

Reg. No. _____

Karunya University

(Karunya Institute of Technology and Sciences)

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – November/December - 2016

14ME2054 PRINCIPLES OF RESOURCE AND QUALITY MANAGEMENT

Time: 3 hours

Maximum Marks: 100

SET-A

1. Solve the following problem by simplex method

$$\text{Minimize } Z = x_1 - 3x_2 + 2x_3$$

Subjected to

$$3x_1 - x_2 + 2x_3 \leq 7$$

$$-2x_1 + 4x_2 \leq 12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

and x_1, x_2, x_3 all ≥ 0 .

(OR)

2. Solve the following transportation problem. Cell entries represent the unit of shipping.

	I	II	III	IV	V
A	12	4	9	5	9
B	8	1	6	6	7
C	1	12	4	7	7
D	10	15	6	9	1

The availability at the sources I, II, III, IV and V are 40, 20, 50, 30 and 40 respectively. The requirement at destinations A, B, C and D are 55, 45, 30 and 50 respectively. Find the optimal allocation using MODI method.

3. The jobs of a project with the respective time estimates are given in table

Jobs	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
t_o	3	2	6	2	5	3	3	1	4
t_m	6	5	12	5	11	6	9	4	19
t_p	15	14	30	8	17	15	27	7	28

- Draw the network.
- Find the variance of each job, length of project and variance of project.
- What is the probability that the jobs on the critical path will be completed by the due date 42 days.
- What is the probability that the jobs on the next most critical path will be completed by the due date of 42 days.

(OR)

4. There are seven jobs each of which goes through two machines in the order M_1 , M_2 . Find the sequence which minimizes the total elapsed time and also find idle time of machines. (Time units in hrs)

Jobs	Cutting Machine M_1	Finishing machine M_2
1	14	21
2	26	15
3	17	16
4	11	21
5	9	22
6	26	12
7	18	13
8	15	25

5. Car Arrivals at a petrol pump, having one petrol unit in Poisson with an average of 10 cars per hour. The service time is distributed exponentially with a mean of minutes.

Find:

- the average number of the cars in the system.
- Average waiting time in the queue.
- Average queue length
- The probability that the number of cars in the systems is 2.

(OR)

6. Solve the following game whose pay off matrix is given below by concept of dominance.

	Player A			
Player B	3	2	4	0
	2	4	2	4
	4	2	4	0
	0	4	0	8

7. Explain the 14 principles of Deming on TQM Implementation.

(OR)

- Explain in detail the seven tools of quality with examples.
- Describe the need and implementation of ISO 9000 quality system.