STD: X   **Marks: 60**
Date: 24/09/2020   **Time: 2hrs**

Question 1

a.   If $A = \begin{bmatrix} 0 & -1 \\ 4 & -3 \end{bmatrix}$, $B = \begin{bmatrix} -5 \\ 6 \end{bmatrix}$ and $3A \times M = 2B$, find matrix M.   **[3]**

b.   Find the number that must be subtracted from the polynomial $3y^3 + y^2 - 22y + 15$, so that the resulting polynomial is completely divisible by $(y + 3)$.   **[3]**

c.   Ahmed has a R.D. account in a bank. He deposits Rs. 2500 per month for 2 yrs. If he gets Rs.66, 250 at time of maturity. Find : i)interest paid by bank ii) Rate of interest   **[4]**

Question 2

a.   Using a graph paper, draw an Ogive for following distribution which shows marks obtained in Hindi. by 100 students.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	5	10	20	25	15	12	9	4

Use Ogive to estimate: i. Median   ii)No. of students who score marks above 65.
iii)Inter quartile range   **[6]**

b.   A mathematics aptitude test of 50 students was recorded as follows:

Marks	50-60	60-70	70-80	80-90	90-100
No. of students	4	8	14	19	5

Draw a histogram & hence locate the mode.   **[4]**

Question 3

a.   Three coins are tossed together. Write all possible outcomes. Now, find the probability of getting: (i) Exactly two heads (ii)   At least two heads (iii) At most two heads   **[3]**

b.   Price of an article is equals to 9000 and rate of GST on it is equals to 18% . A shopkeeper buys this article at a reduced price and sells it at its market price. If the shopkeeper paid rupees 162 CGST to the government find the amount paid by the shopkeeper (inclusive of GST)   **[3]**

c.   Prove that: $(\text{cosec } A - \sin A)(\sec A - \cos A)(\tan A + \cot A) = 1$.   **[4]**

Question 4

a.   Calculate the mean of the distribution.   **[3]**

Marks	10-20	20-30	30-40	-40-50	50-60	60-70	70-80
No. of student	2	6	16-	12	9	7	4

b.   A& B are two points on x-axis & y-axis respectively. P is mid-point of AB. Find:
i)   Co-ordinates of A & B.
ii)   Slope of line AB.
iii)   Equation of line AB.   **[3]**
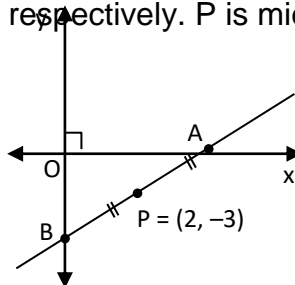
c. On a graph paper, plot the triangle ABC whose vertices are the points A(5,4) B(7,5) C(-3,6). On the same graph paper draw the image of the triangle under reflection in the line y = 3. Mark any two points on the graph paper which are invariant under this reflection. Also, write the coordinates of the points marked **[4]**

Question 5

a. Find the sum of the terms in the sequence: 5 + 8 + 11 + ………+ 68 **[3]**

b. In the given figure, PQ is diameter chord SR ‖ PQ. $\angle PQR = 65°$, Calculate:
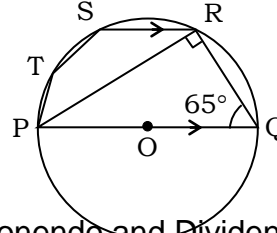
  i) $\angle RPQ$

  ii) $\angle STP$ **[3]**

c. Given $x = \dfrac{\sqrt{a^2 + b^2} + \sqrt{a^2 - b^2}}{\sqrt{a^2 + b^2} - \sqrt{a^2 - b^2}}$ Use Componendo and Dividendo to prove: $b^2 = \dfrac{2a^2 x}{x^2 + 1}$ **[4]**

Question 6

a. Using remainder theorem, factories: $x^3 + x^2 - 4x - 4$. **[3]**

b. Solve the equation $3x^2 - x - 7 = 0$ and give your answer correct up to two significant figures. **[3]**

c. Find the range of values of x which satisfies $-2\dfrac{2}{3} \le x + \dfrac{1}{3} < 3\dfrac{1}{3}$, $x \in R$

  Graph these values of x on number line. **[4]**

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