MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
MBA II Year I Semester (R18) Supplementary End Semester Examinations– FEB 2022
OPERATION RESEARCH

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either Part A or Part B only. Q.no 6 which is a case study is compulsory.

Q.1(A)   What is Operation Research? Explain features and role of Operation Research in   10 M
Decision Making.

OR

Q.1(B)   Solve the L.P.P. by Simplex method: $Max.Z = 5x_1 + 3x_2$ 10 M
Subject to $x_1 + x_2 \leq 2$, $5x_1 + 2x_2 \leq 10$, $3x_1 + 8x_2 \leq 12$, $x_1, x_2 \geq 0$

Q.2(A)   Determine the optimum transportation cost for the following Transportation   10 M
problem:

	D1	D2	D3	D4	Availability
P1	1	2	1	4	30
P2	3	3	2	1	50
P3	4	2	5	9	20
Requirement	20	40	30	10	

OR

Q.2(B)   Consider the problem of assignment five jobs to five persons. The assignment costs   10 M
are given below. Determine the optimal assignment schedule:

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array} \begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \\ \begin{bmatrix} 8 & 4 & 2 & 6 & 1 \\ 0 & 9 & 5 & 5 & 4 \\ 3 & 8 & 9 & 2 & 6 \\ 4 & 3 & 1 & 0 & 3 \\ 9 & 5 & 8 & 9 & 5 \end{bmatrix} \end{array}$$

Q.3(A)   Solve the following game by using dominance property: 10 M

$$\begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array} \begin{array}{cccc} A & B & C & D \\ \begin{bmatrix} 3 & 2 & 4 & 0 \\ 3 & 4 & 2 & 4 \\ 4 & 2 & 4 & 0 \\ 0 & 4 & 0 & 8 \end{bmatrix} \end{array}$$

OR

Q.3(B)   Explain: 10 M
i) Pure Strategies   ii) Mixed Strategies   iii) Two Person, Zero Sum   iv) Payoff
Matrix

Q.4(A) What is replacement problem? Describe some important replacement situations. What are the types of replacement decisions?   10 M

OR

Q.4(B) A confectioner sells confectionery items. Past data of demand per week in '00 kgs with frequency are   10 M

Demand	0	5	10	15	20	25
Frequency	2	11	8	21	5	3

Generate the demand for next 15 weeks by using the following random numbers:
35, 52, 90, 13, 23, 73, 34, 57, 35, 83, 94, 56, 67, 66, 60.
Also find out the average demand per week.

Q.5(A) ABC company has one hob regrinding machine. The hobs needing grinding are sent from company's tool crib to this machine which is operated one shift per day of 8 hours duration. It takes on the average half an hour to regrind a hob. The arrival of hobs is random with an average of 8 hobs per shift.   10 M
1. Calculate the present utilization of hob regrinding machine.
2. What is average time for the hob to be in the regrinding section?
3. The management is prepared to recruit another grinding operator when the utilization of the machine increases to 80%. What should the arrival rate of hobs then be?

OR

Q.5(B) Write short notes of the following   10 M
        a) Critical Path Method and   b) PERT

Q.6   **CASE STUDY**
        The following table gives the activities of construction project and duration: 10 M

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration (days)	20	25	10	12	6	10

Draw the network for the project. Find the
        a.   Critical path and project duration.
        b.   Total Float, Free float and independent float for each activity

END