LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – **COMPUTER APPLICATIONS**

FOURTH SEMESTER – NOVEMBER 2016

CA 4808 - RESOURCE MANAGEMENT TECHNIQUES

Date: 05-11-2016   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART A

Answer ALL Questions   **(10 X 2 = 20 Marks)**

1. What are slack and surplus variables?
2. Define the following: i. Feasible solution   ii. Optimal solution.
3. Give the steps of Row Minima Method for initial allocation in Transportation Problem.
4. State True or False

   i. In Transportation Problem, VAM is not as efficient as North – West Corner rule.
   ii. For a balanced transportation Problem, no. of rows need not be equal to no. of columns.
5. What do you mean by decision-making under conditions of risk?
6. In game theory, what is saddle point?
7. What is dummy activity?
8. Distinguish between PERT and CPM
9. What is queue behaviour?
10. In a bank, customers arrive every 10 minutes and they are served every 6 minutes. What is clerk's idle time?

PART B

Answer ALL Questions   **(5 X 8 = 40 Marks)**

11a. Solve graphically the following:

Minimize $z = 4x_1 - 3x_2$

Subject to $x_1 - x_2$ 2

$3x_1 + 4x_2$ 3

$7x_1 + 5x_2$ 35

x_1, x_2 0

(or)

11b. Solve graphically the following

Minimize $Z = 3x_1 + 2x_2$

Subject to $5x_1 + x_2$ 10

$x_1 + x_2$ 6

$x_1 + 4x_2$ 12

x_1, x_2 0

12a. A department has 4 employees with 4 jobs to be performed. The cost (in rupees) each employee will charge per hour to perform each job is given in the following matrix. How should the jobs be allocated to the employees so as to minimize the total cost.

Employee Job	A	B	C	D
1	30	60	30	70
2	50	40	65	70
3	50	70	80	75
4	40	80	55	70

(or)

12b. Describe MODI method in Transportation Problem.

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13a. Define the terms: (a) Laplace criterion (b) Hurwicz criterion

A retailer purchases newspaper everyday and sells on the same day. Any unsold item will be a loss for him. The daily demand for newspaper is in the range of 15, 16, 17, and 18   with respective probabilities 0.1, 0.2, 0.4, and 0.3 . How many papers should the retailer order to maximize the profit? The payoff matrix is given below:

Action Event	Probability	15	16	17	18
15	0.1	225	200	175	150
16	0.2	225	240	215	190
17	0.4	225	240	255	230
18	0.3	225	240	255	270

(or)

13b. Solve the game whose payoff matrix is given below:

Player B Player A	B1	B2	B3	B4
A1	3	2	4	0
A2	3	4	2	4
A3	4	2	4	0
A4	0	4	0	8

.   14a. Given the following information

Activity	0-1	1-2	1-3	2-4	2-5	3-4	4-5
Duration (days)	2	12	15	7	4	3	10

i.   Draw the network diagram
ii.   Identify critical path and find the total project duration.
iii.   Determine total, free, and independent floats.

(or)

14b. A project consists of 7 activities. The time estimate are in days.

Activity	A	B	C	D	E	F	G
Predecessor	---	A	A	C	B	D,E	F
T_O	1	2	3	4	3	2	4
T_M	4	5	3	10	6	5	4
T_P	7	14	3	19	15	14	4

i.   Draw the PERT network diagram and find the critical path.
ii.   Find the expected length of the critical path and its variance.

.   15a. A television repairman finds that the time spent on his jobs has an exponential

Distribution with a mean of 30 minutes. If he repairs sets in the first cum first order

and if the arrival of sets follows a Poisson distribution with an average rate of 10 per

8-hour day. What is the repairman's expected idle time each day? How many jobs are

waiting in the shop? Also average waiting time of each job in the queue and in the shop.

(or)

15b. Cars arrive at a petrol pump with exponential inter-arrival times having mean ½ minute. The attendant

takes an average of 1/5 minute per car to supply petrol, the service time being exponentially

distributed. Determine

i. the average number of cars waiting to be served.

ii. the average number of cars in the queue and

iii. the proportion of time for which the pump attendant is idle.

PART C

Answer any TWO Questions (2 X 20 = 20 Marks)

16a. Solve the following L.P.P by simplex method

Maximize $Z = 4x_1 - 3x_2$

Subject to $5x_1 + 3x_2$ 15

$x_1 + 3x_2$ 6

$x_1 - x_2$ 2

x_1, x_2 0

16b. Write the following algorithms for Transportation Problem:

   i.   Vogel's Approximation Method   ii. Least Cost Method.

17a. ABC Ice Cream company has a distribution depot in Choolaimedu for distributing ice cream in South Chennai. There are four vendors located in places A, B, C and D of South Chennai who have to be supplied ice cream every day. The following matrix displays the distances (in kms.) between the deport and the four places.

What route should the company van follow so that the total distance travelled is minimum?

FROM TO	Deport	A	B	C	D
Deport	-	3.5	3	4	2
A	3.5	-	4	2.5	3
B	3	4	-	4.5	3.5
C	4	2.5	4.5	-	4
D	2	3	3.5	4	-

17b. Describe Hungarian method of solving an Assignment Problem.

18a. The marketing department of a food products company worked out the payoffs in terms of yearly net profits for each of the strategies of three events (expected sales). This is represented in the following table:

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

Select the strategy on the basis of the following:

i. Maxmin criteria ii. Laplace criteria iii. Hurwicz criteria iv. Savage criteria.

18 b. In a tool crib, manned by a single assistant, operators arrive at the tool crib at the rate of 10 per hour. Each operator needs 3 minutes on an average to be served. Find out the loss of production due to time lost in waiting for an operator in a shift of 8 hours if the rate of production is 100 per shift.

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