SECOND PRELIMINARY EXAMINATION 2019-20
[BANGALORE

STD: X
SUB: MATHEMATICS
MARKS: &
TIME:

SECTION – A

All questions are compulsory

Q I.

1. The expression $(ax^3 + bx^2 - 5x + 2a)$ is exactly divisible by $(x^2 - 3x - 2)$. Calculate the value of a and b and factorize the expression completely.

[3]

2. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, $B = \begin{bmatrix} x & 1 \\ 4 & -1 \end{bmatrix}$ and $A^2 + B^2 = (A + B)^2$, find the value of 'x'.

[3]

3. A coin is tossed, and a dice is thrown simultaneously.

[4]

   a. Describe the sample space S

   b. Find the probability of getting

   (i) A head and an odd number

   (ii) A tail

Q II.

1. Solve the inequation and represent the solution set on a number line for the following:

[3]

   a. $X \in W$

   b. $x \in R$

   $-2\frac{3}{4} < 12 - 2x - 3 \le 2$

2. Solve the following by using the formula and write the root correct to 3 significant figures.

[3]

   $(x - 4)^2 - 5x - 3 = 0$

3. Use graph paper to answer the following questions. (Take 1cm = 1unit on both the axes).

[4]

a. Plot the points A (2, 3) and B (6, 3).

b. Reflect A in the origin to get the image D.

c. Reflect A in the x-axis to get the image C.

d. Write the co-ordinates of C and D.

e. Give a geometrical name for the figure ABCD and find its area.

f. Name an invariant point from the figure on reflection in y-axis.

Q III.

1. $A(5,-2), B(6,3), C(8,5)$ are the vertices of the $\triangle ABC$. Find the equation of:[3]

   a. The median of the triangle through A.

   b. The altitude of the triangle through B.

2. The sum of the ages of Vivek and his younger brother Amit is 47 years. The product of their ages in years is 550. Find their ages.   [3]

3. Draw Histogram for the following:-   [4]

C.I.	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	12	20	26	18	10	6

Q IV.

1. Solve for x, for the given AP, if $(1 + 4 + 7 + \ldots + x) = 247$ [3]

2. The model of a building is constructed with the scale factor 1: 30.   [3]

   a. If the height of the model is 80cm, find the actual height of the building in meters.

   b. If the actual volume of a tank at the top of the building is $27m^3$, find the volume of the tank on the top of the model.

3. The marked price of an article is ₹. 6000. Wholesaler sells it to the dealer at 20% discount. The dealer further sells it to a customer at a discount of 10% on the marked price. If the rate of GST at each stage is 18%, find the amount of Tax paid by the dealer to the government. [4]

SECTION – B
Solve any 4 questions

Q V.

1. Prove the identity: [3]

$$sinA(1 + tanA) + cosA(1 + cotA) = secA + cosecA$$

2. Mr. Sharma receives an annual income of ₹ 900 in buying ₹ 50 shares selling at ₹ 80. If the dividend declared is 20%, find the: [3]

   a. Amount invested by Mr. Sharma.
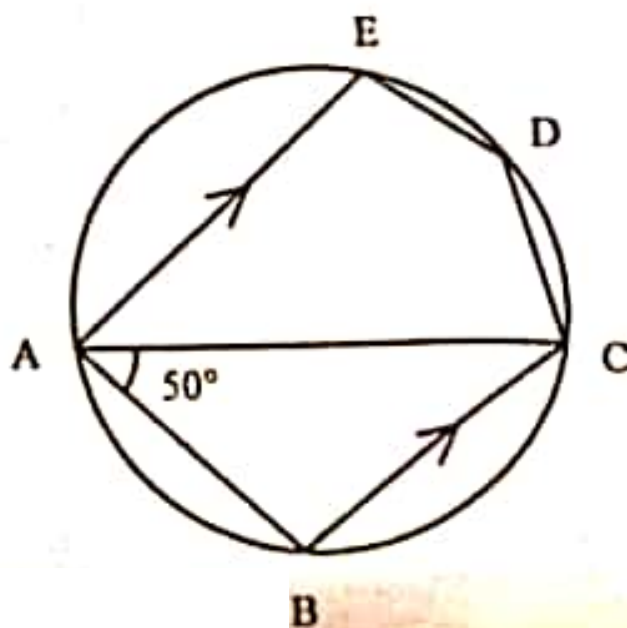
   b. Percentage return on his investment.

3. Draw a Circle of radius 4.5cm. Draw two tangents to this circle so that the angle between the tangents is 60°. [4]

Q VI.

1. In the given figure, ABCDE is a pentagon inscribed in a circle such that AC is a diameter and side BC ‖ AE. If ∠BAC = 50°, find giving reasons: [3]

   a. ∠ACB

   b. ∠EDC

   c. ∠BEC

   Hence prove that BE is also a diameter.

2. Solve the following inequation, write down the solution set and represent it on the real number line: [3]

$$-2 + 10x \leq 13x + 10 < 24 + 10x, \; x \in Z$$

3. Using ruler and a compass only contruct a semi circle with diameter BC = 7cm. Locate a point A on the circumference of the semicircle such that A is equidistant from B and C. Complete the cyclic quadrilateral ABCD, such that D is equidistant from AB and BC. Measure $\angle ADC$ and write it down. [4]

Q VII.

1. $A(4, 2)$, $B(6, 8)$ and $C(8, 4)$ are the vertices of a triangle ABC. Write down the equation of the median of the triangle through A. [3]

2. In the given figure AC is a tangent to the circle with centre O. If $\angle ADB = 55°$, find x and y. Give reasons for your answers. [3]
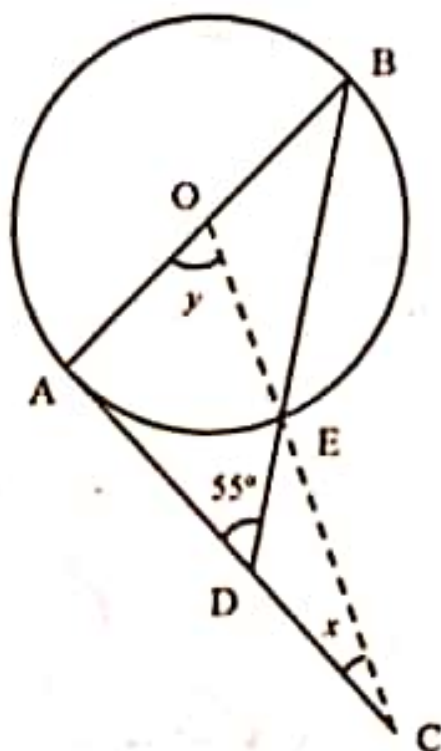
3. Priyanka has a recurring deposit account of ₹. 1000 per month at 10% per annum. If she gets ₹. 5550 as interest at the time of maturity, find the total time for which the account was held. [4]

Q VIII.

1. Solve for x:

[4]

$$\frac{\sqrt{2x+1}+\sqrt{x-3}}{\sqrt{2x+1}-\sqrt{x-3}} = 4$$

2. Use Graph paper for this question.

[6]

A survey regarding height (in cm) of 60 boys belonging to Class 10 of a school was conducted. The following data was recorded:

Height	135-140	140-145	145-150	150-155	155-160	160-165	165-170
No.of boys	4	8	20	14	7	6	1

Taking 2cm = height of 10cm along one axis and 2cm = 10 boys along the other axis draw an ogive of the above distribution. Use the graph to estimate the following:

a. The median

b. Lower Quartile

c. If above 158 cm is considered as the tall boys of the class.

   Find the number of boys in the class who are tall.

Q IX.

1. Solve the equation $4x^2 - 5x - 3 = 0$ and give your answer correct to two decimal places.

[3]

2. Find the sum of GP

[3]

$1 + 3 + 9 + 27 + \ldots\ldots\ldots$ to 12 terms.

3. Two poles AB and PQ are standing opposite each other on either side of a road 200m wide. From a point R between them on the road, the angles of elevation of the top of the poles AB and PQ are 45° and 40° respectively. If height of AB = 80m, find the height of PQ correct to the nearest meter.

[4]

Q X.

1. If $A = \begin{bmatrix} 3 & -1 \\ 0 & 2 \end{bmatrix}$, find matrix B such that $A^2 - 2B = 3A + 5I$ where I is a

   2×2 identity matrix. [3]

2. Prove that $A(2, 1), B(0, 3)$ and $C(-2, 1)$ are the three vertices of an isosceles right –angled triangle. Hence find the coordinates of a point D, if ABCD is a square. [3]

3. Find the length of a canvas, 2m in width, required to make a conical tent, 12 m in diameter and 12.6m in slant height. Also find the cost of canvas at a rate of ₹ 12 per meter. [4]

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