



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A.DEGREE EXAMINATION – COMPUTER APPLICATIONS

THIRD SEMESTER – NOVEMBER 2018

16/17PCA3ES01– RESOURCE MANAGEMENT TECHNIQUES

Date: 31-10-2018

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART – A

Answer ALL the questions

10 x 2= 20

- 1) When does the simplex method of solving an LPP give an unbounded solution?
- 2) Name the phases of operations research.
- 3) Mention the methods for finding the initial basic feasible solution of a transportation problem.
- 4) What is the objective of assignment problem?
- 5) When does the game have a saddle point?
- 6) List the classification of replacement problems.
- 7) What is network scheduling?
- 8) List the conditions that has to be satisfied for an activity to lie on the critical path.
- 9) What do you mean by balking and renegeing?
- 10) Given $\rho = 0.6$, what is the probability that there are no customers in the system?

PART – B

Answer ALL the questions

5 x 8= 40

- 11) a) Solve the following LPP graphically

$$\text{Maximize } 30x + 40y$$

$$\text{Subject to } 3x_1 + 2x_2 \leq 60$$

$$3x_1 + 5x_2 \leq 80$$

$$5x_1 + 6x_2 \leq 110$$

$$x_1 \geq 0, x_2 \geq 0$$

(OR)

- b) Find the optimal solution for the following using simplex method:

$$\text{Maximize } 30x + 40y$$

$$\text{Subject to } 2x_1 + x_2 = 300$$

$$3x_1 + 4x_2 = 509$$

$$4x_1 + 7x_2 = 812$$

$$x_1 \geq 0, x_2 \geq 0$$

12) a) Solve the following transportation problem using UV method.

	D1	D2	D3	Supply
	300	360	425	600
	390	340	310	300
	255	295	275	1000
Demand	400	500	800	

(OR)

b) Solve the following assignment problem

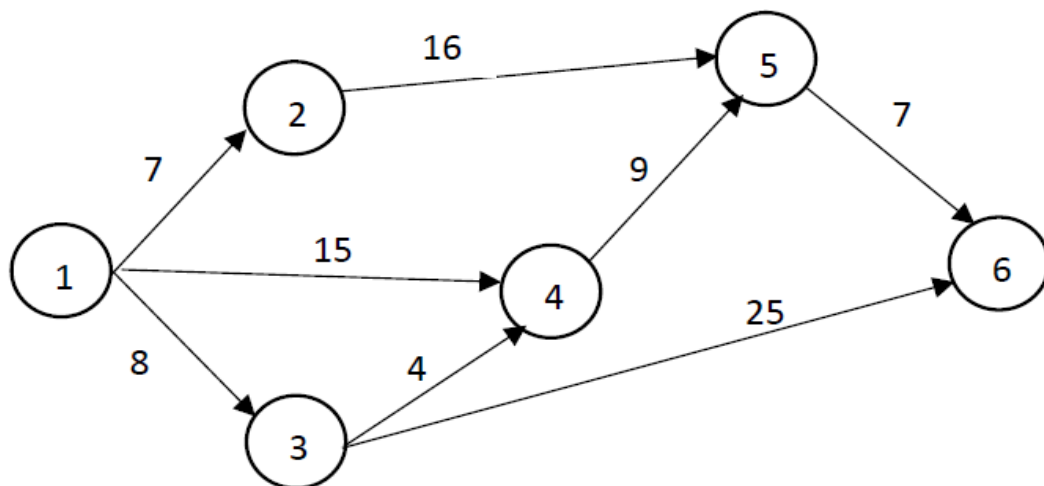
	P1	P2	P3	P4
J1	2	10	9	7
J2	15	4	14	8
J3	13	14	16	11
J4	4	15	13	9

13) a) Write the steps involved in Laplace and Hurwicz criterion

(OR)

b) A machine costs ₹ 500. Operation and maintenance costs are zero for the first year and increase by ₹ 100 every year. If money is worth 5% every year, determine the best age at which the machine should be replaced. The resale value of the machinery is negligibly small. What is the weighted average cost of owning and operating the machine?

14) a) Determine the shortest path of the following network:



(OR)

b) construct a network diagram for the project specified below

Event → Event	Activity	Predecessor Activity
1→2	A	-
1→3	B	-
1→4	C	-
2→5	D	A
3→6	E	B
4→6	F	C
5→6	G	D

15) a) Explain Queueing System and classification.

(OR)

b) A bank is considering to open a drive-in window for customer service. Management estimates that the customers will arrive for service at 15/hour. The teller whom they consider to employ can serve customers at the rate of 1 in every 3 minutes. Assuming Poisson arrival and exponential service time. Find

i) Utilization of teller ii) Average customers in the queue iii) probability of zero customers in the system. Iv) Idle time of the teller.

PART - C

Answer ANY TWO questions

2 x 20= 40

16) a) Solve the following LPP using Big M method (15)

Maximize

$$12x_1 + 15x_2 + 9x_3$$

Subject to:

$$8x_1 + 16x_2 + 12x_3 \leq 250$$

$$4x_1 + 8x_2 + 10x_3 \geq 80$$

$$7x_1 + 9x_2 + 8x_3 = 105$$

$$x_1, x_2, x_3 \geq 0$$

b) Describe the Hungarian method of solving an Assignment problem (5)

17) a) The marketing department of a food products company worked out their payoffs in terms of yearly net profit, for each of the strategies of 3 events. This is represented in the payoff matrix below. Select the strategy on the basis of the following: (10)

i) Laplace Criterion ii) Hurwicz Criterion and iii) Maximin Criterion

Strategies Nature of state	S1	S2	S3
N1	70000	30000	15000
N2	50000	45000	0
N3	30000	30000	30000

b) Solve the game with the following payoff matrix using theory of dominance. (10)

		Player B			
		<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
Player A	1	4	2	3	6
	2	3	4	7	5
	3	6	3	5	4

18) a) The following information is known about a project. (10)

Activity	Activity Time (days)	Immediate Predecessor(s)
A	7	--
B	2	A
C	4	A
D	4	B, C
E	4	D
F	3	E
G	5	E

- i) Draw the project network.
- ii) Identify the critical path and
- ii) Determine the project duration.

b) At a central warehouse, vehicles are at the rate of 24 per hour and the arrival rate follows poisson distribution. The unloadingtime of the vehicles follows exponential distribution and the unloading rate is 18 vehicles per hour. There are 4 unloadingcrews.

Find(i) P_0 and P_3 (ii) L_q , L_s , W_q and W_s . (10)

