

**Full Marks: 60****Pass Marks: 24****Time: 3 hours**

Centre:

Symbol No:

Candidates are required to answer the questions in their own words as far as possible.

Group A

Attempt all the questions.

[10×1 = 10]

1. Circle (O) the correct answer.

- i) If $A = [-1, 3)$ and $B = [2, 5]$, then $A - B$ is equal to

- a) $[-1,2)$
c) $(-1,2)$
- b) $[-1,3)$
d) $[-1,3]$

- ii) If $f(x) = \sqrt{x}$ and $g(x) = x + 1$ then, what is the value of $g \circ f(x)$?

- a) $\sqrt{x+1}$
c) $x + \frac{1}{4}$
- b) $\sqrt{x} + 1$
d) $x + 2$

- iii) What is the reciprocal of the complex number $(2,1)$?

- a) $(1/5, 1/5)$ b) $(2/5, -1/5)$
c) $(-2/5, 1/5)$ d) $(-2, -1)$

- iv) What type of function $y = f(x) = ax^2 + bx + c$ is?

- a) Constant function b) Linear function
- c) Identity function d) Quadratic function

- v) Geometrical meaning of scalar triple product of three vectors $\vec{a}, \vec{b}, \vec{c}$ is the

- a) Volume of parallelepiped formed by $\vec{a}, \vec{b}, \vec{c}$ as adjacent sides

b) $|\vec{a}| \times \text{Projection of } \vec{b} \text{ on } \vec{a} \text{ and } \vec{c}$

c) $|\vec{b}| \times \text{Projection of } \vec{b} \text{ on } \vec{a}$

d) $|\vec{a}| \times |\vec{b}| \times |\vec{c}|$

vi) If a, b, c is in H.P then, what is the value of b?

a) $\frac{a+c}{2}$

b) \sqrt{ac}

c) $\frac{2ac}{a+c}$

d) $2\frac{\sqrt{ac}}{a+c}$

vii) Which of the following is the rank of the Matrix $\begin{bmatrix} 2 & 4 \\ 2 & 4 \end{bmatrix}$?

a) 0

b) 1

c) 2

d) 3

viii) In how many ways 6 persons can seat in a round table?

a) 720

b) 360

c) 120

d) 60

ix) Let $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, and a map $T: R^2 \rightarrow R^2$ defined by $T(x)=A(x)$ then what is the image of $u = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ under T?

a) $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$

b) $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$

c) $\begin{bmatrix} 0 \\ 2 \end{bmatrix}$

d) $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$

x) If $r = \frac{1}{1+\cos\theta}$ then, this is the equation of..

a) Parabola

b) Hyperbola

c) Ellipse

d) Circle



Tribhuvan University
Faculty of Humanities & Social Sciences
OFFICE OF THE DEAN
2019

Bachelor in Computer Applications
Course Title: Mathematics I
Code No: CAMT 104
Semester: 1st

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Group B

Attempt any SIX questions.

[6×5 = 30]

2. In class of 100 students 40 students failed in Mathematics, 70 failed in English and 20 failed in both subjects. Find
 - a) How many students passed in both subjects?
 - b) How many students passed in Mathematics only?
 - c) How many students failed in mathematics only?
3. Find the domain and range of the function $f(x) = \frac{2x+1}{3-x}$.
4. Find the Maclurin series of the function $f(x) = \sin x$.
5. Prove that $\begin{bmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{bmatrix} = (x-y)(y-z)(z-x)$.
6. Find a unit vector perpendicular to the plane containing points P(1, -1, 0), Q(2, 1, -1) and R(-1, 1, 2).
7. In how many ways can be letter of words “Sunday” be arranged? How many of these arrangement begin with S? How many begin with S and don’t end with y?
8. If $x + iy = \sqrt{\frac{1+i}{1-i}}$ then show that $x^2 + y^2 = 1$.

Group C

Attempt any TWO questions.

[2×10 = 20]

9. a) Define conic section. Find the coordinates of vertices, eccentricity and foci of the ellipse $9x^2 + 4y^2 - 18x - 16y - 11 = 0$.

1+5

b) If $T: R^2 \rightarrow R^3$ defined by $T(x_1, x_2) = (x_1 + x_2, x_2, x_1)$ be the linear transformation, then find matrix associated with linear map T. **4**

10. Define irrational number. Prove that $\sqrt{2}$ is an irrational number. **1+4**

If functions $f: R \rightarrow R$ defined by $f(x) = 2x + 1$ and $g: R \rightarrow R$ defined by $g(x) = x^2 - 2$. Find the formulae for composite functions $f \circ g$ and $g \circ f$ and also verify that $f \circ g \neq g \circ f$.

4+1

11. a) If arithmetic mean, geometric mean and harmonic mean between two unequal positive numbers are A, G, H respectively. Then prove that $A > G > H$. **4**

b) What is the relation between permutation and combination of n objects taken r at a time? A committee of 5 is to be constituted from 6 boys and 5 girls. In how many ways can this be done so as to include at least a boy and a girl? **1+5**