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Name of Examination : **Summer 2021** - (Preview)

Course Code & Course Name : **SH291U - Mathematics for Computer Engineering**

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Maximum Marks : **60**

Duration : **3 Hrs**

[Edit](#) [Print](#) [View Answer Key](#) [Close](#) **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Solve all the questions

- a) Find the approximate value for the real root of $x \log_{10}(x) - 1.2 = 0$ correct to five decimal places by Newton Raphson method. [5]
- b) Use Gauss Seidal method to solve the equation [5]
 $3x - 0.1y - 0.2z = 7.850$, $1x + 7y - 0.3z = -19.30$, $3x - 0.2y + 10z = 71.4$
- c) Solve $x^3 - 5x + 3 = 0$ by using Regula false method. [4]

2) Solve any three questions

- a) The first four moments of a distribution about the value 5 of the variable are 2,20,40 and 50. Find β_1 & β_2 [4]
- b) Find the correlation coefficient for the following data [4]

x	10	11	14	14	20	22	16	12	15	13
y	12	14	15	16	21	26	21	15	16	14

- c) In a sample of 100 cases, the mean of a certain test is 14 and S.D. is 2.5, Assuming the distribution to be normal. Find how many score 16 ? [4]
- d) The two regression equation of the variables x & y are $x = 19.13 - 0.87y$, $y = 11.64 - 0.50x$ Find \bar{x} , \bar{y} , r . [4]

3) Solve any three questions

- a) Find the best fitting regression equation of type $y = a e^{bx}$ to the following data [4]

x	1	5	7	9	12
y	10	15	12	15	21

- b) Find the best fitting regression equation of type $y = a x^b$ to the following data [4]

x	1	2	3	4	5	6
y	2	16	54	128	250	432

- c) In two large populations there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations. [4]
- d) A normal populations has a mean of 6.8 and S.D. of 1.5, A sample of 400 members gave a mean of 6.75, Is the different significant ? [4]

4) Solve any three questions

- a) A random variable X has the density function $f(x) = \begin{cases} k e^{-3x}, & x > 0 \\ 0, & x \leq 0 \end{cases}$ Find (i) $\text{const } t$ (ii) $P(1 < X < 3)$ (iii) $P(X \geq 2)$ (iv) $P(X < 1)$ [4]
- b) Prove that for suitable constant C, $F(x) = \begin{cases} 0, & x \leq 0 \\ C(1 - e^x)^2, & x > 0 \end{cases}$ is the distribution function, find the density function and $P(1 < X < 2)$ [4]
- c) A random variable X has the density function $f(x) = \begin{cases} e^{-x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$ Find (i) $E(X)$ (ii) $E(X^2)$ (iii) $E(e^{2x/3})$ [4]
- d) Let X be the random variable with density function $f(x) = \begin{cases} 3x^2, & 0 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases}$ Find $E(X)$ & $\text{Var}(X)$ [4]

5) Solve any two questions

- a) Use Euler's modified method, to solve $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$ Find the value of $y(0.1)$ taking $h=0.05$ [5]
- b) Using fourth order Runge Kutta method, find $y(1.1)$, $y(1.2)$ when $\frac{dy}{dx} = xy$, $x(0) = 1$, $y(0) = 1$ [5]
- c) Using Picards method, find the solution upto the third approximations of the equation $\frac{dy}{dx} = y + x$, $y(0) = 1$ [5]