LOYOLA SCHOOL, BHUBANESWAR

Half Yearly Evaluation – September 2025

Class: X **Sub: Mathematics** **F.M. = 80** **Time: 3Hrs**

- ❖ This question paper is divided into two Sections Section A and Section B.
- ❖ Attempt **ALL questions** from **Section 'A'** and any **FOUR questions** from **Section 'B'**.
- ❖ The intended marks for the questions or parts of the questions are given in brackets [ ].
- ❖ All workings, including rough works, must be clearly shown and should be done on the same sheet as the rest of the answer.
- ❖ Omission of essential working will result in loss of marks.

Section – A (40 marks)
(Answer ALL questions)

Question 1 **[1x15=15]**

(i) ₹ 200 share are available at a discount of 20%. The price of 50 shares is :

(a) ₹ 11,000 (b) ₹ 8,000 (c) ₹ 19,000 (d) ₹ 14,000

(ii) The solution set for the inequation $-2x + y \leq 3$, $x \in R$ is

(a) $\{x : x \in R, x < 2\}$ (b) $\{x : x \in R, x > 2\}$ (c) $\{x : x \in R, x \leq 2\}$ (d) $\{x : x \in R, x \geq 2\}$

(iii) One root of equation $3x^2 - mx + 4 = 0$ is 1, the value of m is:

(a) 7 (b) -7 (c) $\frac{4}{3}$ (d) $-\frac{4}{3}$

(iv) The mean proportion between $3+2\sqrt{2}$ and $3-2\sqrt{2}$ is:

(a) 1 (b) -1 (c) $2\sqrt{2}$ (d) 3

(v) Dev bought an electrical fan which has a marked price of ₹800. If the GST on the goods is 7%, then the SGST is:

(a) ₹24 (b) ₹28 (c) ₹56 (d) ₹80

(vi) If A = [a b] and B = $\begin{bmatrix} c \\ d \end{bmatrix}$, then

(a) only matrix AB is possible.
(b) only matrix BA is possible.
(c) both matrices AB and BA are possible
(d) both matrices AB and BA are possible, AB = BA.

(vii) If the sum of n terms of an arithmetic progression $S_n = n^2 - n$, then the third term of the series is:

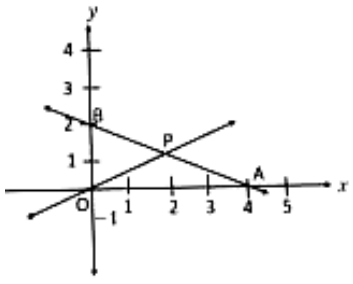
(a) 2 (b) 4 (c) 6 (d) 9

(viii) Which of the following is **NOT** a geometric progression?

(a) 1/3, 1, 3, 9 (b) 1/5, 1/5, 1/5, 1/5 (c) $-2, 4, -8, 16$ (d) 2,0,4,0,8,0

(ix) In the given diagram, O is the origin, and P is the midpoint of AB.
The equation of OP is

(a) y = x
(b) 2y = x
(c) y = 2x
(d) y= $-x$



(x) In the A.P. 8, 13, 18, ……, the n^{th} term is 83, then *n* is equal to:

(a) 14 (b) 16 (c) 13 (d) 15

(xi) In parallelogram ABCD, A = (6, 0), B = (12, – 4) and C = (4, – 4); then the co-ordinates of vertex D are:

(a) (2, 0) (b) (–2, 0) (c) (0, 2) (d) (0, –2)

(xii) The inclination of a line passing through the points (4, 3) and (5, 4) is:

(a) 1 (b) –1 (c) 45^0 (d) 60^0

(xiii) Matrix A = $\begin{bmatrix} 6 & 9 \\ -4 & k \end{bmatrix}$ such that $A^2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$. Then *k* is:

(a) 6 (b) – 6 (c) 36 (d) ± 6

(xiv) If – 4x > 8y, then

(a) x > 2y (b) x > –2y (c) x < – 2y (d) x < 2y

(xv) The point P (5, 5) is first reflected in the line y =0 and then in x-axis to get the point Q. The co-ordinates of point Q are :

(a) (5, 5) (b) (–5, 5) (c) (5, –5) (d) (–5, –5)

Question 2 **[4 x 3 = 12]**

(a) Vivek invest ₹ 4,500 in 8%, in 8%, ₹ 10 shares at ₹ 15. He sells the share when the price rises to ₹ 30, and invests the proceeds in 12% ₹ 100 shares at ₹ 125. Calculate:

(i) the sale proceeds.

(ii) the number of ₹ 125 shares he buys.

(iii) the change in his annual income from dividend.

(b) If A = $\begin{bmatrix} -1 & 3 \\ 2 & 0 \end{bmatrix}$, B= $\begin{bmatrix} 1 & -2 \\ 0 & 3 \end{bmatrix}$, C= [1 – 4] and D= $\begin{bmatrix} 4 \\ 1 \end{bmatrix}$

(i) Is the product AC possible? Justify your answer.

(ii) Find the matrix X, such that X = AB + B^2 – DC

(c) The sum of a certain number of terms of the Arithmetic Progression (A.P.) 20, 17, 14, …….. is 65. Find the :

(i) number of terms.

(ii) last term.

Question 3

(a) The maturity value of a R.D. Account is ₹ 16,176. If the monthly instalment is ₹ 400 and the rate of interest is 8%; find the time (period) of this R.D. Account. **[4]**

(b) Find the coordinates of the centroid P of the ΔABC, whose vertices are A (–1, 3), B(3, –1) and C (0, 0). Hence, find the equation of a line passing through P and parallel to AB. **[4]**

(c) The following bill shows the GST rate and the marked price of articles: **[4]**

Rajdhani Departmental Store				
S. No.	Item	Marked Price	Discount	Rate of GST
(a)	Dry fruits (1 kg)	₹ 1200	₹100	12%
(b)	Packed Wheat flour (5kg)	₹ 286	Nil	5%
(c)	Bakery products	₹ 500	10%	12%

Find the total amount to be paid (including GST) for the above bill.

(d) For this question, use a graph paper. Scale: 2 cm =1 unit along both x and y-axis) **[5]**
Plot the points A (2, 2), and B (6, –2) in the graph and answer the following:

(i) Reflect points A in origin to point D and write the co-ordinates of point D.

(ii) Reflect points A in line y= –2 to point C and write the co-ordinates of points C.

(iii) Find a point P on CD which is invariant under reflection in x =0, write its co-ordinates.

(iv) Write the geometrical name of the closed figure ABCD.

(v) Write the co-ordinates of the point of intersection of the diagonals of ABCD.

Section – B (40 marks)
(Answer ANY FOUR questions)

Question 4 **[3+3+4]**

(a) Pamela factorized the following polynomial :

$2x^3 + 3x^2 - 3x - 2$

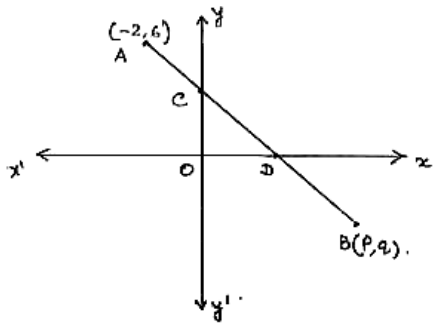
She found the result as (x +2) (x–1) (x –2). Using remainder and factor theorem, verify whether her result is

correct. If incorrect, give the correct result.

(b) $A = \begin{bmatrix} -6 & 0 \\ 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 1 & 3 \end{bmatrix}$

Find matrix M, if $M = \frac{1}{2}A - 2B + 5I$, where I is the identify matrix.

(c) In the given figure, if the line segment AB is intercepted by the y-axis and x-axis at C and D, respectively,
Such that AC : AD = 1 : 4 and D is the midpoint of CB.
Find the coordinates of D, C and B.



Question 5 **[3+3+4]**

(a) Jitesh buys 350 shares of ₹ 50 par value of a company. The dividend declared by the company is 14%. If his return percent from the shares is 10%, find the market value of each share.

(b) Solve for x and graph the solution on the number line.

$\frac{1}{2}(2x - 1) \le 2x + \frac{1}{2} \le 5\frac{1}{2} + x$, $x \in W$

(c) The mean proportion between two numbers is 6 and their third proportion is 48. Find the two numbers.

Question 6 **[3+3+4]**

(a) A man opened a recurring deposit account in a branch of PNB. The man deposits certain amount of money per month per month such that after 2 years, the interest accumulated is equal to his monthly deposits. Find the rate of interest per annum that the bank was paying for the recurring deposit account.

(b) The mid-point of the line segment joining (3m, 6) and (–4, 3n) is (1, 2m –1). Find the values of m and n.

(c) How many terms of the G.P. $\frac{2}{9}, -\frac{1}{3}, \frac{1}{2}, \ldots\ldots\ldots\ldots$ must be added to get the sum equal to $\frac{55}{72}$?

Question 7 **[3+3+4]**

(a) Write down the co-ordinates of the image of the point $(3, -2)$ when :

(i) reflected in the X- axis.

(ii) reflected in the Y- axis.

(iii) reflected in the X - axis followed by the reflection in the Y - axis.

(b) Find the common difference of an A.P. whose first term is $\frac{1}{2}$ and the 8th term is $\frac{17}{6}$. Also, write its 4th term.

(c) Solve the following quadratic equation and give answer correct to two significant figures :

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

Question 8 **[3+3+4]**

(a) Find the equation of the line which passes through (2, 7) and whose y-intercept is 3.

(b) If x = $\frac{\sqrt{a+3b}+\sqrt{a-3b}}{\sqrt{a+3b}-\sqrt{a-3b}}$, prove that : $3bx^2 - 2ax + 3b = 0$.

(c) The total cost price of a certain number of identical articles is ₹ 4,800. By selling the articles at ₹ 100 each, a profit equal to the cost price of 15 articles is made. Find the number of articles bought.

Question 9 **[3+3+4]**

(a) Without solving the following quadratic equation, find the value of '*m*' for which the given equation has real and equal roots : $x^2 + 2(m-1)x + (m+5) = 0.$

(b) Find the G.P. whose 4th term is 54 and the 7th term is 1458.

(c) A dealer has given 20% discount on a showpiece of Rs 30000. GST of 28% was charged on the discounted price. Find the total amount shown in the tax invoice. What is the amount of CGST and SGST?

Question 10 **[3+3+4]**

(a) Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets ₹1,200 as interest at the time of maturity, find :

(i) the monthly instalment.

(ii) the amount of maturity.

(b) Solve for x and graph the solution on the real number line.

$-8\frac{1}{2} < -\frac{1}{2} - 4x \leq 7\frac{1}{2}$, $x \in Z$

(c) Point A and B have co-ordinates (7, –3) and (1, 9) respectively. Find:

(i) the slope of AB.

(ii) the equation of perpendicular bisector of the line segment AB.

(iii) the value of 'p' if (–2, p) lies on it.

********** **ALL THE BEST** **********