M. TECH.-I (ELECTRONICS V.L.S.I.) (CBCS – 2015 COURSE) :
WINTER - 2017
SUBJECT: LINEAR ALGEBRA & RANDOM PROCESS

Day: **Monday**
Date: **22/01/2018**

W-2017-2783

Time: **11.00 AM TO 02.00 PM**
Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Attempt **ANY THREE** questions from each section.
3) Answers to both the sections should be written in the **SEPARATE** answer book.

SECTION - I

Q.1 Prove that set of integers with respect to addition and multiplication forms a vector space. **(10)**

OR

Q.1 Determine the Eigen values and Eigen vectors of A. **(10)**

$$A = \begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$$

Q.2 Solve the following example of unbalanced assignment problem. **(10)**

Salesman	**Territory**		
1	10000	15000	23000
2	20000	17000	26000
3	15000	16000	22000
4	18000	19000	27000

OR

Q.2 Find the initial feasible solution to the following transformation problem using Vogel's approximation method. **(10)**

	X	Y	Z	
I	1	2	3	50
II	3	2	1	80
III	4	5	6	75
IV	3	1	2	95
	120	80	8	

Q.3 Use Runge Kutta method of fourth order to solve $\frac{dy}{dx} = 1 + \sqrt{xy}$; $y(0) = 1$ to find y at x = 0.2 taking h = 0.1 **(10)**

OR

Q.3 Solve by using Admas Bash forth method. **(10)**

$y' = y - t^2 + 1 \quad 0 \le t \le 2 \quad y(0) = 0.5$

$y'(t) = y - t^2 + 1 \quad y = 0.5$ when $t = 0$

P.T.O.

SECTION - II

Q.4 Define conditions, distributions. Consider the bivariate Random variable (x, y) of probability is given by **(10)**

$$P_{xy}(x_1, y_1) = \begin{cases} K(2x_i + y_j) & x_i = 1, 2, 3.... \\ 0 & y_j = 1, 2, 3..... \end{cases}$$

OR

Q.4 Define marginal probability mass function. Consider a binary communication channel, Let x, y be bivariate Random variate where X is i/p and y is o/p channel **(10)**

$Let\ P(x) = 0,\ P(y) = 1\ at\ x = 0 = 0.1\ \&$

$P(y) = 0\ at\ x = 1 = 0.2$

i) Find joint pmf at xy.

ii) Find marginal pmf at x & y.

iii) are x & y independent?

Q.5 Draw a diagram showing the physical layout of a queuing system with multi server multi-channel service facility? **(10)**

OR

Q.5 Explain Poission input, exponential service. **(10)**

Q.6 Explain Power spectrum density function for Random Process. **(10)**

OR

Q.6 Explain Gaussion Random Process. **(10)**

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