Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2019-20
EXM/P/09/01

Year and Program: 2019-20 S.Y. B. Tech. | **School of Technology** | **Department of Computer Science Engineering**

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

Day and Date: Monday 18/11/19 | **End Semester Examination (ESE)** | **Time:** 10.30 am to 1.30 pm **Max Marks: 100**

Instructions:
1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.
5) Use of Z- table is allowed.

		Marks	Bloom's Level	Cos
Q.1				
a)	Find a real root of the equation $3x+\sin(x)-e^x=0$ by the method of False position. (Take initial approximations as 0.3 and 0.4).	07	L_3	CO1
	OR			
a)	Determine the solution of the equation $8-\frac{9}{2}(x-\sin x)=0$ by using the Bisection method accurate to three decimal places in the interval $(2,3)$.	07	L_3	CO1
b)	Find the first and second order derivatives from the following table at $x=1.5$.	08	L_3	CO2

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

OR

b)	Find the first and second order derivatives of the function tabulated below at $x=8$.	08	L_3	CO2

x	4	5	7	10	11	13
y	48	100	294	900	1210	2028

Q.2 a)	Find the approximate value of $\int_0^6 \frac{e^x}{1+x}dx$, using Simpson's one-third and Simpson's three-eighth rules.	07	L_3	CO3

OR

ESE

a) Evaluate $\int_4^{5.2} \log_e(x)\,dx$ approximately by using Weddle's rule. 07 L_4 CO3

b) Find the mean, median and mode for the following data: 08 L_3 CO4

x	15-25	25-35	35-45	45-55	55-65	65-75
f	4	11	19	14	0	2

OR

b) i) Find the Binomial distribution if the mean is 5 and variance is $\frac{10}{3}$, also find $P(X=2)$. 08 L_3 CO4

ii) If a Poisson distribution is such that $P(X=2)=P(X=3)$ find $P(X=0)$ and $P(X=4)$.

Q.3 **Solve any Two of the following.**

a) Find the root of the equations by Newton Raphson method 08 L_2 CO1

(i) $x^3-10x^2+5=0$ (given $x_0=0.7$),

(ii) $3x-\cos(x)-1=0$ (given $x_0=0.4$).

b) Find the first and second order derivatives from the following table at $x=5.2$. 08 L_1 CO2

x	4.9	5.0	5.1	5.2	5.3	5.4	5.5
y	134.29	148.417	164.022	181.272	200.337	221.406	244.692

c) Use Romberg's method to evaluate approximately $\int_1^2 \left(x+\frac{1}{x}\right)^2 dx$, take h=0.5, 0.25 and 0.125. 08 L_4 CO3

d) In a large consignment 2.28% of employees receive income below Rs. 4500 per month and 15.87% of employees receive income above Rs. 7500 per month. Assuming that income follows normal distribution. Find the mean and standard deviation of the distribution. 08 L_3 CO4

Q.4 **Solve any Three of the following.**

a) Define alpha cut and strong alpha cut of a fuzzy set. Also prove that ${}^{\alpha+}A \subseteq {}^{\alpha}A$. 06 L_1 CO5

ESE

b) Let $A(x)=\frac{2x}{2x+5}$; $B(x)=\frac{x}{x+1}$, for $x\in\{6,7,8,9,10\}$, then find 06 L_3 CO

(i) $A\cup\overline{A\cap B}$, (ii) Verify DeMorgan's Law $\overline{A\cup B}=\overline{A}\cap\overline{B}$.

c) For a fuzzy numbers A and B find $A+B$ and $A-B$, where 06 L_4 CO

$$A(x)=\begin{cases}\frac{x+2}{2} & ;-2<x\le 0,\\ \frac{2-x}{2} & ;0<x\le 2,\\ 0 & ;\text{otherwise,}\end{cases}\quad\text{and}\quad B(x)=\begin{cases}\frac{x-2}{2} & ;2<x\le 4,\\ \frac{6-x}{2} & ;4<x\le 5,\\ 0 & ;\text{otherwise.}\end{cases}$$

d) Find 06 L_1 CO

i) $[2,5]-[1,3]$,

ii) $[2,5]+[1,3]$,

iii) $[1,3]\cdot[2,8]$,

iv) $[-0.5,1]\cdot[4,6]$,

v) $[2,5]/[1,3]$,

vi) $[-0.2,-0.4]/[3,4]$.

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ESE