Roll No…….. **Total No. of Printed Pages: [02]**

Total No. of Questions: [09]

B. Tech (Mechanical Engg.) (Semester – 8th)

OPERATIONS RESEARCH

Subject Code: BMECD1821

Paper ID: [18112350]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Define operations research.
b) Write the significances in Simplex method.
c) Give the mathematical formulation of an assignment problem.
d) State the characteristics of transportation problem.
e) Write down various types of replacement models
f) Write short note on two person zero sums game.
g) What are the types of inventory?
h) What is the difference between PERT and CPM?
i) What is degeneracy in Transportation Problem?
j) Explain queuing system and steady state.

Section – B **(5 marks each)**

Q2. Compare between Assignment problem and Transportation problem

Q3. Find the Total cost using North-west corner method. Also find the optimal solution.

	W1	W2	W3	W4	Capacity
F1	95	105	80	15	12
F2	115	180	40	30	7
F3	195	180	95	70	5
Requirement	5	4	4	11	

Q4. Explain briefly deterministic and probabilistic dynamic programming.

Q5. Following data regarding processing times of some jobs on three machines I, II and III. The order of processing is I, II, III. Determine the sequence that minimizes the total

elapsed time required to complete the jobs. Also evaluate I and the idle time of II and III.

Job	A	B	C	D	E	F	G
I	3	8	7	4	9	8	7
II	4	3	2	5	1	4	3
III	6	7	5	11	5	6	12

Q6. Write the assumptions made in game theory.

Section – C **(10 marks each)**

Q7. What do you mean by LPP? Solve the following LPP

Maximize $Z = 2x_1+4x_2$

Subject to the constraints

$2x_1+ x_2\leq 18$; $3x_1+ 2x_2 \geq 30$; $x_1+2x_2=26$; x1, $x_2\geq 0$

Q8. Apply Dynamic programming to

Max $Z= 2x_1+3x_2$

subject to $x_1+2x_2 \leq 4$ $2x_1+x_2 \leq 3$ and $x_1, x_2\geq 0$

Q9. Determine the early start and late start in respect of all node points and identify critical path for the following network

