



**Tribhuvan University**  
**Faculty of Humanities & Social Sciences**  
**OFFICE OF THE DEAN**  
**2020**

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

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

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

**Group B**

**Attempt any SIX questions.**

**[6×5 = 30]**

2. Out of 500 people 285 like tea, 195 like coffee, 115 like lemon juice, 45 like tea and coffee, 70 like tea and juice, 50 like juice and coffee. If 50 do not like any drinks.

- i) How many of people like all three drinks.
- ii) How many people like only one drink?

3. If  $x - iy = \frac{3 - 2i}{3 + 2i}$ , then prove that  $x^2 + y^2 = 1$ .

4. If H is the harmonic mean between a and b the prove that  $\frac{1}{H-a} + \frac{1}{H-b} = \frac{1}{a} + \frac{1}{b}$ .

5. Define singular and non-singular matrix. Find the inverse of the matrix  $A = \begin{bmatrix} 1 & -2 & -1 \\ 2 & 1 & 1 \\ 3 & -5 & 8 \end{bmatrix}$ .

6. Find the focus, vertex, equation of axis, equation of directrix and length of Latus rectum of ellipse.  
 $4x^2 + 9y^2 = 36$ .

7. If  $\theta$  is the angle between two unit vectors  $\vec{a}$  and  $\vec{b}$ , then show that  $\frac{1}{2} |\vec{a} - \vec{b}| = \sin \frac{\theta}{2}$ .

8. How many numbers of at least three different digits can be formed by using the digits 1, 2, 3, 4, 5, 6 ?

**Group C**

**Attempt any TWO questions.**

**[2×10 = 20]**

9. Prove by vector method:  $\cos(A+B) = \cos A \cdot \cos B - \sin A \cdot \sin B$

10. Find the equation of circle passing through the points (1, 2), (3, 1) and (-3, -1).

11. Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  and  $g: \mathbb{R} \rightarrow \mathbb{R}$  be defined by  $f(x) = 2x + 3$  and  $g(x) = x^2 - 1$  respectively then find,

i)  $f \circ f$

ii)  $f^{-1} \circ g$

iii)  $g \circ f$

iv)  $f \circ (f \circ g)$