KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD

Malleswaram, Bangalore

MODEL QUESTION PAPER FOR THE YEAR 2019-20

Subject: Mathematics	**MODEL PAPER –2**	Subject code-81E
Time:3 hours 15 minutes	**Private fresh**	Maximum marks: 100

I   In the following questions, four choices are given for each question, choose and write the correct answer along with its alphabet: 1x8=8

1. In the pair of linear equations x + y =9 and x – y =1, the value of x and y are
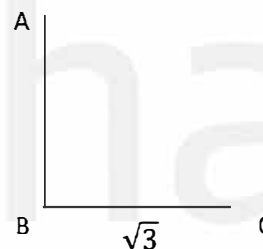
   A) 5 and 4   B) 4 and 5   C) 6 and 3   D) 3 and 6

2. The product of prime factors of 120 is

   A) $2^3 \times 3^2 \times 5^1$ B) $2^2 \times 3^1 \times 5^1$ C) $2^3 \times 3^1 \times 5^2$ D) $2^3 \times 3^1 \times 5^1$

3. In the figure, the value of sin C is

   A) $\frac{2}{\sqrt{3}}$ B) $\frac{\sqrt{3}}{2}$ C) ½   D) 1
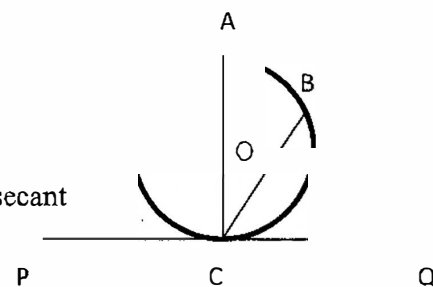

4. The distance between the point (4,3) and the Origin is

   A) 7 units   B) 25 units   C) 5 units   D) 6 units

5. In the figure BC is

   A) Radius   B) Chord   C) Diameter   D) secant

6. If the nth term of an arithmetic progression is $4n^2 -1$, then the 8th term is.
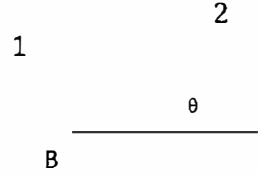
   A) 32   B) 31   C) 256   D) 255

7. 26 English alphabet cards(Without repeating any alphabet) are put in a box and shuffled well. If a card is chosen at random then the probability that the card with an Vowel is.

A) $\frac{3}{26}$ B) $\frac{5}{26}$ C) $\frac{1}{26}$ D) $\frac{21}{26}$

8. In the figure, the angle of elevation θ is

A) 30^0 B) 45^0 C) 90^0 D) 60^0

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

9. The LCM of 24 and 36 is 48 and hence find their HCF.

10. Find the roots of the quadratic equation $x^2 + 7x + 12 = 0$.

11. Find the value of $\sin 90^0 + \tan 45^0$.

12. Find the co-ordinates of the mid-point of the line segments joining the points (6,2) and (4,4).

13. If A is an event of a random experiment, such that $P(A) : P(\bar{A}) = 1: 2$, find the value of $P(\bar{A})$.

14. If the perimeter and area of a circle are numerically equal, then find the radius of the circle.

15. Write the formula to find the volume of the sphere.

16. The perimeter of circle with centre `O` is 24cm, the angle formed by an arc of the circle at its centre is 30^0. Find the length of the arc AB.
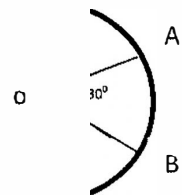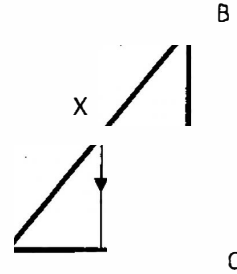
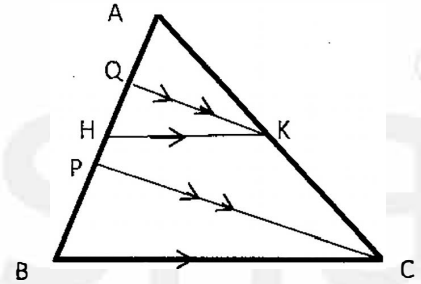## III. Answer the following: 18×2=36

17. Prove that $7 + \sqrt{5}$ is irrational.

18. In the adjoining figure, XY $\parallel$ BC. AX = p-3; BX= 2p-2

    and $\frac{AY}{CY} = \frac{1}{4}$. Find the value of p.

OR

In the figure, PC $\parallel$ QK and BC $\parallel$ HK. If AQ = 6cm, QH = 4cm, HP = 5cm and KC = 18cm, then find the lengths of AK and AB.

19. Write the general form of the following:

    a) Linear polynomial

    b) Cubic polynomial

20. Draw a circle of radius 4cm, and construct a pair of tangents to the circle from a point 8cm away from its center.

21. If α and β are the zeros of the polynomial p(x) = $3x^2$ -12x +15, find the value of $\alpha^2 + \beta^2$.

22. The angle of elevation of the top of a vertical tower on a level ground from point, at a distance of $9\sqrt{3}$ m from its foot on the same ground is 60^0. Find the height of the tower.

OR

Find the diameter of the circular base of right circular cone whose slant height is 8cm and semi vertex angle is 60^0.
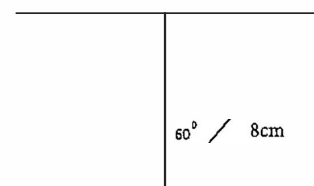
23. Find the area of un shaded region in the given circle of radius 7cm and sector angle is 30^0 as in the figure.

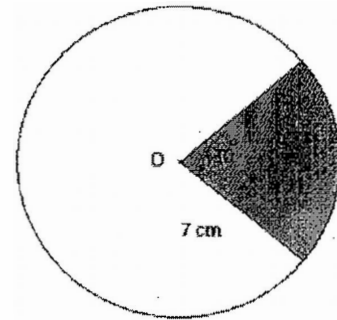24. Curved surface area of right circular cylinder is 440 cm^2 and the radius of its circular base is 7cm. Find the volume of the cylinder.

25. Without actual division show that $\frac{23}{200}$ is a recurring rational number.

26. Solve: $x + y = 8$ and $2x - y = 1$.

27. Find the sum of first 10 terms of an arithmetic progression whose first term is 3 and 10th term is 39

28. A pole is fixed on a level ground perpendicular to the ground and a point on the same ground 8m away from the foot of the pole, the angle of elevation of the top of the pole is found to be 60^0. Calculate the distance between the tip of the pole and the point on the ground.

29. Find the ratio in which P (-4, 6) divides the line joining points A (-6,10) and B(3, -8) internally.

30. A solid cone of height 14cm having its base radius 7cm is melted and recast to form a solid hemisphere. Calculate the radius of the solid hemisphere.

31. Find the length of an arc of a circle of radius 10.5cm , if the angle subtended by the arc at the centre of the circle is 60^0.

32. Draw a line segment AB = 6cm and divide it in the ratio 1:2.

33. Draw a tangent to a circle of radius 3cm at any point on the circle.

34. A fair cubical die whose faces are numbered 1 to 6 is rolled once. Find the probability that the number occurring on its top face is a prime number.

IV. Answer the following: 3 x 9 =27

35. A fraction becomes $\frac{8}{11}$, if 3 is added to both the numerator and the denominator, also if 3 is subtracted from the numerator and the denominator it becomes $\frac{2}{5}$. Find the fraction.

<div align="center">OR</div>

10 years hence, the age of x will be 2 times that of age of y, 10 years ago, the age of x was six times that of age of y. What are their present ages?

36. Find the two consecutive positive integers, whose sum of their squares is 365.

37. Find the perimeter of the triangle whose vertices are (-2,1), (4,6) and (6,3).

<div align="center">OR</div>

Three consecutive vertices of a parallelogram are A(1,2), B(2,3) and C(8,5). Find the fourth vertex.

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

39. A flower vase is in the form of a frustum of a cone. The perimeters of its bases are 44cm and 8.4 π cm. if the depth is 14cm, then find how much soil it can hold.

<div align="right">14 cm</div>

<div align="center">OR</div>

A toy is in the form of cone mounted on a hemisphere both are of same radius. The diameter of the conical portion is 6cm and its height is 4cm. Determine the surface area of the solid.

(Take π = 3.14)
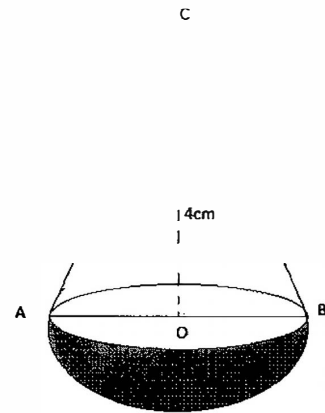
40. Solve graphically: $5x + y = 17$ and $2x - 2y = 2$.

41. The following distribution gives the daily income of 50 workers of a factory.

Daily Income (in Rs)	Number of workers
100 -150	15
150-200	12
200 -250	10
250-300	8
300-350	5

Convert the distribution above to a ' less than type' cumulative frequency distribution, and draw it's Ogive.

42. The sum of first n terms of an arithmetic progression is 210 and sum of its first (n-1) terms is 171. If the first term is 3, then write the arithmetic progression.

43. A man drives his car with uniform speed from place A to the place B which is 150 km.away. Again he returns to the place A by increasing the speed of the car 10 km/hour there by reaches 30 minutes earlier than the time taken in the forward journey. Find the total time taken by him in forward and return journey.

OR

A,B and P are the three non-collinear points on a plane. The distance between the point A and P is 2m more than the distance between the points B and P. if the distance between points A and B is 10m and AB is the longest side of the triangle ABC.Is ABC a right angled triangle or not, Justify your answer using the discriminant of quadratic equation and also find the measure of AP and BP.

V. Answer the following.   4x 4 =16

44. If the sum of first 8 terms of arithmetic progressions is136 and that of first 15 terms is 465,then find the sum of first 25 terms.

<div align="center">OR</div>

The sum of the 5th and 9th terms of an arithmetic progression is 40 and the sum of the 8th and 14th term is 64. Find the sum of first 20 terms.

45. The mode of the following distribution table is 15. Find the mean of this data, and then find the median value by using empirical formula relating mean, median and mode.

C.I.	Number of workers
1- 5	7
5 – 9	2
9-13	2
13-17	8
17-21	1

46. Show that $\frac{sin\theta}{1-cos\theta} + \frac{1+cos\theta}{sin\theta} = 2\ cosec\ \theta$

47. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 8cm and 6cm, then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

VI. Answer the following   1x5=5

48. State and prove:The converse of Pythagoras theorem.