

00865
9800

**B.Tech. Civil (Construction Management) /
B.Tech. Civil (Water Resources Engineering)**

**Term-End Examination
December, 2010**

ET-301(A)/ET-534(B) : SYSTEMS METHODS

Time : 3 hours

Maximum Marks : 70

Note : All questions are compulsory. Use of calculator is allowed. Each and every notation should be elaborated.

1. Answer any six questions : **6x5=30**
- (a) What do you understand by Economic system ? Describe its elements.
 - (b) What do you understand by Electric Power Generation systems ? Describe Electric Power Generation systems with the help of block diagram.
 - (c) The D.C motor is the most suitable motor for variable speed drives. State the reasons.
 - (d) Differentiate between Physical and Non-Physical system by citing at least two examples of each.
 - (e) State the two fundamental facts which make possible a study of systems.

- (f) Describe scale model and Analogue model with the help of examples. (at least two examples of each)
- (g) What is dual simplex problem ? Explain with the help of a suitable example.
- (h) What are the two basic types of control systems ? Give at least two examples of each type.

2. Answer any two of the following : **2x10=20**

- (a) A diet for a sick person must contain at least 4000 units of vitamins, 50 units of minerals and 1400 units of calories. Two foods A and B are available at a cost of Rs 4/- and Rs 3/- per unit respectively. If one unit of A contains 200 units of vitamins, 1 unit of minerals and 40 units of calories and one unit of food B contains 100 units of vitamins, 2 units of minerals and 40 units of calories. Find by graphic method, what combination of foods be used to have least cost ?
- (b) A company has 3 factories A, B and C which supply to 4 ware houses situated at P, Q, R and S. The monthly production capacity Tons of A, B and C are 120, 80, and 200 respectively. The monthly requirements (Tons) for the ware houses P, Q, R and S are 60, 50, 140, and 50 respectively.

The transportation cost (Rs per ton) matrix is given below :

FACTORIES	WARE HOUSES			
	P	Q	R	S
A	4	5	2	5
B	3	8	4	8
C	7	4	7	4

Using Vogel's Method, determine the optimum transportation distribution of products to ware houses to minimize the total transportation cost.

- (c) An automobile dealer wishes to put four repairmen to four different jobs. The repairmen have some what different kinds of skills and they exhibit different levels of efficiency from one job to another. The dealer has estimated the number of man-hours that would be required for each job-man combination. This is given in the matrix form in following table :

MAN \ JOB	A	B	C	D
	1	5	3	2
2	7	9	2	6
3	6	4	5	7

Find the optimal assignment that will result in minimum man hours needed.

3. Answer any two of the following : 2x10=20

- (a) The National Paints Ltd., would like to improve its inventory management policies for its supply of paints used for automobiles. Annual demand for such paint, is 50,000 litres, and the paint, which costs Rs 20 per litre, is used at a constant rate. Annual carrying costs are estimated at 15 per cent of the value of paint held. Each order costs Rs 80. Determine :
- (i) How much paint should be ordered each time ?
 - (ii) How often should paint be ordered ?
 - (iii) Time between two consecutive orders.
 - (iv) What is the total annual cost associated with this policy ?

(b) A small project consists of seven activities, the details of which are given below :

Activity	Duration (days)			Immediate Predecessor
	Most likely	optimistic	Pessimistic	
A	3	1	7	-
B	6	2	14	A
C	3	3	3	A
D	10	4	22	B, C
E	7	3	15	B
F	5	2	14	D, E
G	4	4	4	D

- (i) Draw the network, find the critical path and the expected project completion time.
- (ii) What project duration will have 95% confidence of completion ?

For 95% probability, take the value of z as 1.64.

- (c) Answer *any four* of the following :
- (i) Distinguish between an activity and an event.
 - (ii) What are the characteristics of dynamic programming problem ?
 - (iii) What do you understand by Kendall's Notation ? Describe the M/M/1 Queuing Model.
 - (iv) Discuss Multiple solution and Infeasible problem in linear programming
 - (v) Describe static system and Dynamic system. Give at least one example where the same system behaves as static system at certain times, and as dynamic system at other times.
-