Tribhuvan University
Faculty of Humanities & Social Sciences
OFFICE OF THE DEAN
2024

Bachelor in Computer Applications
Course Title: Mathematics II
Code No: CAMT 154
Semester: II

Full Marks: 60
Pass Marks: 24
Time: 3 hours
Batch: 2022

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. A function $f(x)$ is defined as

$$f(x)=\begin{cases} 2x+3 \text{ for } x<1 \\ 4 \text{ for } x=1 \\ 6x-1 \text{ for } x>1 \end{cases}$$

   Is the function $f(x)$ continuous at $x=1$? If not, how can you make it continuous at $x = 1$?

3. Find the derivative of e^{-2x} using the first principle.

4. Evaluate $\displaystyle\lim_{x \to \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$

5. Find area of the region enclosed by the parabola $y=2-x^2$ and line $y = x$.

6. Evaluate

   a) $\displaystyle\int_0^2 \frac{dx}{\sqrt{x^2 + 4^2}}$

   b) $\displaystyle\int x^2 e^x dx$

7. State Mean Value Theorem. Give its geometrical meaning. Verify the Mean Value Theorem for the function $f(x) = x^3+x^2-6x$ in the interval $[-1,4]$.

8. Examine the consistency of the system. Solve it by using Gauss elimination method.
   $3x+y+z = 5$, $x-4y+z = -2$, $x+y-3z = -1$

Group C

Answer any TWO questions

[2 ×10 =20]

9. Using simplex method, find the optimal solution of the following linear programming problem.
   Minimize $Z = 10x+15y$
   Subject to $x+y \geq 8$,
             $5x+3y \geq 30$,
   and, $x \geq 0, y \geq 0$

10. Solve the following : a) $x\frac{dy}{dx}-3y=x^2$ b) $xdy - ydx = x^2 ydy$

11. a) Use Simpson's $\frac{1}{3}$ Rule to evaluate $\displaystyle\int_0^1 \frac{1}{1+x^2} dx$ taking $n = 4$. Also find the error.

   b) A man who has 130 m of fencing material wishes to enclose a rectangular garden. Find the maximum area he can enclose.