FIRST TERMINAL EXAMINATION: 2022 – 23

MATHEMATICS **FULL MARKS: 80**

STD. X A/B/C/D/E **TIME: 2½ Hrs.**

Section - A

Attempt all the questions from this Section

Q.1.i) In a transaction from Delhi to lucknow , MRP = Rs.10,000 discount = 10%, GST = 28%. Here IGST is :

(a) Rs. 2520 (b) Rs. 5040 (c) nil (d) none of these

(ii) A refrigerator was sold for Rs. 15,000 under intrastate transaction from station A to station B and the GST rate is 18%. CGST is equal to :

(a) Rs. 1400 (b) Rs. 1350 (c) Rs. 1300 (d) Rs. 2700

(iii) A man deposited Rs. 1000 per month in a recurring deposit account for 3 years at 8% p.a. The maturity value is :

(a) Rs.44,000 (b) Rs.40,000 (c) Rs.40,440 (d) Rs. 44,444

(iv) A man deposited Rs. x per month for y years in a recurring deposit account. If at the time of maturity he got Rs. z as interest, then the total maturity amount is :

(a) Rs. (12xy + z) (b) Rs.12xyz (c) Rs. (xy + 12z) (d) Rs. $\frac{xyz}{12}$

(v) If $-x \geq -8$ then :

(a) $x \geq 8$ (b) $x \leq 8$ (c) $x \leq -8$ (d) $x = 8$

(vi) If $-3x + 1 \geq 19$, and $x \in I$, then the solution set is :

(a) $\{x \geq -6, x \in I\}$ (b) $\{x \leq 6, x \in I\}$

(c) $\{x \leq -6, x \in I\}$ (d) $\{-x \leq -6, x \in I\}$

(vii) The roots of $3x^2 - 5x + 1 = 0$ are :

(a) irrational (b) equal (c) imaginary (d) none of these

(viii) The roots of the quadratic equation $x^2 - 10x + 25 = 0$ are :

(a) Rational and unequal (b) Irrational and unequal

(c) rational and imaginary (d) equal and imaginary

(ix) The quadratic equation $x^2 + m(2x + m - 1) + 2 = 0$ has equal roots. Find the value of m is :

(a) 1 (b) 2 (c) -2 (d) 0

(x) x,y,z are in continued proportion , then : y^2 is equal to :

(a) x+z (b) xz (c) $\frac{x}{z}$ (d) none of these

(xi) If (x -2) is a factor of x^2 - 4x + m, then the value of m is :

(a) -4 (b) 4 (c) 0 (d) -1

(xii) If (x – 1) is a factor of $x^3 + 2x^2$ - x + k, then the value of k is :

(a) 1 (b) 2 (c) -2 (d) -1

(xiii) If $3\begin{bmatrix} 2 & x \\ 1 & 0 \end{bmatrix} + 2\begin{bmatrix} 4 & 3 \\ y & 2 \end{bmatrix} = \begin{bmatrix} z & -3 \\ 15 & 4 \end{bmatrix}$, then : The value of x is :

(a) 2 (b) -3 (c) 3 (d) -1

(xiv) The nth term of an AP 5 , 11 , 17 , 23 , ... is :

(a) 6 m – 1 (b) 6 m + 1 (c) 5 m – 1 (d) 6 n – 1

(xv) If x, 2x + p, 3x + 6 are in AP , then then value of p is :

(a) 2 (b) 3 (c) 5 (d) 7

Q2.i.) when divided by (x – 3), the polynomials x^3- px^2 + x +6 and $2x^3$-x^2-(p+3)x -6 leave the same remainder . Find the value of p . Also find the remainder in each case. **[4]**

(ii) 3,9,m,81 and n are in continued proportion. Find the value of `m' and `n'. **[4]**

(iii) If $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}$,$B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$,find the matrix `x' such that A + 2x = 2B + C. **[4]**

Q3.i.) If x,y,z are in continued proportion , prove that $\frac{(x+y)^2}{(y+z)^2} = \frac{x}{z}$. **[4]**

(ii) The sum of the first three terms of an Arithmetic Program is 42 and the product of the first and third term is 52 . Find the first term and the common difference. **[3]**

(iii) Find the image of each of the following points when reflected in x – axis

(a) (5 , 8) (b) (3 , -4) (c) (-6, -2).

SECTION - B

Q4.i) Solve for 'x' $\frac{x-1}{x-2}+\frac{x-3}{x-4}=3\frac{1}{3}$. **[3]**

(ii) Solve the following inequation and write the solution set. Also represent it on the number line. $13x-5<15x+4<7x+12$. **[4]**

(iii) Mohan has a recurring deposit account in a bank for 2 years at 6% per Annum simple interest. If he gets Rs.1200 as interest at the time of maturity, find

(i) the monthly installment

(ii) the amount of maturity **[3]**

Q5.i) A retailer purchases an air conditioner for Rs. 35,000 from a company. He sold it to a consumer at a profit of Rs. 5000 . Calculate the , tax liability of the retailer if the GST rate on air conditioner is 28%. **[4]**

(ii) Solve the following quadratic equation and calculate the answer correct to two decimal places

$$x^2-5x-10=0.$$ **[3]**

(iii) What least number must be added to each of the numbers 6 , 15 , 20, and 43 , so that the resulting numbers are proportional. **[3]**

Q6.i) Kiran deposited ₹ 200 per month for 36 months in a bank's recurring deposit account. If the bank pays interest at 11% per annum, find the amount she gets on maturity. **[4]**

(ii) Using the properties of proportion, find the value of x when $\frac{x^4+1}{2x^2}=\frac{17}{8}$. **[3]**

(iii) The sum of the first three terms of an A.P is 42 and the product of the first and third term is 52. Find the first term and common difference. **[3]**

Q7.i) Solve for x $\sqrt{3}x^2+10x-8\sqrt{3}=0$. **[3]**

(ii) Using Componendo and Dividendo find the value of x $\frac{\sqrt{3x+4}+\sqrt{3x-5}}{\sqrt{3x+4}-\sqrt{3x-5}}=9$. **[4]**

(iii) Find x and y if $x+y=\begin{bmatrix}7 & 0\\ 2 & 5\end{bmatrix}$ and $x-y=\begin{bmatrix}3 & 0\\ 0 & 3\end{bmatrix}$. **[3]**

Q8.i) Using Remainder Theorem. Find the value of k if on dividing $2x^3+3x^2-kx+5$ by $(x-2)$ leaves a remainder 7.

(ii) How many terms of AP 7, 11,15,19,23 ..... must be taken to get the sum 250? **[3]**

(iii) Find the value of 'k' for which $x=3$ is a solution of the quadratic equation $(k+2)x^2-kx+6=0$ Thus, find the other root of the equation. **[3]**

Q9.i.) Which term of AP 5, 12,19,26,33 .....will be 35 more than its 12^{th} term. **[4]**

(ii) Using factor Theorem factorize $3x^3+2x^2-19x+6$. **[3]**

(iii) Without solving the given Quadratic Equation find the value of p for which it has real and equal Roots. **[3]**

Q10.i.) Sharukh opened a recurring deposit account in a bank and deposited Rs. 800 per month for $1\frac{1}{2}$ Yrs Rs.15084 at the time of maturity, find the rate of interest per annum. **[4]**

(ii) If $A = \begin{matrix} 2 & 5 \\ 1 & 3 \end{matrix}$, $B = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$ and I is the identity matrix of the same order and A^t is the transfer of A . Find $A^tB + BI$. **[3]**

(iii) Find the nature of the roots of quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ and hence solve it . **[3]**