Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

Year and Program: S.Y. B. Tech. **School of Technology** **Department: Computer Science & Engineering**

Course Code: CST 201 **Course Title: Mathematics for Modern Computing** **Semester : III**

Day : Monday **End Semester Examination** **Time:2 Hrs.**

Date: 01.02.2021 **Max. Marks:50**

Instructions:
1) All Questions are compulsory.
2)Non-programmable calculator is allowed.
3) Assume suitable data wherever necessary.
4) Use of Z- table is allowed.

Q.1 **Answer the following (any Two)**–

		Marks	Bloom's Level	CO
a)	What is an error in numerical methods? Explain types of errors with suitable examples.	8	L_2	CO1
b)	Find the positive root of the following equations by Newton's Raphson method i) $2\sin x = x$ (with $x_0 = 2$), ii) $x\sin x + \cos x = 0$ (with $x_0 = \pi$).	8	L_4	CO1
c)	Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 0.2$ from the following table	8	L_2	CO2

x	0.0	0.3	0.6	0.9	1.2	1.5	1.8
y	-1	-0.6289	-0.1264	0.6371	1.9856	4.4375	8.7056

Q.2 **Answer the following (any two)** –

a)	Use Romberg's method to compute $\int_0^1 \frac{dx}{1+x^2}$, correct to four decimal places.(Take $h = 0.5, 0.25$ and 0.125)	8	L_2	CO2
b)	Verify the following functions are probability density functions? i) $f(x) = x\left(2 - \frac{x}{2}\right); 0 \le x \le 3$, ii) $f(x) = \frac{1}{2}e^{-\lvert x\rvert}; -\infty < x < \infty$.	8	L_1	CO3
c)	The probability that a missile will strike the target is $\frac{1}{5}$. If six missiles are fired, find the probability that (i) exactly two will strike the target,(ii) exactly four will strike the target, (iii)at least two will strike the target.	8	L_1	CO3

Q.3 **Answer the following (any two)** –

a) Explain with suitable examples: 9 L_3 CO4

i) Support of fuzzy set,

ii) Core of fuzzy set,

iii) Height of fuzzy set,

iv) Normal and subnormal of fuzzy set,

v) Level set of fuzzy set.

b) If A and B are fuzzy sets defined on universal set X, then prove that 9 L_3 CO4

$|A|+|B|=|A\cup B|+|A\cap B|$.

Also find degree of subsethood $S(A,B)$ and $S(B,A)$ for

$$A(x)=\frac{2x}{x+5} \text{ and } B(x)=\left(1-\frac{x}{5}\right) \text{ for } x\in\{0,1,2,3,4,5\}.$$

c) Find $A+B$ and $A.B$ for the fuzzy sets 9 L_2 CO4

$$A(x)=\begin{cases}\frac{x+1}{2} & ;-1<x\le 1\\ \frac{3-x}{2} & ;1<x\le 3\\ 0 & ;\text{otherwise}\end{cases} \quad \& \quad B(x)=\begin{cases}\frac{x-1}{2} & ;1<x\le 3\\ \frac{5-x}{2} & ;3<x\le 5\\ 0 & ;\text{otherwise}\end{cases}$$

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