Roll No .....

## MEDC/MEVD/MEIC/MEPE/MEHP/ MEPS/MTPS-101

## M.E./M.Tech., I Semester

Examination, November 2022

## **Advanced Mathematics**

Time: Three Hours

Naximum Marks: 70

Note: i) Attempt any five questions

- ii) All questions carry ental marks.
- 1. a) Find the solution of the parabolic equation  $u_n = 2u_t$  when u(0, t) = u(4, t) = 0 and u(x, 0) = x (4 x), taking h = 1. Find the values up to t = 5.
  - b) Explain the Wavelet transform with suitable example.
- 2. a) If the random variable X has the values 0, 1, 2, ..... then for what value of t, the given function p(x) = (1 t) tx, x = 0, 1, 2, ..., is a probability density function of X.
  - b) Find the mean and variance of the Poisson's distribution.
- 3. a) What is stochastic process and its types? Discuss.
  - Find the probability for queuing model (M/M/1: ∞/∞/FCFS)
- 4. a) Explain fuzzy reasoning and extension principle in detail.
  - b) Let  $X = (x_1, x_2, x_3, x_4)$  and two fussy set A and B are  $A = \{(x_1, 0.2), (x_2, 0.5), (x_3, 0.7), (x_4, 1)\}$   $B = \{(x_1, 0.6), (x_2, 1), (x_3, 4), (x_4, 0.3)\}$ Find  $A \cup B$  and  $A \cap B$

a) What do you mean by Reliability? Write a note on basic element of Reliability.

- b) A certain type of electric component has a uniform failure rate of 0.00001 per hour. What is its reliability for a specified period of service of 10,000 hours?
- a) The mean time to failure of a particular type of component is 800h. What is probability that a similar component will fail in an operating time of
  - i) 200h

ii) 400h

iii) 800h

- iv) 1000h
- b) What is fuzzy logic and explain about fuzzy sets with its operations?
- a) Explain cell array and its syntax in writing a MATLAB program with an example.
  - Describe briefly about the advanced functions available in MATLAB programming.
- 8. Write a short notes on any two
  - a) Haar Transform
  - b) Binomial Distribution
  - Distribution queuing system
  - d) Fault tolerant analysis

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