H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech III Semester Supplementary Examinations July-2025**
Course Name : **Computer Oriented Statistical Methods**
Course Code : **A400006**
Branch : **IT & CSD**
Date & Session : **01-07-2025 FN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Define probability density function of discrete random variable. 1 M
2. Two events A and B are Independent iff? Explain. 1 M
3. Explain about probability mass function of the continuous random variable. 1 M
4. Define Random variable. 1 M
5. Expression for the area of the shaded region under the normal curve. 1 M
6. Sate Central limit theorem. 1 M
7. What fraction is called the degree of confidence? 1 M
8. Explain t test with example. 1 M
9. Define Ergodic. 1 M
10. Explain about Stochastic process. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). In an electric bluds manufactory factory machines X,Y,Z manufactures 20%,30%&50% of the total of their output and 6%,3%and 2% are defective. A blub is drawn at random and found to be defective. Find the probabilities that it is manufactures from (i) Machine X (ii) Machine Y (iii) Machine Z 10M

OR

11. B). (i) What is the probability of getting a total of 7 or 11 when a pair of fair dice is tossed. 5M
(ii) If a car agency sells 50% of its inventory of a certain foreign car equipped with side airbags, find a formula for the probability distribution of the number of cars with side airbags among the next 4 cars sold by the agency. 5M

12. A). Let X be a random variable with density function 10M

$$f(x)=\begin{cases}\frac{x^2}{4} & -1<x<2\\ 0 & elsewhere\end{cases}.$$

Find the Expected mean and variance.

(P.T.O..)

OR

12. B). (i) On average a textbook author makes two word processing errors per page on the first draft of her textbook. What is the probability that on the next page will make (a) 4 or more mistakes (b) no errors? 5M

(ii) It is Known that 605 of mice inoculated with a serum are protected from a certain disease. If 5 mice are involved, find the probability that,(a) None contracts the disease (b) More than 3 contract the disease. 5M

13. A). (i) An electrical firm manufactures light bulbs that have a life, before burn-out, that is normally distributed with mean equal to 800 hours and a standard deviation of 40 hours. Find the probability that a bulb burns between 778 and 834 hours. 5M

(ii) Explain about F-Distribution. 5M

OR

13. B). (i) A normal population with unknown variance has a mean of 20. Is one likely to obtain a random sample of size 9 from this population with mean of 24 and a standard deviation of 4.1? If not, what conclusion would you draw? 5M

(ii) Find the value of z if the area under a standard normal curve (a) to the right of z is 0.3622 (b) to the left of z is 0.1131 (c) between 0 and z with $z > 0$ is 0.4838. 5M

14. A). In a random sample of n=500 families owning television sets in the city of Hamilton, Canada, it is found that x=340 subscribe to HBO. Find a 95% confidence interval for the actual proportion of families with television sets in the city that subscribe HBO. 10M

OR

14. B). Random sample of 400 men and 200 women in a locality were asked whether they would like to have bus stop near their residence. 200 men and 400 women in favor of the proposal. Test the significance between the difference of two proportions at 5% level. 10M

15. A). Consider the Markov chain with three states , $S = \{1,2,3\}$ that has the following transition matrix 10M

$$P = \begin{bmatrix} \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ \frac{1}{3} & 0 & \frac{2}{3} \\ \frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}$$

(i) Draw the state transition diagram for the chain

(ii) If we know $P(X_1 = 1) = P(X_1 = 2) = \frac{1}{4}$

Find $P(X_1 = 3, X_2 = 2, X_3 = 1)$.

OR

15. B). I have 4 umbrellas, some at home, some in the office. I keep moving between home and office. I take an umbrella with me only if it rains. If it does not rain I leave the umbrella behind (at home or in the office). It may happen that all umbrellas are in one place, I am at the other, it starts raining and must leave, so I get wet. 10M

(i). If the probability of rain is p, what is the probability that I get wet?

(ii).Current estimates show that p = 0.6 in Edinburgh. How many umbrellas should I have so that, if I follow the strategy above, the probability I get wet is less than 0.1?

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Examination : **B.Tech III Semester Supplementary Examinations July-2025**
Course Name : **Numerical Methods and Complex Variables**
Course Code : **A400007**
Branch : **EEE & ECE**
Date & Session : **01-07-2025 FN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Find an approximate value of $(127)^{\frac{1}{3}}$ using Newtons-Raphson method. 1 M
2. State Newton's forward interpolation formula. 1 M
3. Write Simpson's 1/3 rd formula. 1 M
4. Write Modified Euler's method formula. 1 M
5. Define Analytic function. 1 M
6. Write Cauchy-Riemann equations in Cartesian form. 1 M
7. State Zeros of Analytic function. 1 M
8. Define pole of f(z). 1 M
9. State Dirichlet's conditions. 1 M
10. Write Fourier Sine Transform Formula. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find the roots of the equation $x^3 - 3x - 5 = 0$ which lies between 2 and 3 by bisection method. 10M

OR

11. B). Using Lagrange's Interpolation formula, find the polynomial $f(x)$ which fits the following data. 10M

x	-1	0	3
y	3	-6	39

12. A). Evaluate $\int_0^1 \frac{dx}{1+x^2}$ taking h=$\frac{1}{6}$, using Simpson's 3/8 th rule. 10M

OR

12. B). Find $y(0.1)$ *and* $y(0.2)$ using Range-Kutta 4th order formula given that $y' = x^2 - y$ *and* $y(0) = 1$ 10M

13. A). If $f(z)$ is an analytic function of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f'(z)|^2$ 10M

OR

13. B). Find the conjugate harmonic function of the harmonic function $u = x^2 - y^2$. 10M

(P.T.O..)

14. A). Evaluate $\int_C \frac{z^3 e^{-z}}{(z-1)^3} dz$ where C is $|z-1| = \frac{1}{2}$ using Cauchy's integral formula. 10M

OR

14. B). Expand $f(z) = sinz$ in Taylor's series about $z = \frac{\pi}{4}$. 10M

15. A). Obtain the Fourier series for the function $f(x) = e^x$ from x=0 to x=2π. 10M

OR

15. B). Find the Fourier cosine transform of $f(x) = \frac{1}{1+x^2}$. 10M

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