## Roll No.....

## MCSE/MSE-101

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

Examination, November 2019

## **Advanced Computational Mathematics**

Time: Three Hours

Maximum Marks: 70

Note: i) Attempt any five questions.

- ii) All questions carry equal marks
- Show that the mapping  $f:V_3(R) \to V_2(R)$ , defined by f(a, b, c) = f(a, b) so linear transformation. What is the kernel of this transformation?
  - b) Examine whether the system of vectors  $q_1 = (1,2,3)$ ;  $q_2 = (1,0,1)$  and  $q_3 = (0,1,0)$  are linearly dependent or not.
- 2. a) Prove that Hermit Polynomial

$$H_n(x) = (-1)^n e^{x^2} \frac{d^n}{dx^n} (e^{-x^2})$$

- b) Define Heaviside unit step function. Using this find  $L(t^3 rt + 5 + 3\sin 2t)$
- (3.) a) Solve the Poisson's Equation:  $u_{xx} + u_{yy} = -10(x^2 + 4^2 + 10)$  over the square with sides x = 0, y = 0, x = y = 3 with u = 0 on the boundary and mesh length 1.

i) FT

ii) DFT



Using separation of variable technique to solve  $3u_x + 2u_y = 0$  with  $u(x, 0) = 4e^{-x}$ .

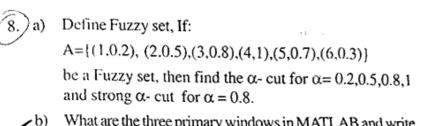
- b) Find the mean and variance of Binomial distribution.
- 5. a) For the Normal Curve  $y = \frac{1}{\sigma \sqrt{2\pi}} e^{-(x-m)^2/2\sigma^2}$

find the mean and standard deviation.

 Fit a Poisson's distribution to the following calculate theoretical frequencies

x:	0	1	2	3	4
f:	122	60	15	2	1

- 6. a) Obtain the steady state difference equation for the queueing model (M/M/1: N/FCFS) in usual notation and solve them for p<sub>0</sub> and p<sub>1</sub>.
  - Define Stochastic Process and explain classification of stochastic process.
- (7. a) Obtain the distribution of the number in the system in steady state for M/M/S model by considering it as a birth and death process.
- What do you understand by Markov process? In what areas of management can it be applied successfully.



What are the three primary windows in MATLAB and write their purpose?

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