

B.TECH SEM – VI (2007 COURSE) (INF. TECH.) :
WINTER - 2017

SUBJECT: OPERATIONAL RESEARCH

Day: **Thursday**
Date: **23/11/2017**

W-2017-2522

Time: **10.00 AM TO 01.00 PM**
Max Marks: 80

N.B:

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of remaining questions answer **ANY TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Both the sections should be written in the **SEPARATE** answer books.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Assume suitable data if necessary.

SECTION-I

- Q.1** a) Explain the various contributor and development of operation research. **(05)**
- b) Explain the degeneracy in simplex method. **(05)**
- c) Explain with suitable example the application of a transportation model. **(04)**
- Q.2** a) Explain any three optimization models. Used to obtain optimized solution in IT problems. **(07)**
- b) State the characteristics of operation research. **(06)**
- Q.3** A company makes two kind of CRT screens. CRT screen A is of high quality and CRT screen B is of lower quality. The respective profits are Rs. 8 and Rs 6 per CRT screen. Each CRT screen of type A requires twice as much time as CRT screen of type B and if all CRT screen were of type B, the company could make 1000. CRT screens per day. The supply of material is sufficient for only 800 CRT screen. (Both A& B combined) CRT screen type A requires a high quality frames and only 400 such high quality frames are available per day. There are only 700 frames a day available for type B. Determine of CRT screens to be used for each type so as to maximum profit. **(13)**
- Q.4** a) What is degeneracy in transportation problem? Explain with suitable example. **(04)**
- b) Five lectures by experts are to be scheduled so as not to conflict with one another. The lecturers are to be delivered in the afternoon on week days only, otherwise, because of other close schedules; certain standards will be forced to drop out these lectures. The following table or matrix indicates the numbers of absentees lecture wise and day wise, schedule these lectures in such a way to minimize the total number of the students forced to remain absent. **(09)**

	1	2	3	4	5
Mon	3	2	3	9	10
Tue	11	5	9	10	2
Wed	1	3	8	2	4
Thur	8	11	10	5	2
Fri	8	6	5	6	9

P.T.O

SECTION-II

- Q.5** a) What is inventory control? Give the classification of inventory. **(05)**
 b) Explain replacement of items that fail completely. **(05)**
 c) Explain stock & floats in network analysis. **(04)**

- Q.6** a) A firm has a machine whose purchase price is Rs. 30,000 its maintenance cost and resale price at the end of different years are as given below. **(09)**

Year	1	2	3	4	5	6
Maintenance Cost	1500	1700	1200	2500	3500	5500
Resale Price	1700	15300	14000	12000	8000	3000

Obtain the economic life of the machine and the minimum average cost.

- b) State the assumption of sequencing models. **(04)**
- Q.7** a) A supermarket has two girls running up sales at the counters. If the service time for each customers is exponential with mean 4 minutes, as if people arrive in poisson fashion at the rate of 10 an hour. **(07)**
 i) What is probability of having to wait for service?
 ii) What is the expected percentage of idle time for each girl?
- b) The data collected in running a machine the cost of which is Rs. 30,000 are given below. Determine the optimum period for replacement of the machine. **(06)**

Year	1	2	3	4	5
Resale Value (Rs)	21000	15000	10200	7200	4825
Cost of Spares(Rs)	2000	2135	2440	2850	3400
Cost of Labour (Rs)	7000	8000	9000	10500	12500

- Q.8** a) Find the optimum schedule for the firm project, with overhead cost of Rs. 75. **(09)**

Activity	Immediate Predecessors	Duration (days)		Increase on cost (Rs) for crashing by one day
		Normal Time	Crash Time	
A	-	3	2	150
B	-	4	3	100
C	A	5	4	200
D	A	7	5	300
E	B,C	3	3	0
F	B,C,D	6	2	75

- i) Draw project network using normal duration.
 ii) Find critical path and project duration for case (i).
 iii) Find optimal duration & optimal schedule.
- b) What is the significance of “Saddle Point” in the pay off matrix in game theory? **(04)**