Tribhuvan University

Faculty of Humanities & Social Sciences

OFFICE OF THE DEAN

2024

Bachelor in Computer Applications
Course Title: Mathematics
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. Solve the inequality $3 + 2x - x^2 \geq 0$

3. Find the domain and range of the function $f(x) = \sqrt{6 - x - x^2}$.

4. If a, b, c, and d are in G.P. prove that $a^2 - b^2, b^2 - c^2, c^2 - d^2$ are also in G.P.

5. Prove that $\begin{bmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{bmatrix} = xyz\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z} + 1\right)$

6. Find the equation of the ellipse whose latus rectum is 5 and the eccentricity is $\frac{1}{\sqrt{2}}$.

7. If $\vec{a}.\ \vec{b} = \sqrt{3}$ and $\vec{a} \times \vec{b} = (1,\ 2,\ 2)$ find the angle between $\vec{a}$ and $\vec{b}$.

8. How many numbers of three different digits less than 500 can be formed from the integers 1, 2, 3, 4, 5, and 6?

Group C

Attempt any TWO questions. **[2×10 = 20]**

9. a) Prove that $\frac{3+4i}{1-i} + \frac{3-4i}{1+i}$ is a real number.

b) If $x^2 + y^2 = 11\,xy$, prove that $\log\left(\frac{x-y}{3}\right) = \frac{1}{2}(\log x + \log y)$.

10. a) Find the Maclourin series of the function $f(x) = cosx$.

b) Take any matrix of order 3×3 and express it as a sum of symmetric and skew-symmetric matrix.

11. a) Find the equation of a hyperbola in standard form having focus (-2,0) and Diretrix $x = -\frac{1}{2}$.

b) In an examination paper on mathematics, 20 questions are set. In how many different ways you can choose 18 questions to answer?