Manaslu Public Secondary School Re- Examination-2078 Subject: Basic Mathematics

Grade XI

Time: 3 Hrs.

F.M. 75

Group 'A' 11×1=11

Choose the correct answer.

١.	The domain	of the	function	$\sqrt{x-2}$	is
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a. x > 2 b. x < 2 c. $x \ge 2$

 $d. x \leq 2$

2. If the inverse of the function f(x) = -x is g(x), thus

a. g(x) = x b. g(x) = -x c. $g(x) = \frac{1}{x}$ d. $g(x) = -\frac{1}{x}$

3. If $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then A^2 is equal to

a. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ b. $\begin{pmatrix} 1 & 4 \\ 0 & 0 \end{pmatrix}$ c. $\begin{pmatrix} 0 & 0 \\ 1 & 1 \end{pmatrix}$ d. $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

4. The function $f(x) = 2x^3 - 15x^2 + 36x + 4$ is maximum at,

a. x = 3

b. x = 0 c. x = 4

d. x = 2

5. If ω is a complex cube root of unity, then,

a. $\omega^4 = \omega$ b. $\omega^5 = 1$ c. $\omega^2 = \omega^4$ d. $\omega = \omega^6$

6. The interval satisfying $3 \le x \le 5$ is

a. [2, 3] b. (2, 3) c. [3, 5] d. (3, 5)

7. The distance between the lines 4x + 3y = 11 and 8x + 6y =15 is

b. 4 c. $\frac{7}{10}$ d. $\frac{11}{5}$

8. The conditional $(p \land q) \Rightarrow q$ is

a. a tautology

b. a contradiction

c. neither tautology nor contradiction

d. none of these

9.
$$\lim_{n \to \infty} \frac{2x^3 - 4x + 7}{3x^3 + 5x^2 - 4}$$
 is equal to
a. $\frac{2}{3}$ b. $\frac{3}{2}$ c. $\frac{-4}{5}$

a.
$$\frac{2}{3}$$

b.
$$\frac{3}{2}$$

c.
$$\frac{-4}{5}$$

d.
$$\frac{-7}{4}$$

10.1f
$$y = \log(\sin x)$$
, then $\frac{dy}{dx}$ equal to

$$a.-cosec^2x$$

b.
$$-sec^2x$$

11. The function
$$f(x) = x^2 - 2x$$
, is increasing in the interval

$$b. (-1, 0)$$

Group 'B' 8×5=40

12.a. Let p and q be any two statements, prove that: (2)

$$(p \land q) \equiv (q \land p)$$

b. Let A, B and C be the subsets of a universal set. Then prove that: $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$. (3)

13.a. If two angles of a triangle are 75° and 60°. Find the ratio of the sides.

b. Rewrite the given inequalities using absolute value sign. (3) -5 < x < 7

14.a. If
$$A = \begin{pmatrix} 4 & -5 \\ 3 & 6 \end{pmatrix}$$
 and $B = \begin{pmatrix} 2 & 3 \\ -1 & -2 \end{pmatrix}$, find $(AB)^T$. (2)

b. If
$$A = \begin{pmatrix} 2 & 4 & 3 \\ 2 & 3 & 4 \\ 5 & 2 & 6 \end{pmatrix}$$
, find A^T . Show that the sum of the given

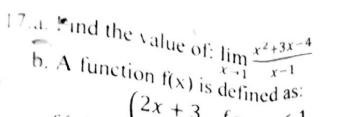
matrix and its transpose is a symmetric matrix. (3)

15.a. Find the inverse of the matrix $\begin{pmatrix} 3 & 2 \\ -1 & 6 \end{pmatrix}$. (2)

b. Prove that:
$$\begin{vmatrix} 1 + a_1 & a_2 & a_3 \\ a_1 & 1 + a_2 & a_3 \\ a_1 & a_2 & 1 + a_3 \end{vmatrix} = 1 + a_1 + a_2 + a_3$$

16.a. Prove that: $(1+i)^4 (1+\frac{1}{i})^4 = 16.(2)$

b. Find the square roots of 3 - 4i. (3)



$$f(x) = \begin{cases} 2x + 3 & \text{for } x < 1 \\ 5 & \text{for } x = 1 \\ 6x - 1 & \text{for } x > 1 \end{cases}$$

Is the function continuous at x=1? (3)

18.a. Find
$$\frac{dy}{dx}$$
 of $\sin(4x - 5)$ (2)

b. Find from the first principles the derivatives of
$$\sqrt{x}$$
 (3)

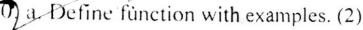
19.a. Evaluate:
$$\int \frac{x+3}{x+3}$$
 (2)

b. Find the area of the curve
$$y=(x-1)(x-2)$$
 bounded by x-axis. (3)

b. Find t

colline

Group 'D' 3×8=24



b. If
$$f(x) = 2x + 1$$
 and $g(x) = 3x - 1$, find $gof(x)$. (2)

c. Let a function
$$f: A \to B$$
 be defined by $f(x) = \frac{x^2}{6}$ with $A = \frac{x^2}{6}$

$$\{-2, -1, 0, 1, 2\}$$
 and $B = \left(0, \frac{1}{6}, \frac{2}{3}\right)$, find the range of f. is the function of one to one and onto both? (4)

$$3x + y + 1 = 0 (2)$$

b. If P is the length of the perpendicular dropped from the origin on the line
$$\frac{x}{a} + \frac{y}{b} = 1$$
, prove that: $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2}$ (2)

c. Find the equation of the bisectors of the angles between the lines
$$3x + 5y = 11$$
 and $3x + 5y = -23$ (4)

a. Examine whether the function
$$f(x) = 15x^2 - 14x + 1$$
 is increasing or decreasing at $x = \frac{2}{5}$ (2)

b. Find the local maxima and minima of the function: (2)

$$f(x) = 3x^2 - 6x + 3$$

c. Show that the three points A, B, C with position vectors $\vec{i} = 2\vec{j} + 3\vec{k}$, $2\vec{i} + 3\vec{j} - 4\vec{k}$ and $-7\vec{j} + 10\vec{k}$ respectively are collinear. (4)

The End