Tribhuvan University

Faculty of Humanities & Social Sciences

OFFICE OF THE DEAN

2019

Bachelor in Computer Applications **Full Marks: 60**
Course Title: Mathematics I **Pass Marks: 24**
Code No: CAMT 104 **Time: 3 hours**
Semester: 1st

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. 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 $f(x) = sinx$.
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 $T: R^2 \to R^3$ 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 $f: R \to R$ defined by $f(x) = 2x + 1$ and $g: R \to R$ defined by $g(x) = x^2 - 2$. Find the formulae for composite functions $f \bullet g$ and $g \bullet f$ and also verify that $f \bullet g \neq g \bullet f$. **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**