SECOND PRELIM EXAM 2018-19

Std: X | Marks: 80

Date: 08/01/19 | Subject: Mathematics | Dur. : 2 hrs 30 mins

Section A (40 marks)

[Attempt all questions from this section]

Question 1:-

a) If $2x^3 + cx^2 - dx - 15$ has $(2x + 3)$ as a factor and leaves a remainder -5 when divided by $(x - 1)$, find the value of c and d. 3

b) Find the value of m for which the given equation has real and equal roots.
$x^2 + 2(m-1)x + (m+5) = 0$ 3

c) Given A (-4 , -6) and B (8 , 4), find the equation of line AB and the ratio in which the line x = 0, divides AB. List the coordinates of the y-intercept. 4

Question 2 :-

a) Solve the following linear inequation and graph the solution set on the no line:- 3

$$\frac{-1}{5} \leq \frac{3x}{10} + 1 < \frac{2}{5} \; ; x \in R$$

b) An investor purchases Rs 100 shares at 10% discount, by paying 15% dividend for Rs 7200. After a year he receives dividend and sells all the shares at 20% premium, find sales proceeds and annual income. 3

c) Find 4 numbers in AP whose sum is 20 and sum of whose squares is 120. 4

Question 3:-

a) The curved surface area of a cylindrical roller is 132 m^2 and its volume is 99 m^3. Find the diameter and the length of the roller. 3

b) Cards marked with numbers 2 to 101 are placed in a box and mixed thoroughly. One card is is drawn at random from this box. Find the probability that the number on the card is :-

i) Number less than 14
ii) Number which is a perfect square
iii) Prime number less than 20 3

c) Draw a histogram and estimate mode from it :- (Take 2cm = 1 unit on both the axes) 4

Y axis

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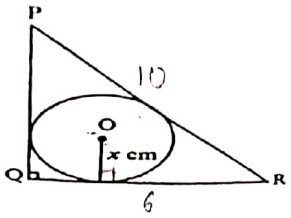
Class interval	20 - 30	30 – 40	40 – 50	50 - 60	60 – 70
Frequency	3	5	12	7	4

Question 4 :-

a) Simplify :- $\begin{pmatrix} -2\sin 30 & \text{cosec } 30 \\ \tan 45 & \cos 0 \end{pmatrix} \begin{pmatrix} \text{cosec } 90 \\ \cos 60 \end{pmatrix}$ 3

b) Which terms of GP : $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \ldots\ldots$ is $\frac{1}{19683}$? 3

c)



In the given figure, triangle PQR is a right angled triangle at Q, in which PR = 10 cm, QR = 6 cm. A circle has been inscribed in triangle PQR. Find :-

i) The length of side PQ

ii) The length of the radius of the circle. 4

Section B (40 marks)

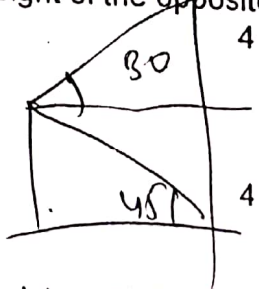
[Attempt any 4 questions from the following]

Question 5 :-

a) Prove the identity :- (cosec A + cot A) (1 – cos A) = sin A 3

b) Find x and y if :- $\begin{pmatrix} -2 & 0 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 2x \end{pmatrix} + 3 \begin{pmatrix} -2 \\ 1 \end{pmatrix} = 2 \begin{pmatrix} y \\ 3 \end{pmatrix}$ 3

c) From a window 15 meters high above the ground in a street, the angles of elevation and depression of the top and foot of another house on the opposite side of the street are 30^0 and 45^0 respectively. Find the height of the opposite house. (Give your answer to the nearest meter). 4



Question 6 :-

a) Using properties of proportion to solve the following :- 4

$$\frac{1 + x + x^2}{1 - x + x^2} = \frac{62\,(1 + x)}{63\,(1 - x)}$$

b) Use graph paper for this question. Given below are the weights of students in Std 10. Draw an ogive for the given distribution (take scale 2cm = 5 kg on one axis and 2 cm = 20 students along the other axis). 6

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Weight(kg)	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 -80
No of students	5	17	22	45	51	31	20	9

From the graph determine:-

i) The median
ii) The lower quarlile
iii) The percentage of students weighing 55 kg and above
iv) The no of students who are overweight, if weighing 72 kg or more is considered overweight.

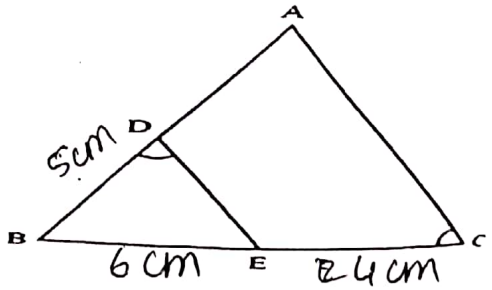
Question 7 :-

a) Mr Sham opened a R.D account scheme with a bank for 3 years. If the rate of interest is 8% p.a and the bank pays Rs 1776 as the interest at the time of maturity, find the money deposited monthly and the maturity value he receives at the end of three years. 3

b) Construct Δ ABC in which BC = 8 cm, ∠ABC = 60^0. Mark a point P inside the triangle which is equidistant from AB, BC and equidistant from B and C. 3

c) In the given figure, ABC is a triangle with ∠EDB = ∠ACB. Prove that Δ ABC similar ΔEBD. If BE = 6 cm, EC = 4 cm, BD = 5 cm and area of ΔBED = 9 cm^2, Calculate :- 4

i) Length of AB
ii) Area of Δ ABC



Question 8 :-

a) If $y + (2p+1)x + 3 = 0$ and $8y - (2p - 1)x = 5$ are mutually perpendicular to each other, find the values of p. 3

b) Find the sequence which is in geometric progression given that the 5^{th} term of the G.P is 81 and the 2^{nd} term is 24. 3

c) A car covers a distance of 400 km at a certain speed. Had the speed been 12 km/hr more, the time taken for the journey would have been 1 hour 40 minutes less. Find the original speed of the car. 4

Question 9:-

a) Is the given sequence A.P or G.P :- $\frac{1}{2}, 1, \frac{3}{2}, \ldots\ldots$ 3

Hence find the 30^{th} term of the sequence.

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b) Factorise the given expression completely: 3

$x^3 - 7x^2 + 14x - 8$

c) Use graph paper for the following questions.(Take 1 cm = 1 unit on both the axes) 4

i) Plot P(2,4) , Q(-2,-1) and R(5,0)

ii) Reflect the points P and Q in the line y=0 and name it as S and T

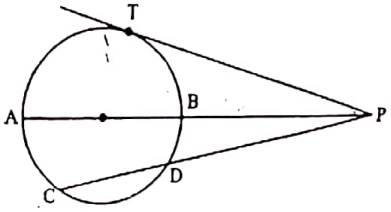
iii) Give a special name for the figure PQRSTQSR

iv) Find the area of the figure formed.

Question 10 :-

a) Find mean, median and mode of 1,10,9,8,2,4,4,3,9,1,5,6,2,4,7 3

b) In the circle with centre O, chords AB and CD intersect externally at P and PT is a tangent to the circle at T. If PB = 12 cm, AB = 15 cm and PC = 36 cm, find the length of PT and CD 3



c) The surface area of a solid metallic sphere is 5544 cm^2. It is melted and recast into solid right circular cones of radius 7 cm and height 14 cm. Calculate the radius of the sphere and the number of cones recast. 4

Question 11 :-

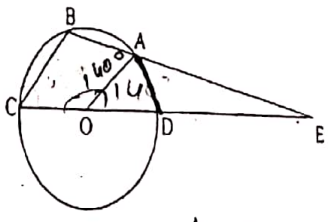
a) If the mean of the following distribution is 7.5, find the missing frequency f.

Variable	5	6	7	8	9	10	11	12
Frequency	20	17	f	10	8	C	7	6

3

b) Solve the quadratic equation $3x^2 - x - 7 = 0$ and give the answer correct to two decimal places. 3

c) In the figure, O is the centre of the circle, $\angle AOC = 140^0$, $\angle BCO = 45^0$. Find :- i) $\angle EAD$ ii) $\angle OEA$ iii) $\angle CBA$ 4



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