(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 140851 Roll No. | | | | | | | | | | |

B. TECH.

Theory Examination (Semester-VIII) 2015-16

OPERATIONS RESEARCH

Time : 3 Hours ***Max. Marks : 100***

Section-A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) Discuss simplex and convex set with respect to LPP.

(b) Explain the concept of alternate optima in LPP.

(c) What is degeneracy in TP?

(d) What is curse of dimensionality?

(e) Why we use dominance property?

(f) How can we solve problems with risk?

(g) What are different techniques of selective inventory control?

(h) When we need simulation?

Max $Z = 3x_1 + 2x_2$

Subject to,

$2x_1 + x_2 \leq 2$

$3x_1 + 4x_2 \geq 12$

$x_1, x_2 \geq 0$

(b) Obtain optimal solution of the transportation problem given below :

	D_1	D_2	D_3	D_4	Supply
F_1	2	2	2	1	3
F_2	10	8	5	4	7
F_3	7	6	6	8	5
Demand	4	3	4	4	

(c) With help of an example, explain the Hungarian algorithm.

(2)

The processing time for the jobs on each machine (in hours) is given below:

Job	A	B	C	D	E	F
M_1	1	4	6	3	5	2
M_2	3	6	8	8	1	5

Find optimum sequence, total elapsed time as well as idle times for the two machines.

(f) A contractor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that when he starts production run, he can produce 25,000 bearings per day. The holding cost of a bearing in stock in Rs 0.02 per year. Set-up cost of a production is Rs 18. How frequently should the production run be made?

(g) A car par contains 5 cars. The arrival of cars is Poisson with mean of 10 per hour. The length of

(3)

B	2	5	8	None
C	2	4	6	A
D	2	3	10	B
E	1	3	11	B
F	4	6	8	C,D
G	1	5	15	E

Draw the network and find the critical path and variances. Also find the probability of completing the project by 18 weeks.

Section-C

Note : Attempt any two questions from this section. **(15×2=30)**

3. (a) Make dual of the following primal model :

$$\text{Min } Z = 4x_1 + 5x_2 - 3x_3$$

(4)

He has 5 sales boys to assign to three areas of the stadium. The table below, shows estimated sales that can be made with different assignments:

No of salesmen assigned	East stand	North stand	Club stand
1	15	45	30
2	30	90	60
3	60	135	90
4	120	180	120
5	150	180	150

Use dynamic programming to obtain assignment of salesmen for sales maximization. (10)

4. (a) Explain the procedure for sequencing 2 jobs on k machines. (5)

(5)

(b) Use dual simplex method to solve the LPP model given below : (10)

Max $Z = 3x_1 - x_2$

Subject to, $X_1 + X_2 \geq 1$

$2x_1 + 3x_2 \geq 2$

$x_1, x_2 \geq 0$

5. (a) What do you understand by simulation? Discuss different methods for generation of rando numbers. (5)

(b) The demand for a certain product has a rectangular distribution between 4000 and 5000. Find the optimal order quantity, if the storage cost is Rs 1 per unit and shortage cost is Rs 7 per unit. (10)