,-4) using the distance formula.

21) In the given figure, PO.SO= QO.RO, $\angle P = 40^0$ & $\angle Q = 80^0$.



Show that $\Delta POQ \cong \Delta ROS$ & hence find $\angle R$.

22) Name the tangent and the secant for the circle given in the figure.



23) One marble is drawn randomly from a basket having 3 red marbles,

5 blue marbles and 2 green marbles. Find the probability of

i) getting red marbles. ii) not getting red marbles.

24) Three coins are tossed at once. Find the probability of getting

i) at most two heads ii) one head and two tails.

IV Answer the following questions: **9 X 3 = 27**

25) If we add 1 to the numerator and subtract one from the denominator, a fraction increased to 1. It becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction?

26) Quadratic polynomial $2x^2 - 3x + 1$ has zeroes as 'm' and 'n'. Now form a quadratic polynomial whose zeroes are '2m' and '2n'.

27) If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k.

OR

A two digit number is four times the sum of the digits. It is also equal to 2 times the product of the digits. Find the number.

28) Find the area of a quadrant of a circle whose circumference is 22 cm. (Take $\pi=\frac{22}{7}$)

OR

A car has two wipers which do not overlap. Each wiper has a blade of length 25 cm sweeping through an angle of 115°. Find the total area cleaned at each sweep of the blades. (Take π=3.14)

29) Find the ratio in which y-axis divides the line segment joining the points A(5,-6) and B(-1,-4). Also find the co-ordinates of the point of division.

OR

If the points $P(x, y)$ is equidistant from the points $A(a + b, b - a)$ and $B(a - b, a + b)$.

Prove that $bx = ay$.

30) Prove that $\sqrt{3}$ is an irrational number.

31) Prove that, "tangents drwan from an external point to a circle are equal in length".

32) Prove that $\frac{sinA-cosA+1}{sinA+cosA-1} = \frac{1}{secA-tanA}$

OR

Express the trigonometric ratios of sin A, sec A and tan A in terms of cot A.

33) Marks scored by 10th standard students of certain school is as follows;

Marks	0-10	10-20	20-30	30-40	40-50
Number of students	5	7	20	12	6

Find the mean marks for the given distribution.

OR

The following data gives the information on the observed life times(in hours) of 150 electrical components

Life time(in hours)	0-20	20-40	40-60	60-80	80-100
Number of components	15	10	35	50	40

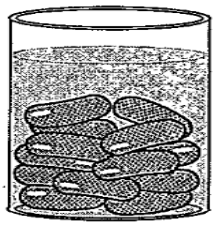
Find the mode of the distribution.

V Answer the following questions: **4 X 4 = 16**

34) In an Arithmetic progression of 50 terms, the sum first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the arithmetic progression.

35) Solve by using graph: $2x + y = 8 \; and \; x - y = 1$.

36) A Gulab jamun contains sugar syrup up to about 30% of its volume.

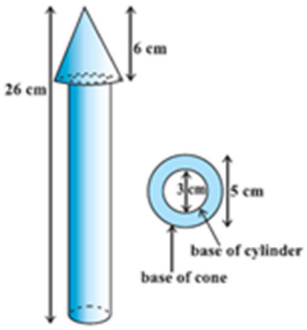


Find approximately how much syrup would be found in 45 Gulab jamuns, each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm.

(Take $\pi=\frac{22}{7}$)

OR

A wooden toy rocket is in the shape of a cone mounted on a cylinder, as shown in Fig. The height of the entire rocket is 26 cm, while the height of the conical part is 6 cm. The base of the conical portion has a diameter of 5 cm, while the base diameter of the cylindrical portion is 3 cm. If the conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colures. (Take $\pi=3.14$)



37) The shadow of a tower standing on a level ground is found to be 30 m longer when the sun's altitude is 30^0 than when it is 60^0. Find the height of the tower.

VI Answer the following questions: **5 X 1 = 5**

38) Prove that "If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar".

DEPARTMENT OF SCHOOL EDUCATION

OFFICE OF DDPI, KOLAR DISTRICT, KOLAR

Model Question Paper 2024-25 SET - 4

Class-10 Mathematics

TIME-3 .15 HOURS **MAXIMUM 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 alternatives and write the complete answer along with its letter of alphabet. **8x1=8**

1. The degree of a cubic polynomial is

   A) 0 B) 1 C) 2 D) 3

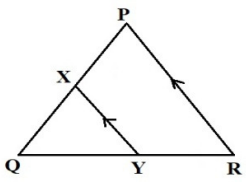
2. The standard form of the quadratic equation $x^2 = x - 6$ is

   A) $x^2 + x - 6 = 0$ B) $x^2 - x - 6 = 0$ C) $x^2 - x + 6 = 0$ D) $x^2 + x + 6 = 0$

3. The distance of the point p(a, b) from the origin is

   A) $\sqrt{a^2 + b^2}$ B) $\sqrt{a^2 - b^2}$ C) $a^2 + b^2$ D) $a^2 - b^2$

4. In △PQR, if XY ‖ PR then the correct relation is

   A) $\frac{QX}{XP} = \frac{QR}{YR}$ B) $\frac{QX}{XP} = \frac{QY}{YR}$ C) $\frac{QP}{XP} = \frac{QY}{YR}$ D) $\frac{XY}{XP} = \frac{QY}{YR}$

5. A straight line passing through a point on a circle is

   A) a radius B) a secant C) a tangent D) a transversal

6. If 13 $sin\theta$ = 12, then the value of $cosec\theta$ is

   A) $\frac{12}{13}$ B) $\frac{13}{12}$ C) $\frac{5}{13}$ D) $\frac{5}{12}$

7. The graphical representation of the pair of lines x + 2y – 4 = 0 and 2x + 4y – 12 = 0 is

   A) Intersecting lines C) Coincident lines

   B) Perpendicular lines D) Parallel lines

8. A cubical dice whose faces numbered from 1 to 6 is rolled once. The probability of getting an square number is

   A) $\frac{1}{3}$ B) $\frac{2}{3}$ C) $\frac{3}{6}$ D) $\frac{1}{6}$

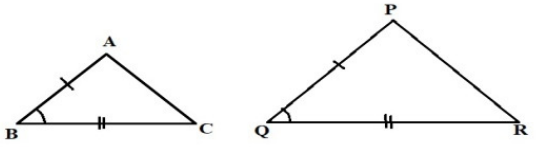
II Answer the following questions. **1 x 8 = 8**

9. Write the formula to find the sum of the first n terms of an Arithmetic progression, whose first term is ‘a’ and the last term ‘a_n’.

10. How many solutions does a pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ have? If they are inconsistent.

11. Write the formula to find the volume of a sphere with radius ‘r’ units.

12. By which similarity criterion △ABC and △PQR are similar? In the adjoining figure.

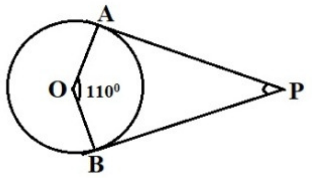


13. Find the mode of the following scores: 4, 6, 5, 6, 8, 6, 7, 6, 5.

14. Define sure event.

15. Write the discriminant of the quadratic equation $px^2 + qx + r = 0$

16. In the figure PA and PB are the tangents drawn from an external point P.



If $\angle AOB = 110^0$ then, find the measure of $\angle APB$.

III) Answer the following questions. **2 x 8 = 16**

17. Find the 26^{th} term of an arithmetic progression 4, 8, 12, 16, ... by using formula.

OR

If the first term and 12^{th} term of an arithmetic progression are 3 and 47 respectively then find the common difference.

18. Solve the given pair of linear equations by Elimination method:

$x + 2y = 6$

$x + y = 4$

19. Find the roots of the equation $x^2 + 6x + 5 = 0$ by factorization method.

20. A cone and a hemisphere have equal bases and equal volumes. Find the ratio of their heights.

21. If the circle with Centre (3, 2) passes through the point (3, 2a) and the diameter of the circle is 8units, then find the value of 'a'.

22. Express 3825 as a product of its prime factors.

OR

Find the HCF of (36, 90) then, find the LCM of that HCF and 27.

23. Evaluate: $\cos^2 45^0 + \sin^2 45^0 - \tan^2 45^0$

24. A game consists of picking a card numbered from 1 to 30. Niswan wins the game if the card she picked is a multiple of 3 or 7. Find the probability that Niswan will lose the game.

IV) Answer the following questions. **3 x 9 = 27**

25. Find the zeros of the polynomial $4s^2 - 4s + 1$ and verify the relationship between the zeros and the coefficients.

26. Find the area of the sector of a circle with radius 4cm and of angle 30^0. Also find the area of the corresponding major sector. (use $\pi = 3.14$)

OR

Find the length of the arc of a circle with radius 7cm which subtends an angle 120^0. Also find the length of the major arc.

27. Show that $\sqrt{3}$ is an irrational number.

28. In $\triangle ABC$, XY $\parallel$ BC. If AX = p – 3, BX = 2p – 2 and $\frac{AY}{CY} = \frac{1}{4}$ then, find the value of p.

OR

A vertical pole of length 6m casts a shadow 4m long on the ground and at the same time a tower casts a shadow 28m long. Find the height of the tower.

29. Prove that "the tangent at any point of a circle is perpendicular to the radius through the point of contact."

30. Find the mean for the following frequency distribution table.

Class Interval	Frequency(f_i)
10 – 20	3
20 – 30	4
30 – 40	2
40 – 50	6
50 – 60	5
	$\sum f_i = 20$

OR

Calculate the median for the following frequency distribution table.

Class interval	Frequency
1-4	6
4-7	30
7-10	40
10-13	16
13-16	4

31. Two trains leave a railway station at the same time. The first train travels towards East and the second train travels towards North. The first train travels 5km/h faster than the second train. If after two hours, they are 50km apart then, find the average speed of each train.

32. If a point p(k, 7) divides the line segment joining the points Q(8, 9) and R(1, 2) in the ratio m : n. Find the ratio m: n. Also find the value of k.

33. Show that $(1 + \cot\theta - \operatorname{cosec}\theta)(1 + \tan\theta + \sec\theta) = 2$

OR

Show that $(\tan^2\theta + \cot^2\theta + 2) = \sec^2\theta.\operatorname{cosec}^2\theta$

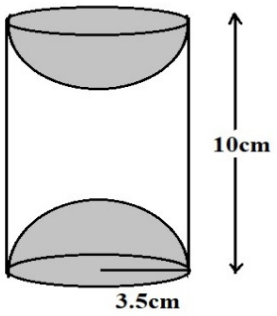
IV) Answer the following questions. **4 x 4 = 16**

34. Find the solution of the following pair of linear equations by graphical method.

$2x + y = 7, \quad x - y = 2$

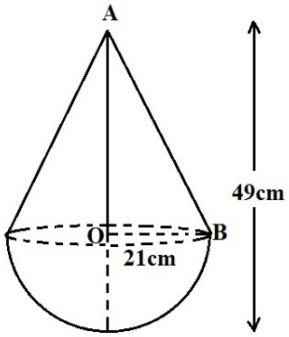
35. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder as shown in the figure. If the height of the cylinder is 10cm, and its base is of radius 3.5cm then find the total surface area of the article.

Also find the cost for painting it at ₹0.5 per cm^2.



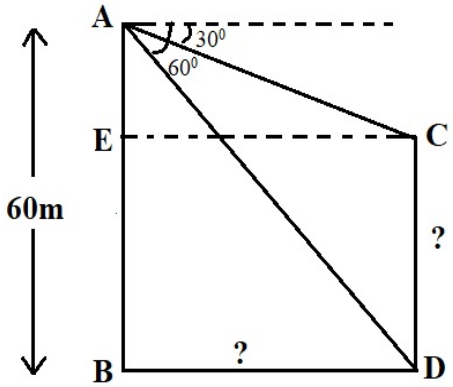
OR

A toy is in the form of a cone of radius of base 21cm, mounted on a hemisphere of same radius as shown in the figure. The total height of the toy is 49cm. Find the volume of the toy.



36. Prove that "If a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio."

37. Two poles AB and CD are on the opposite sides of a river bank. The height of the pole AB is 60m. As seen from the top of the pole AB, the angles of depression of the top and foot of the pole CD are 30^0 and 60^0 respectively. Find the height of the pole CD and width (BD) of the river.



V) Answer the following question. **5 x 1 = 5**

38. In an Arithmetic progression 7^{th} term is 5 more than twice the second term and 10^{th} term is 10 less than thrice the 3^{rd} term. Find the A.P and also find the sum of first 15 terms.