Manaslu Public High School
Nayabazar-16, Kathmandu

First Terminal Examination-2078

Subject: Basic Mathematics

Grade XI | Time: 3 Hrs. | F.M. 75

Group 'A' 11×1=11

Choose the correct answer.

1. $\lim_{x\to\infty} \frac{2x^3-4x+7}{3x^3+5x^2-4}$ is equal to

   a. $\frac{2}{3}$ b. $\frac{3}{2}$ c. $-\frac{4}{5}$

2. $\lim_{x\to 9} \frac{x^{\frac{3}{2}}-27}{x-9}$ is equal to

   a. $\frac{3}{2}$ b. $\frac{9}{2}$ c. $-\frac{2}{3}$

3. $\lim_{x\to a} \frac{x^n-a^n}{x-a}$ is equal to

   a. xa^{n-1} b. an^{a-1} c. na^{n-1}

4. If $A = \begin{pmatrix} 2 & 1 \\ 1 & -2 \end{pmatrix}$, then AA^T *is equal to*

   a. $3I$ b. $4I$ c. $5I$

5. The value of $\begin{vmatrix} 3 & 4 & 5 \\ 15 & 21 & 26 \\ 21 & 29 & 34 \end{vmatrix}$ is

   a. 6 b. -6 c. 5

6. The cofactor of 3 of $\begin{pmatrix} 1 & 2 & -1 \\ 2 & 0 & 1 \\ 1 & 3 & -1 \end{pmatrix}$ *is*

   a. -4 b. 3 c. -3

7. If $(x, y) = (1, 2) + (2, 3)$. Then the value of x is

   a. 11 b. 1 c. 3

8. The value of $3\sqrt{-4} + 5\sqrt{-9} - 4\sqrt{-25}$ is

   a. 1 b. i c. -1

9. The absolute value of $1 - 2i$ *is*

   a. 2 b. -3 c. $\sqrt{5}$

10. The value of $1 + \omega + \omega^2$ is equal to

    a. -1 b. 0 c. 1

11. If w be a complex cube roots of unity, then the value of $(1 + \omega + \omega^2)^3 - (1 - \omega + \omega^2)^3$ is

    a. 1 b. 16 c. 0

Group 'B' 10×2=20

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

b. If $A = \begin{pmatrix} 4 & x+2 \\ 2x-1 & 0 \end{pmatrix}$ *and* $A = A^T$, find the value of x.

13.a. Evaluate: $\begin{vmatrix} -1 & 0 & 3 \\ 2 & 1 & 4 \\ -2 & -3 & -1 \end{vmatrix}$

b. Find the inverse of $\begin{pmatrix} 2 & 4 \\ 1 & 3 \end{pmatrix}$

14.a. Simplify: $\sqrt{-9} + \sqrt{-25} - \sqrt{-36}$

b. Prove that: $\frac{a - b\cos C}{c - b\cos A} = \frac{\sin C}{\sin A}$

15.a. If $x - iy = \sqrt{\frac{1-i}{1+i}}$, prove that $x^2 + y^2 = 1$

b. Find the absolute value of $(3 + 4i)(3 - 4i)$

16.a. Evaluate: $\lim_{x \to 1} \frac{x^2+3x-4}{x-1}$

b. Find the value of: $\lim_{x\to\infty} \frac{4x^2+3x+2}{5x^2+4x-3}$

Group 'C' 6×4=24

17.a. Find the value of: $\lim_{x\to a} \frac{\sqrt{3x}-\sqrt{2x+a}}{2(x-a)}$

b. If C=30^0, B=45^0, c=$6\sqrt{2}$ solve the triangles.

18.a. If $A = \begin{pmatrix} 3 & 4 \\ 4 & -3 \end{pmatrix}$, prove that: $AA^T = A^TA = 25I$. Where I is a unit matrix of order 2.

b. Show that: $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix} = (a-b)(b-c)(c-a)$

19.a. Find the square roots of $3-4i$.

b. Simplify: $(1-i^3)^6.\left(1-\frac{1}{i^3}\right)^6$

Group 'D' 4×5=20

20.If $a^4+b^4+c^4= 2c^2(a^2+b^2)$, prove that c=$45^0$ or 135^0

21.Show that: $\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = xyz\left(1+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$

22.If $A = \begin{pmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ -0 & -2 & 1 \end{pmatrix}$, Find A^{-1} *and verify that* $AA^{-1} = I$

23.Show that:

a) $(2+\omega+\omega^2)^3 + (1+\omega-\omega^2)^8 - (1-3\omega+\omega^2)^4 = 1$

b) $(1-\omega)(1-\omega^2)(1-\omega^4)(1-\omega^8) = 9$

The End $\omega^3 = 1$