M. Tech.-I (Electronics V.L.S.I.) (CBCS – 2015 Course) : WINTER - 2018

SUBJECT: LINEAR ALGEBRA AND RANDOM PROCESS

Day: - Monday
Date: 10/12/2018

W-2018-3115

Time: 11.00 AM TO 02.00 PM
Max Marks. 60

N.B. :

1) All questions are **COMPULSORY**.
2) Answer to Section-I and Section-II should be written in **SEPARATE** answer book.
3) Use of Non-programmable **CALCULATOR** is allowed.
4) Figures to right indicate **FULL** Marks.
5) Assume suitable data wherever **NECESSARY**.

SECTION-I

Q.1 Prove that set at all solution a,b,c of equation a+b+2c+0 is a sub space of vector space $V_3(R)$ **(10)**

OR

Let R be the field of real number and P_n be the set of all polynomials of degree at most n over the field R. Prove that P_n is the vector space over the field R.

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

Machine	Operations			
	I	II	III	IV
A	10	5	13	15
B	3	9	18	3
C	10	7	3	2
D	5	11	9	7

OR

Find the initial feasible solution to the following transportation problem by (VAM) methods.

		To			
		X	Y	Z	
From	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 Given $\frac{dy}{dx} = x^2 (1+y)$ & y(1) =1, y(1.1) = 1.233 y(1.2) = 1.548, y(1.3) = 1.979 evaluate y(1.4) by Adams – Bash forth method **(10)**

OR

Apply Runge-Kutta method to find an approximate value of y for x= 0.2 in steps of 0.1, if $dy/dx = x+y^2$, given that y=1, where x=0.

P.T.O.

SECTION-II

Q.4 Consider an experiment of drawing randomly three balls from an urn containing two red, three white, & four, blue balls. Let (x,y) be a bivariate r.v. where x & y denote respectively the number at red & white balls chosen . **(10)**

a) Find the range at (x,y).
b) Find the joint pmf's at (x,y)
c) Find the marginal pmf's at x&y.

OR

Define Random variables & distribution function and write down properties of marginal distribution function.

Q.5 Briefly explain the important characteristics of queuing system **(10)**

OR

A Supermarket has two girls ringing up sales at the counters. If the service time for each customer exponential with mean 4 minutes, and if people arrive in a Poisson fashion at the rate at 10 an hour calculate the

a) Probability of having to wait for service?
b) Expected percentage of idle time for each girl?

Q.6 Explain Poisson Random process. **(10)**

OR

Explain power spectral density function for random process.

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