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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR  
(AUTONOMOUS)**

**MBA I Year II Semester Regular Examinations October-2020**

**OPERATIONS RESEARCH**

Time: 3 hours

Max. Marks: 60

**SECTION – A**

(Answer all Five Units 5 x 10 = 50 Marks)

**UNIT-I**

- 1 a Define Operations Research. Explain the process of Operations Research. 5M  
 b Maximize  $Z = 11x_1 + 4x_2$  5M  
 Constraints  $7x_1 + 6x_2 \leq 84$   
 $4x_1 + 2x_2 \leq 32$   
 $x_1 \geq 0, x_2 \geq 0$   
 Solve the above liner programming problem by using graphical method.

**OR**

- 2 a What are the major applications of Operations Research 5M  
 b Solve the following problem by Simplex method. 5M  
 Max.  $Z = 8x_1 + 19x_2 + 7x_3$   
 Subject to constraints  
 $3x_1 + 4x_2 + x_3 \leq 25$   
 $x_1 + 3x_2 + 3x_3 \geq 50$   
 $x_1 \geq 0, x_2 \geq 0.$

**UNIT-II**

- 3 a Find Initial basic feasible solution for the below problem 5M

	W1	W2	W3	W4	Supply
F1	10	0	20	11	20
F2	12	7	9	20	25
F3	0	14	16	18	15
Demand	10	15	15	20	

- b Write the procedure of solving assignment problem by Hungarian method. 5M

**OR**

- 4 a Solve the following assignment problem 10M

Operation /task	I	II	III	IV	V
A	20	15	18	20	25
B	18	20	12	14	15
C	21	23	25	27	25
D	17	18	21	23	20
E	18	18	16	19	20

- b Write short notes on the following  
 a) Hungarian Method of assignment  
 b) Un balanced assignment problem

**UNIT-III**

- 5 a Define Game theory. Explain pure strategies and mixed strategies **5M**  
 b Write the steps of dominance rule in Games? **5M**

**OR**

- 6 a For the game given below determine optimal strategies for A **5M**

		B	
		3	1
A	2	2	7
	1	1	11

- b Calculate the value of the game and find the best strategies for player A and Player B. **5M**

		B		
		1	3	6
A	2	2	1	3
	6	6	2	1

**UNIT-IV**

- 7 a Define Project. What are the steps involved in CPM? **5M**  
 b Write short notes on a) Project Crashing b) PERT. **5M**

**OR**

- 8 a Draw the network and identify the critical path. **5M**

Activity	Duration
1-2	7
1-3	7
2-3	8
2-4	6
3-6	9
4-5	3
5-6	5

- b Write short notes on **5M**  
 i) Steps in PERT  
 ii) Cost slope  
 iii) Project crashing

**UNIT-V**

- 9 a Define replacement models? Explain the replacement model types in detail **5M**  
 b Find the sequence of jobs and elapsed time, idle times of 1 and 2 machines. **5M**

Job	1	2	3	4	5	6
Machine-1	5	9	4	7	8	6
Machine-2	7	4	8	3	9	5

**OR**

- 10 a A) Why should manufacturers go for replacement? **5M**  
 B) What is Group replacement?  
 b There are five jobs (namely 1,2,3,4 and 5), each of which must go through machines A, B and C in the order ABC. Processing Time (in hours) are given below: **5M**

Jobs	1	2	3	4	5
Machine A	5	7	6	9	5
Machine B	2	1	4	5	3
Machine C	3	7	5	6	7

Find the sequence of the jobs and elapsed time.

**SECTION – B**  
(Compulsory Question)

**11****1 x 10 = 10 Marks**

A fleet owner finds from his past experience records that the cost of the machine is Rs 6000/- and the running cost are given below. At what age the replacement is due;-

Year	1	2	3	4	5	6	7	8
Maintenance Cost	1000	1200	1400	1800	2300	2800	3400	4000
Resale Value	3000	1500	750	375	200	200	200	200

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