STD: X

MARKS: 80

DATE: 03.12.2018

TIME: 2½ Hrs. + 15 Mins.

Reading Time

Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this Paper is the time allowed for writing the answers.

Attempt all questions from Section A and any four questions from Section B.
All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.
Omission of essential working will result in loss of marks.
The intended marks for the questions or parts of questions are given in the brackets [   ].
Mathematical tables are provided.

SECTION A (40 MARKS)
(Answer *all* the questions from this Section)

Question 1

a) Given $\begin{bmatrix} 2 & 1 \\ -3 & 4 \end{bmatrix} X = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ [3]

   i)   Write the order of the matrix X

   ii) Find the matix X

b) Mr Gupta opened a recurring deposit account in a bank.He deposited ₹ 2500 per month for two years. At the time of maturity he got ₹ 67500. Find : [3]

   i)   The total interest earned by him

   ii) The rate of interest per annum

c) There are two dice; one red and one black .Both are rolled simultaneously. Calculate the probability that : [4]

   i)   The number on the red dice is 3

   ii) Each dice shows five

   iii) The number on the black dice is either 2 or 4

   iv) The product of two numbers is odd.

This paper consists of 7 printed pages and one blank page.

Turn over

Question 2

a) The surface area of a solid metallic sphere is 616 cm² .It is melted and recast into smaller spheres of diameter 3.5cm. How many such spheres can be obtained? [3]

b) In a flower bed, there are 23 rose plants in the first row, 21 in the second row , 19 in the third row, and so on. There are 5 rose plants in the last row. Find the total number of rose plants in the flower bed. [3]

c) In the given figure, O is the centre of the circle .Tangents at A and B meet at C . If $\angle ACO = 30°$ find [4]

    i) $\angle BCO$ ii) $\angle AOB$ iii) $\angle APB$
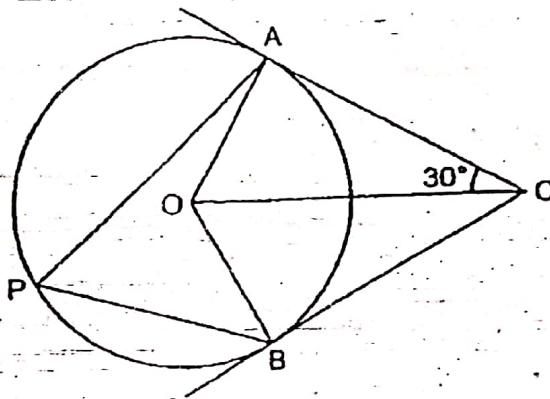
Question 3

a) If $(x-2)$ is a factor of $2x^3 - x^2 - px - 2$ [3]

    i) Find the value of p

    ii) With the value of p factorise the above expression completely.

b) Prove that $\sin\theta(1+\tan\theta) + \cos\theta(1+\cot\theta) = \sec\theta + \csc\theta$ [3]

c) Plot P (2 , 4) and Q (-2 , 1) and R (5, 0) on a graph paper [4]

    i) Reflect P and Q in x axis to get P¹ and Q¹ and write their co ordinates

    ii) Give a geometrical name to the figure PQQ¹P¹R .

    iii) Find the area of the figure .

    iv) Write the equation of the line QQ¹.

2

Question 4

a) Solve the following inequation, write the solution set and represent it on a number line   [3]

$$4x - 19 < \frac{3x}{5} - 2 \leq \frac{-2}{5} + x, \quad x \in R$$

b) P (3 , 4), Q (7, -2) and R (-2 , -1) are the vertices of the triangle PQR. Write down   [3]
the equation of the median of the triangle through R.

c) The mean marks obtained by 50 students in a test is 62.8 where a and b are two   [4]
missing data. Find a and b.

Marks	0 - 20	20 - 40	40 - 60	60 - 80	80 -100	100 -120
No. of students	5	a	10	b	7	8

SECTION B - 40 MARKS
(Attempt any *4* from this Section)

Question 5

a) The first term of a G.P. is 27 and 8th term is $\frac{1}{81}$. Find the sum of its first 6 terms.   [3]

b) Mr. Parekh invested ₹52000 on ₹100 shares at a discount of ₹20 paying 8% dividend.   [3]
At the end of one year he sells the shares at a premium of ₹20. Find :

i) The annual dividend

ii) The profit earned including his dividend

c) Construct a triangle BCP where BC= 5cm , BP= 4 cm , ∠PBC = 45°. Complete the   [4]
rectangle ABCD such that
i) P is equidistant from AB and BC
ii) P is equidistant from C and D
iii) Measure the length of AB
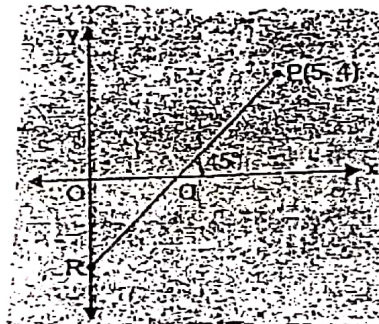

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Question 6

a) If $\dfrac{x^2 + y^2}{x^2 - y^2} = \dfrac{17}{8}$ Use properties of proportion to find the value of : [3]

    i) $x : y$

    ii) $\dfrac{x^3 + y^3}{x^3 - y^3}$

b) Given $A = \begin{bmatrix} p & 0 \\ 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -q \\ 1 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$ and $BA = C^2$. Find the values of p and q [3]

c) In the given figure, find the equation of the line through P (5, 4) making an angle of [4]
45° with the x axis. Also find the co- ordinates of Q and R

Question 7

a) Solve and give your answer correct to 3 significant figures [3]

    $(x - 1)^2 - 3x + 4 = 0$

b) On a map drawn to a scale of 1: 250000 , a triangular plot of land has the following [3]
measurements

    AB = 3cm , BC = 4 cm and ∠ABC = 90°, Calculate;

    i. The actual length of AC in km   ii. The area of the plot in sq km

c) Prove that : [4]

$$\dfrac{1 + (\sec A - \tan A)^2}{\operatorname{Cosec} A (\sec A - \tan A)} = 2 \tan A$$

4

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Question 8

a) A shopkeeper buys a certain number of books for ₹720 .If the cost per book was [3]
₹ 5 less, the number of books that could be bought for₹ 720 would be 2 more.
Taking the original cost of each book to be ₹x , write an equation in x and solve it.

b) If a, b, c and d are in proportion prove that [3]

$$\frac{\sqrt{a^4+c^4}}{\sqrt{b^4+d^4}} = \frac{ma^2+nc^2}{mb^2+nd^2}$$

c) Construct a regular hexagon of side 5 cm. Inscribe a circle in it. [4]

Question 9

a) If one root of the quadratic equation $(k+1)x^2 - kx -10 = 0$ is 2 , find the value of k [3]
and the other root.

b) In the given figure ABC is a triangle with $\angle EDB = \angle ACB$. Prove that $\triangle EDB - \triangle ABC$ [3]
If BE = 6 cm , EC = 4 cm BD = 5 cm and area of $\triangle$ BED = 9cm². Calculate the
i Length of AB   ii . Area of $\triangle$ ABC
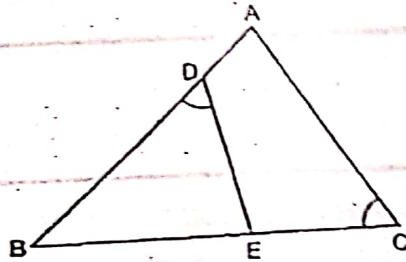
c) A solid cylinder of silver 9 cm high and 4 cm in diameter is melted and recast into a [4]
right circular cone of diameter 6cm. Find the height and the total surface area of the
cone. Give your answer correct to one decimal place.(take π = 3.14)

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Question 10

a) What number should be subtracted from $2x^3 - 5x^2 + 5x$ so that the resulting polynomial has a factor $2x - 3$? [3]

b) In the given semicircle with centre O , tangent drawn at point D meets AB produced at C. Given $\angle DAB = 28^0$, calculate [3]

i) $\angle DBA$, ii) $\angle C$ and iii) $\angle BDC$
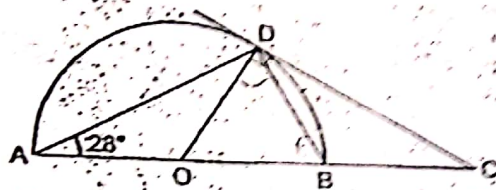
c) From two points A and B on the same side of the building , the angle of elevation of the top of the building are 30^0 and 60^0.If the height of the building is 10m find the distance between A and B corrected to the nearest whole number. [4]

Question 11

a) The following table gives the weight in kgs of 200 students. Use a graph sheet and draw an ogive for the distribution. [6]

Take a scale of 2cm. = 10 kg on one axis and 2cm. = 20 students on the other axis.

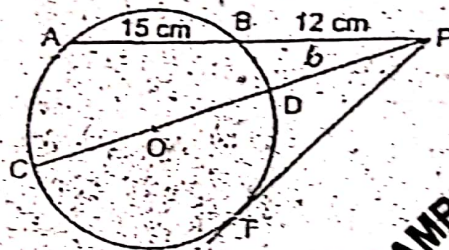| Weight in kgs.	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
No. of students	5	17	22	45	51	31	20	9

Use your graph to estimate the following :

i) The median

ii) The upper quartile

iii) The percentage of students weighing 55 kgs. or more

iv) The weight above which the heaviest 30% of the students fall

v) The number of students who are underweight if 55.7 kg. is the standard weight.

6

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8) In the circle with centre O chords AB and CD intersect externally at P and PT is a [4]
tangent to the circle at T.

If PB = 12 cm, AB = 15 cm and DP = 6 cm . Find the length of i) PT ii) radius..