

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examinations, Even Semester 2021-22
BCA Second Semester

Roll No.....

AS1105: COMPUTATIONAL MATHEMATICS

Time: 2 Hours

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.

- Q.1 Integrate $\int_0^1 \frac{dx}{1+x^2}$, $n=12$ using Trapezoidal Rule and Simpson's 3/8 rule. Compare and discuss the results. 4.0 (LO4)
- Q.2 Integrate the differential equation $y' = -2xy^2$, $y(0) = 1$. Find $y(0.2)$ using Runge Kutta Method by taking a suitable value of h . Discuss on the implication on results if we use Euler's method for the same. 5.0 (LO4)
- Q.3 Given, p = "It is raining", q = "the sun is shining", r = "there are clouds in the sky", answer the following questions. 4.0 (LO5)
- a) Translate $(p \wedge q) \rightarrow r$ into English sentence.
- b) Translate $\sim (p \leftrightarrow (q \vee r))$ into English sentence.
- c) Translate the statement "If there are no clouds in the sky, then the sun is shining." Into logical notations.
- d) Translate the statement "It is raining and the sun is shining." Into logical notations.
- Q.4 Prove or disprove the following using truth table. 4.0 (LO5)
- a) $[p \rightarrow (q \rightarrow r)] \Leftrightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$
- b) $[p \leftrightarrow (q \leftrightarrow r)] \Leftrightarrow [p \leftrightarrow (q \wedge r)]$
- Q.5 Give reasons for the following without using truth tables. 4.0 (LO5)
- a) $[(p \vee q) \wedge s] \Leftrightarrow [(q \vee p) \wedge s]$
- b) $s \wedge p \Leftrightarrow s \wedge (p \wedge p)$
- Q.6 Use Euler's theorem to prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \frac{5}{2} \tan u$, if $u = \sin^{-1} \left(\frac{x^3 + y^3}{\sqrt{x} + \sqrt{y}} \right)$. 5.0 (LO3)
- Q.7 Determine whether $u = \frac{x^2 - y^2}{x^2 + y^2}$ and $v = \frac{2xy}{x^2 + y^2}$ are functional dependent. Explain the reason and discuss your understanding with functional dependence. 4.0 (LO3)