MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
MBA II Year I Semester (R14) Supplementary End Semester Examinations – Dec 2017
OPERATIONS RESEARCH

Time: 3Hrs   Max Marks: 50

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)   Discuss the scope of operations research.   10 M

OR

Q.1(B)   Solve the following L.P.P. by two-phase Simplex method: 10M
$$Max.Z = 2x_1 + x_2 \quad \text{Subject to} \quad x_1 + x_2 \geq 2, \ x_1 + x_2 \leq 4, \ x_1, x_2 \geq 0$$

Q.2(A)   Determine an optimal solution to the following transportation problem: 10M

	D1	D2	D3	D4	Availability
A	7	3	8	6	60
B	4	2	5	10	100
C	2	6	5	1	40
Requirement	20	50	50	80	

OR

Q.2(B)   Five different jobs can be done on five different machines. The cost between jobs   10M
and machines are as follows

	M1	M2	M3	M4	M5
J1	11	17	8	16	20
J2	9	7	12	6	15
J3	13	16	15	12	16
J4	21	24	17	28	26
J5	14	10	12	11	13

How should the jobs be assigned to the various machines so that the total cost is
minimized?

Q.3(A)   There are seven jobs, each of which must go through the machine A and B in the   10 M
order AB. Processing times in hours are given below:

Job	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machine B	8	10	10	6	12	1	3

Determine a sequence of these jobs that will minimize the total elapsed time T and
calculate Idle times of Machine A & B.

OR

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

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

Q.4(A)   The cost of the machine is Rs. 6,100 and its scrap value is Rs. 100. The maintenance   10 M
          costs found from experience are as follows:

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs.)	100	250	400	600	900	1200	1600	2000

Determine the optimum replacement period.

OR

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

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

Consider the following sequence of random numbers:

    48, 78,19,51,56,77,15,14,68,8

Generate the demand for next 10 weeks. Also find out the average demand per
week.

Q.5(A)   Distinguish between CPM & PERT   10 M

OR

Q.5(B)   A tollgate is operated on a freeway where cars arrive according to Poisson   10 M
          distribution with mean frequency of 1.2 cars/min. The time of completing payment
          follows an exponential distribution with mean of 20 seconds. Find
          (i)   the idle time of counter
          (ii)   average no. of cars in the system
          (iii)   average no. of cars in the queue
          (iv)   average time that car spends in the system
          (v)   average time that car spends in the queue.

Q.6   **CASE STUDY**   10 M

A small project is composed of seven activities whose time estimates in weeks are
given below:

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
Optimistic time	1	1	2	1	2	2	3
Most likely time	1	4	2	1	5	5	6
Pessimistic time	7	7	8	1	14	8	15

Find the critical path. Estimate the probability that the project will be completed 18
weeks scheduled date.

END