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

Date : **Max Marks : 50**

Question Paper

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

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	Find a real root of the equation $x^3 - 5x + 1 = 0$ by using Secant method and suppose the root lies in the interval $(0,1)$.	8	L_2	CO1
b)	Using Newton's iterative method, find a real root of the equation $x \log_{10}(x) = 1.2$ correct to five decimal places.	8	L_4	CO1
c)	Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.15$ from the following table	8	L_2	CO2

x	1.00	1.05	1.10	1.15	1.20	1.25	1.30
y	1.0000	1.0247	1.0488	1.0723	1.0954	1.1180	1.1401

Q.2	**Answer the following (any two) –**						
a)	A solid of revolution is formed by rotating about X-axis, the line $x = 0$ and $x = 1$ and a curve passes through the points with the following coordinates	8	L_2	CO3

x	0	0.25	0.5	0.75	1
y	1.0000	0.9896	0.9589	0.9089	0.8415

Estimate the volume of the solid formed using Simpson's rule.

b)	Find the value of k, if each of the following function is probability density functions.	8	L_1	CO4

i) $f(x) = k \frac{1}{1+x^2}; -\infty < x < \infty,$ ii) $f(x) = k\, x^4 e^{-x/2}; 0 < x < \infty.$

c)	In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.	8	L_1	CO4

Q.3 Answer the following (any two) –

a) Define alpha cut, strong alpha cut, core and level set of fuzzy set. Hence compute alpha cut and strong alpha cut for $\alpha = 0.2$ and $\alpha = 0.4$ for the fuzzy set $A(x) = \frac{x}{x+1};\ x \in \{0,1,2,\ldots,10\}$. 9 L_3 CO5

b) Define a special fuzzy set ${}_{\alpha}A$. Also for the following fuzzy set 9 L_3 CO5

$$A = \frac{0.1}{1} + \frac{0.3}{2} + \frac{0.5}{3} + \frac{0.7}{4} + \frac{1}{5},$$

show that $A = {}_{0.1}A \cup {}_{0.3}A \cup {}_{0.5}A \cup {}_{0.7}A \cup {}_{1}A.$

c) Verify the following fuzzy sets are fuzzy numbers? 9 L_2 CO6

i) $A(x) = \begin{cases} 1 & ;0 \le x \le 10 \\ 0 & ;\text{otherwise} \end{cases}$, ii) $B(x) = \begin{cases} x & ;0 \le x \le 1 \\ 0 & ;\text{otherwise} \end{cases}$

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