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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019
Course Code: ME372
Course Name: OPERATIONS RESEARCH

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any three questions. Each question carries 10 marks.

1 a) Differentiate between canonical form and standard form of a Linear Programming Problem with the mathematical representations. (3)

   b) Using Graphical method by selecting a suitable example explain the meaning of a Linear Programming Problem with no solution (4)

   c) Explain the concept of duality as applied to LPP (3)

2 Use 2 Phase method to solve (10)

   Maximize Z= 5x-4y+3z Subject to 2x+y-6z=20; 6x+5y+10z≤76; 8x-3y+6z≤50; x, y, z≥0

3 Solve the following transportation problem (Entries represent unit costs) (10)

	E	F	G	H	SUPPLY
A	1	5	3	3	**34**
B	3	3	1	2	**15**
C	0	2	2	3	**12**
D	2	7	2	4	**19**
DEMAND	**21**	**25**	**17**	**17**	

4 A student has to select one elective in each semester and the same should not be selected in different semesters. The expected grade in each subject in different semester varies as given below. The grade points are S=10, A=9, B=8, C=7, D=6, E=5, F=4. Solve the Assignment problem (10)

	Elective 1	Elective 2	Elective 3	Elective 4
Sem 1	F	E	D	C
Sem 2	E	E	C	C
Sem 3	C	D	C	A
Sem 4	B	A	S	S

PART B

Answer any three questions. Each question carries 10 marks

5   A machine operator has to perform three operations, turning, threading and knurling on a   (10)
    number of different jobs. The time required to perform these operations (in minutes) on
    each job is known. Find the order in which the jobs should be processed in order to
    minimize the total time. Find minimal elapsed time and idle time for each machine

Job	1	2	3	4	5	6
Turning	3	12	5	2	9	11
Threading	8	6	4	6	3	1
Knurling	13	14	9	12	8	13

6   The three time estimate (in days) for the activities of a project are as shown below   (10)

Job	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
a	3	2	6	2	5	3	1	3	4
m	6	5	12	5	11	6	4	9	19
b	15	14	30	8	17	15	7	27	28

    a) Draw the project network

    b) Find the Critical path

    c) Find the probability of project being completed in 31 days

7   Arrivals at a telephone booth are considered to be Poisson wth an average time of 10   (10)
    minutes between one arrival and next. The length of the phone call is assumed to be
    distributed exponentially with mean three minutes

 a) What is the probability that a person arriving at booth will have to wait

 b) What is the average length of the queue

 c) The telephone department will install a second booth when convinced that an arrival

would have to wait at least 3 minutes for the phone. By how much time must be the flow of arrivals be increased in order to justify for a second booth

8   a)   Give reasons for maintaining inventory in a firm (4)

   b)   Derive an expression for Economic Order Quantity and Total Minimum Cost for a Purchase model without Shortage (6)

PART C

Answer any four questions. Each question carries 10 marks.

9   a)   Explain any two approaches that can be used in decision making under risk (4)

   b)   Explain decision tree analysis using any example (6)

10 a)   Explain maximin and minimax principle applied to games (4)

   b)   Explain the terms   1) Saddle point   2) Value for a game (6)

11   Solve the game (10)

Player A	Player B		
	3	-2	4
	-1	4	2
	2	2	6

12 a)   What are the application areas of simulation? (3)

   b)   Determine the area of a circle with 5cm radius using Monte Carlo simulation. Carry out 10 iterations. (7)

13   Students arrive at a college library counter with inter-arrival time distributed as given in Table 1. The time for a transaction at the counter can be 3, 4, 5, 6, or 7 minutes with equal probability for all the values. Simulate the system for 10 transactions and compute the average waiting time for a student and average time a student spends in the system. (10)

Time between arrivals	4	5	6	7	8

(Minutes)					
Proability	0.1	0.3	0.3	0.2	0.1

14 a) Explain the steps involved in the development of a simulation model   (6)

    b) What are the categories of software used in system simulation?   (4)

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