Paper / Subject Code: 34501 / Electronics Systems Design

E 1st Year | Instrumentation & Control | ~~CBSGS~~ Choice Base | Nov. 18

Duration 3 Hours **[Total Marks : 80]**

Note : 1. Question No. **1** is **compulsory**.

2. Attempt any **three** questions from remaining **five** questions.

3. Assume suitable data if necessary.

Q. 1 Answer the following: 20

a) Give reason-why positive feedback is used in comparators?

b) Explain the need and methods of guarding.

c) Explain working of switched capacitor filter.

d) Explain important performance parameters of Analog Multiplexer.

Q. 2 a) Discuss briefly the issues associated with power management of electronic circuits. 10

b) Draw and explain circuit of Instrumentation amplifier. 10

Q.3 a) Explain working of millivoltage rectifier. 10

b) Explain important considerations in design and fabrication of high speed circuits 10

Q.4 a) Explain design of a reference current source for grounded load and discuss effect of each component on performance of this circuit. 10

b) Explain performance parameters of Sample and Hold circuit. 10

Q.5 a) Explain of DC to DC Converter and its important uses. 10

b). Explain principle and working of sigma-delta ADC. 10

Q.6 Write short notes on the following - 20

a) Peak detector circuit

b) Various methods of power supply noise reduction.

1st / Inst & Cont / Sem II - CBSGS to choice Base / Nov-2018

Q. P. Code: 39606

Time : 3 Hours **Marks : 80**

Please check whether you have got the right question paper

1) Question No.1 is compulsory
2) **Attempt any three questions out of the remaining five questions.**
3) **Assume suitable data wherever necessary.**

Q. 1 Explain Briefly 20

a) Pseudo random number generator
b) Conditional probability
c) Exponential distribution
d) Fractional derivative
e) White noise

Q. 2 Differentiate between 20

a) Correlation and covariance of random process
b) Explain the stochastic characteristics of random phased cosine

Q. 3

a) Explain how the stochastic characteristic of a random variable can be described in terms of probability density function. Assume any continuous random variable. 10

b) Explain clearly the concept of Field, Borel field, sigma field and Probability space. 10

Q. 4

a) Explain how the states and covariance of a linear time invariant discrete system are propagated? Using this, derive the equations of kalman filter for the same. 10

b) Write a brief note on Principal component Analysis. 10

Q. 5

a) What is unscented transformation? What is its significance in state estimation? 10

b) Explain the concept of extended kalman filter, as applied to a nonlinear discrete time system. 10

Q. 6 Write a note on 20

a) Poisson process
b) Two dimensional random variable

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ME/INST/ **Paper / Subject Code: 60212 / Elective II: Operation Research.** /NOV.18

SEM III choice Base

Q.P. CODE: 35559

(3 Hours) **(Marks: 80)**

N.B. : (1) Answer any four questions out of the six questions.
(2) Figures to the right indicate full marks.
(3) Illustrate answers with neat sketches where ever required.
(4) Answers to the questions should be grouped and written together.
(5) Assume suitable data if required.

1. (a) Consider the problem for Graphical Method 10

Max. $Z = 8000 X_1 + 7000 X_2$

Subject to,

$3 X_1 + X_2 \leq 66$

$X_1 + X_2 \leq 45$

$X_1 \leq 20$

$X_2 \leq 40$

$X_1, X_2 \geq 0$

(b) What is Monte Carlo simulation Technique? 10

2. (a) Solve by Big M method 10

Minimize $z \quad 12 X_1 + 8 X_2$

Subject to

$2X_1 + X_2 \leq 24$

$3 X_1 + 2X_2 \geq 54$

$X_1 + X_2 \geq 12$

$X_1, X_2 \geq 0$

(b) The demand for an item is deterministic and constant over time and is equal to 600 units per year. The unit cost of the item is Rs.50 while the cost of placing an order is Rs.5. The inventory carrying cost is 20% of the cost of inventory per annum and the cost of shortage is Rs.1 per month. Find the optimal ordering quantity when stock outs are permitted. If the stock outs are not permitted what would be the loss to company. 10

3. (a) Solve the following problem by Dual simplex method 10

Max.$Z = -3 X_1 - 2 X_2$

$X_1 + X_2 \geq 1$

$X_1 + X_2 \leq 7$

$X_1 + 2 X_2 \geq 10$

$X_1, X_2 \geq 0$

(b) Explain in detail the structure of queuing system describing each element of queue with suitable example. 10

4. (a) Obtain the basic feasible solution of the following transportation problem by North West Corner Rule, Matrix Minima Method and Vogel's Appx Method. 10

Origin	W1	W2	W3	Supply
O1	2	7	4	5
O2	3	3	1	8
O3	5	4	7	7
O4	1	6	2	14
Demand	7	9	18	

(b) A small garment making unit has five tailors stitching five different types of garments. All the five tailors are capable of stitching all five types of garments. The output per day per tailor and the profit (Rs.) for each type of garment are given below: 10

Tailor	Garment				
	1	2	3	4	5
A	7	9	4	8	6
B	4	9	5	7	8
C	8	5	2	9	8
D	6	5	8	10	10
E	7	8	10	9	9
Profit (Rs. Per Garment)	2	3	2	3	4

i. Which type of garment should be assigned to which tailor in order to maximize the profit, assuming that there are no other constraints.

ii. If tailor D is absent for a specific period and no other substitute tailor is available what should be the optimal assignment.

5. (a) Use two phase simplex method to solve following problem 10

Maximize $Z = 5X_1 - 4X_2 + 3X_3$

Subject to the constraints $2X_1 + X_2 - 6X_3 = 20$

$6X_1 + 5X_2 + 10X_3 \leq 76$

$8X_1 - 3X_2 + 6X_3 \leq 76$

$X_1, X_2, X_3 \geq 0$

(b) The payoff matrix of a game is given below. Find the solution of the game to A and B. 10

		B				
		I	II	III	IV	V
A	I	-4	-2	-2	3	1
	II	1	0	-1	0	0
	III	-6	-5	-2	-4	4
	IV	3	1	-6	0	-8

6. (a) Consider the LPP and solve by Simplex method 10

Minimize $Z = X_1 - 3X_2 + 3X_3$

Subject to

$3X_1 - X_2 + 2X_3 \leq 7$

$2X_1 + 4X_2 \geq -12$

$-4X_1 + 3X_2 + 8X_3 \leq 10$

and $X_1, X_2, X_3 \geq 0$

(b) The profit for three markets as a function of sales effort expended, as given in the table. How will you distribute a given number of salesmen, so as to achieve maximum profit? 10

No. of salesmen	Markets		
	I	II	III
0	40	50	50
1	42	60	60
2	50	65	70
3	60	75	80
4	66	85	88
5	75	95	105
6	82	110	115
7	90	120	130
