GRADE– X

SUB. MATHEMATICS

UNIT TEST - I

MM - 20

SECTION A (6 Marks)

(Attempt all questions from this Section)

Q. 1) Choose the correct answer to the questions from the given options:

i) What must be subtracted from the polynomial $x^3 + x^2 - 2x + 1$, so that the result exactly divisible by (x-3).

a) -31 b) -30 c) 30 d) 31

ii) If matrix A = $\begin{bmatrix} 2 & 2 \\ 0 & 2 \end{bmatrix}$ and $A^2 = \begin{bmatrix} 4 & x \\ 0 & 4 \end{bmatrix}$, then the value of x is,

a) 2 b) 4 c) 8 d) 10

iii) If (x-2) is a factor of $x^3 - kx - 12$, then the value of k is,

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

iv) If (4a + 7b)(4c - 7d) = (4a - 7b)(4c + 7d) then,

a) a: b = c : 2d b) a : b = 2c : d c) a : b = 4c : d d) a : b = c : d

v) The mean proportional between $\frac{1}{2}$ and 128 is,

a) 64 b) 32 c) 16 d) 8

vi) **Assertion(A)** : Three quantities of the same kind a, b and c are in continued proportion .

Reason(R) : The ratio of a and b is equal to the ratio of b and c.

a) A is true, R is false, b) A is false, R is true, c) both A and R are true , d) both A and R are false.

SECTION- B (14 marks)

(Attempt any 7 questions from this section)

Q.2) If $x = \frac{\sqrt{2a+1} + \sqrt{2a-1}}{\sqrt{2a+1} - \sqrt{2a-1}}$, prove that $x^2 - 4ax + 1 = 0$.

Q.3) Find the value of x and y if : $2\begin{bmatrix} x & 7 \\ 9 & y-5 \end{bmatrix} + \begin{bmatrix} 6 & -7 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 10 & 7 \\ 22 & 15 \end{bmatrix}$.

Q.4) Given A = $\begin{bmatrix} 2 & 0 \\ -1 & 7 \end{bmatrix}$ and I = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $A^2 = 9A + mI$. *Find m.*

Q.5) Find the values of the constants a and b, if (x-2) and (x+3) are both factors of the expression

$x^3 + ax^2 + bx - 12$.

Q.6) Using the factor theorem, show that (x – 2) is a factor of $x^3 + x^2 - 4x - 4$.

Q.7) Given , $A = \begin{bmatrix} 4\sin 30° & \cos 0° \\ \cos 0° & 4\sin 30° \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$. If $AX = B$:

i) Write the order of the matrix X. ii) Find the matrix X.

Q.8) Using componendo and dividendo find the values of x , given $\frac{\sqrt{3x+4} + \sqrt{3x-5}}{\sqrt{3x+4} - \sqrt{3x-5}} = 9$

Q.9) If $k + 3$, $k + 2$, $3k - 7$ and $2k - 7$ are in proportion , find k.

Q.10) If $(x - 2)$ is a factor of the expression $2x^3 + ax^2 + bx - 14$ and when the expression is divided by $(x - 3)$, it leaves remainder 52, find the values of a and b.

Q. 11) Factorise the polynomial $2x^3 + 3x^2 - 9x - 10$ completely.