Quarterly Examination 2017-2018

Std. : X **Full Marks : 80**

Subject : MATHEMATICS **Time : 2½hrs.+15min.**

SECTION A [40 MARKS]

Answer all the questions.

1. (a) Mohan has recurring deposit account in a bank the deposits Rs. 2500 per month for 2 years. If he gets Rs. 66250 at the time of maturity. [4]

Find : (i) the interest paid by the bank.

(ii) the rate of interest.

(b) If $\begin{bmatrix} 0 & 4 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} x & -5 \\ y & 0 \end{bmatrix} = \begin{bmatrix} 5 & z \\ 7 & 9 \end{bmatrix} + \begin{bmatrix} 3 & 4 \\ 2 & 6 \end{bmatrix}$ find the value of x, y and z. [3]

(c) What number should be added to $2x^3 - 3x^2 - 8x$ so that the resulting polynomial leaves the remainder 10 when divided by 2x+1. [3]

2. (a) The weekly wages of 40 workers in a small factory given below. If the mean weekly wages is Rs. 145 find the values of a and b. [4]

Daily Wages	80–100	100–120	120–140	140–160	160–180
No. of Workers	4	6	a	b	18

(b) Find the value of 'm' for which the equation has real and equal roots. [3]

$x^2 + 2(m-1)x + m + 5 = 0$

(c) When 2 dice are rolled what is the probability of gelling. [3]

(i) the same number on both

(ii) a product of 6

(iii) a sum of 8

3. a) By increasing the speed of a car by 10 km/hw the time of journey for a distance of 72 km is reduced by 36 minutes. Find the original speed of the car.

b) Solve the mequation and represent the solution set on the number line. [3]

$-3 + x \leq \frac{8x}{3} + 2 \leq \frac{14}{3} + 2x,\ x \in I$

c) Solve : $\frac{\sin 31^\circ \cos 59^\circ + \cos 31^\circ \sin 59^\circ}{\sec^2 10^\circ - \cot^2 80^\circ}$ [3]

4. (a) Use graph paper, Plot A (2,3) B = (6,3) [6]

i) Reflect A in the origin to get the image D

ii) Reflect A in x axis to gather image C

iii) Write down the co-ordination of C & D.

iv) What kind of figure is ABCD ? Find its Area.

v) What is the reflection of C in Yaxis ?

vi) Name two invariant points on reflection in Y axis.

(b) Using a ruler and pair of compasses only construct.

(i) a triangle ABC given AB = 4 cm BC = 6 cm and LABC = 90^{O}

(ii) a circle which passes through the points A, B and C and mark its centre as O. Measure the length of the radius.

SECTION B

Answer any four questions.

5. (a) The following distribution represents the height of 160 students of a school. [6]

Height (cm)	140–145	145–150	150–155	155–160	160–165	165–170	170–175	175–180
No. of students	12	20	30	38	24	16	12	8

Draw an ogive for the given distribution taking 2cm = 5 cm of height on one axis and 2 cm = 20 students on the other axis. Using the graph determine.

(i) the median range

(ii) the inter quartile range.

(iii) the number of students whose height is above 172 cm.

(b) Prove that $\frac{\text{Sin A} - 2\ \text{Sin}^3\ \text{A}}{2\ \text{Cos}^3\ \text{A} - \text{Cos A}} = \tan A$

6. (a) Solve the equation and give your answer correct 3 significant figure. [4]

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

(b) $A = \begin{bmatrix} -4 & 6 \\ 3 & -5 \end{bmatrix}$ $B = [-4 \quad 2]$ and PA = B find [3]

(i) the order of matrix P

(ii) the matrix P

(c) $4\ \text{Cos}^2\theta - 3 = 0$ Show that $4\ \text{Cos}3\theta - 3\ \text{Cos}\theta = \text{Cos}3\theta$ [3]

7. From the top of two coconut trees, two men started dropping coconuts at the point P on the ground between the two trees. If the trees are 15 cm and 10 cm high, the angle of depression of point P from the top of the trees are 60^{O} and 45^{O} respectively. Find the distance between the trees. [5]

(b) The mean of 8, 13, 6, 4 x, 7, 9, 16, 12 is (x+3). Find the value of x and mean. [3]

(c) The number 6, 8, 10, 12, 13 and x are arranged in an ascending order. If the mean of the observations in equal to the median. Find the value of x. [2]

8. Find the mode of the following distribution by drawing a histogram. [4]

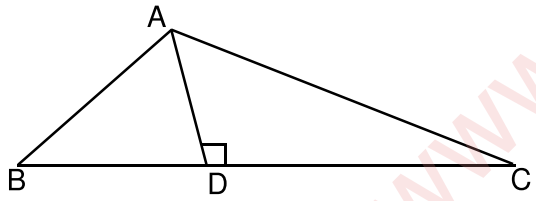
Height	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
No. of plants	4	3	8	11	6	2

b) There are 60 balls in a box. Some are white and others black. Probability of getting a white ball is 3/2 of getting a black ball. How many of each coloured balls are these. [3]

c) Solve the mequation and represent the solution set on the number line. [3]

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

9. In the given figure tan B = $^5/_{12}$ tan c = $^3/_4$ and BC = 56 cm find AD [4]



b) Mrs. Mehta has a recurring deposit account in a bank for 4 years at 10% p.a. She gets Rs. 6370 as the interest on maturity.

Find (i) the monthly instalment. (ii) the maturity value.

c) Solve the equation : $3a^2x^2 + 8abx + 4b^2 = 0$ [2]

10. Show that (x–1) is a factor of $x^3 - 7x^2 + 14x - 8$ Hence, Completely factorise the above expression. [4]

b) Construct a triangle ABC with BC = 6.4 cm AC = 5.8 cm $\angle B = 75^O$. Construct the inscribed circle of ΔABC. [4]

c) Solve $2x-3 = \sqrt{2x^2 - 2x + 21}$ [2]

11. Point (0, 4) and (0, –2) are unvarient on reflection in line L_1 and points (1, 0) and (–3,0) are invariant on reflection in line L_2.

(i) Name the lines L_1 and L_2.

(ii) Write the image of P (–3,4) in L_1 name the image as P' and write its coordinates. Reflect P' in L_2 and name it P'' and Write its coordinates.

b) A wire 112 cm long, is bent to form a right angled triangle. If the hypotenuse is 50 cm long, find the area of the triangle. [3]

c) Given that (x+2) and (x+3) are factors of $2x^3 + ax^2 + 7x - b$. Determine the values of a and b. [3]