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THAKUR PUBLIC SCHOOL
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Mathematics

(Two hours and a half)

Answers to this paper must be written on the paper 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 the loss of marks**.*
The intended marks for questions or parts of questions are given in brackets [].
Mathematical tables are provided.

SECTION A (40 Marks)

*(Attempt **all** questions from this Section)*

QUESTION 1

a) Mrs. Chopra deposits Rs. 650 per month in a Recurring Deposit Account for 2 years at 8% p. a. Find the amount she will receive at the time of maturity? (3)
b) How many terms are there in A.P 9,13,17, 21,.97? (3)
c) Solve the inequation $8 < 5(x+1) - 2 \leq 18, x \in R$ .Graph the solution set. (4)

QUESTION 2

a) Given A= $\begin{bmatrix} 2 & 0 \\ -3 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix}$

Calculate: 3A -2B. (3)

b) Given that the equation $kx^2 - 20x + 25 = 0$. Find the value of k, and also find the roots. (3)
c) If $\frac{9a-5b}{9d-5c} = \frac{9a+5b}{9d+5c}$,then prove that $\frac{a}{b} = \frac{d}{c}$. (4)

QUESTION 3

a) Find the equation of the line whose slope is $-\frac{5}{2}$ and X-intercept is 8. (3)
b) The polynomials $(px^3 + 3x^2 - 3)$ and $(2x^3 - 5x + p)$ when divided by (x - 4) leave the same remainder. Find the value of 'p'. (3)
c) A box contains 16 cards bearing numbers 1,2, 3,.16 respectively. If a card is drawn at random from the box, find the probability that the number on the card is:
i) an odd number. ii) a perfect square. iii) a prime number.
iv) a number not divisible by 4. (4)

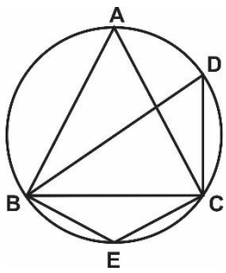
QUESTION 4

a) The marked price of an article is ₹ 15000. A dealer in Gujarat sells the article to a consumer in the same city at a profit of 8%. If the rate of GST is 12%, find: (3)
i) GST paid by the dealer to Central and State Governments.
ii) the amount which the consumer pays for the article.

b) Show that $\frac{tanA+sinA}{tanA-sinA} = \frac{secA+1}{secA-1}$ (3)

c) In the figure, BD is a diameter of the circle, ∠DBC =58°. Calculate: i) ∠BDC (4)

ii) ∠BEC iii) ∠BAC

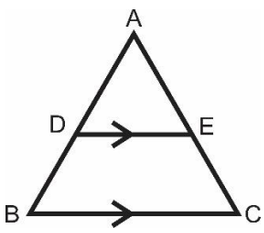


SECTION B (40 Marks)

*(Attempt **any** four questions from this section)*

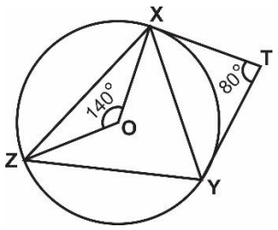
QUESTION 5

a) In the figure, DE ∥ BC. If AD =3.4 cm, AB = 8.5 cm and AC = 3.5 cm. Find AE. (3)



b) Find the ratio in which (a, 2) divides the line joining the points (6, -2) & (-3, 16). Also find 'a'. (3)

c) In the figure, O is the centre of the circumcircle. Tangents at X and Y intersect at T. Given ∠XTY =80° and ∠XOZ = 140°, Calculate ∠ZXY. (4)



QUESTION 6

a) Draw an O-give for the following frequency distribution which shows the marks obtained in the Math paper by 200 students & estimate: (6)

MARKS	0 –10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
NO. OF STUDENTS	5	10	14	21	25	34	36	27	16	12

i. The Median.
ii. The number of students who scored above 85 marks.
iii. If 10 students qualify for merit scholarship, find the minimum marks to qualify.
Take a scale of 2cm = 10marks on one axis & 2cm = 20 students on the other.

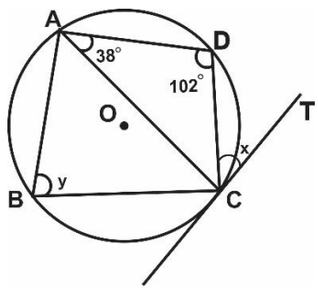
b) Find the values of *x* and *y* if $\begin{bmatrix}1 & 2\\3 & 3\end{bmatrix}\begin{bmatrix}x & 0\\0 & y\end{bmatrix}=\begin{bmatrix}x & 0\\9 & 0\end{bmatrix}$ (4)

QUESTION 7

a) A bag contains 8red ,6 white and 4 black balls. A ball is drawn at random from the bag. Find the probability that drawn ball is: i) red and white. ii) neither white nor black. (3)

b) A (1,0), B (5,3) and D (-2,4) are the three vertices of a square ABCD. Find the co-ordinates of the fourth vertex C. (3)

c) In the given figure, ∠CAD =38° and) ∠D =102°, CT is a tangent to the circle with centre O. Find the angles ***x, y*** and ∠OAC. (4)



QUESTION 8

a) A solid cylinder of radius 3cm and height 8cm is melted and formed into a cone of radius 6 cm. Find the height of the cone. (3)

b) An aero plane travelled a distance of 400km/h at an average speed of ***x*** km/h. On return journey, the speed was increased by 40km/h. If the return journey took 30 minutes less than the onward journey, find the value of '***x***'. (3)

c) Plot the points A (4,6) and B (1,2) on graph paper. Reflect A in ***x-axis*** to get A**'** and reflect B in the line AA**'** to get B**'** i) Write the co-ordinates of A**'** and B**'.**
ii) Give a geometrical name for the figure ABA**'**B**'.** (4)

QUESTION 9

a) Find the mean of the following distribution. (3)

CLASS	40–45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
FREQUENCY	5	12	20	16	10	8	5	4

b) If a, b, c, d are in continued proportion, prove that $\frac{3a-7d}{7a+3d} = \frac{3a^3-7b^3}{7a^3+3b^3}$ (3)

c) From the top of a building 20m high, the angle of elevation of the top of a monument is 45° and the angle of depression of its foot is 15°. Find the height of the monument. (4)

QUESTION 10

a) Find the sum of all 2-digit numbers which are divisible by 3. (3)

b) Solve $x^2 - 3x - 9$ and give answer correct up to 3 significant figures. (3)

c) If A (-3,5), B (2, -1) and C(a,11) are collinear, find the value of 'a'. (4)

QUESTION 11

a) Prove that: $\frac{sinA-2sin^3A}{2cos^3A-cosA} = tanA.$ (3)

b) How many cylindrical glasses 3cm in radius and 5cm deep can be filled with fruit juice from a full cylindrical jug of radius 5cm and 18cm deep? (3)

c) In ΔPQR, point X is situated on side PQ such that, PX= ½ XQ also point Y is situated on side PR such that XY ‖ QR. Find i) Area of ΔPXY: ΔPQR.
ii) If QR = 4.5 cm, find the length XY. (4)
