LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FOURTH SEMESTER – NOVEMBER 2016

CA 4203 - RESOURCE MANAGEMENT TECHNIQUES

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

PART-A

Answer ALL questions   10 X 2=20

1. What is Operations research?
2. What is Pivotal element?
3. Define an assignment problem.
4. List out the methods of solving Transportation problem
5. How to calculate the idle time in sequencing problem?
6. Mention the purpose of Network problem
7. Define dummy activity and activity.
8. Write the formula to calculate EOQ with shortage.
9. Define Lead time.
10. Write the type of situation for replacement?

PART-B

Answer ALL questions   5 X 8=40

11 a) The company manufactures three items A, B and C these items are processed on three machines m_1, m_2, and m_3 . The time required for each product in each machine is given below. Also the total time of availability of each machine is given.

MACHINEA	TIME A	PER B	UNIT(HOURS) C	AVAILABILITY OF THE MACHINE HR/DAY
M_1	1	1.5	2	18
M_2	2	1	1	20
M_3	1	2	2	16

Formulate this problem as an LP model to maximize availability of the machine.

(OR)

11 b) Solve the following L.P.P graphically.

Maximize $Z=40x_1 + 100x_2$
subject to the constraints $2x_1 +x_2$ 500
                                     $2x_1 +x_2$ 1000
                                            X_1, x_2 0

12 a) Find an initial basic feasible solution to the following transportation problem

using north-west corner rule and Least cost method:

	D_1	D_2	D_3	supply
0_1	2	7	4	5
0_2	3	3	1	8
0_3	5	4	7	7
0_4	1	6	2	14
DEMAND	7	9	18	

(OR)

12 b) A marketing manager has 5 salesmen and 5 sales districts. Considering the capabilities of the salesman and the nature of districts, the marketing manager estimates that sales per month (in hundred rupees) for each salesman in each district would be as follows:

Salesman	Sales District				
	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

What is the maximum sale that may be expected if an optimum assignment is made?

13 a Find the sequence that minimizes the total elapsed time(in Hrs) required to complete the following tasks on two machines

Jobs	J1	J2	J3	J4	J5	J6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

(OR)

13 b) Construct the network diagram.

A<D; A<E; B<F; D<F; C<G; C<H; F<I; G<I

Task : A   B   C   D   E   F   G   H   I

Time : 8   10   8   10   16   17   18   14   9

(days)

14 a A Manufacture has to supply 12000 units of his product/year. Shortages are not

allowed the inventory holding costRs.0.20/unit/month. The set up cost/run is

Rs.350. Determine the following
(i) The optimum lot size q_0
(ii) Optimum scheduling period t_0
(iii) Minimum total variable yearly cost

(OR)

14 b) The daily demand for a commodities 100 units Every time an order is places a

fixed cost of Rs.100 is incurred. The daily holding cost/unit inventory is

Rs.0.02.If the lead-time is 12 days, determine the E.O.Q and reorder point.

15a) A truck is priced at Rs. 60,000and running cost are estimated as Rs. 6000 for

each of the first four year increasing by Rs.2000/year in the fifth and subsequent

year. If the money is worth 10%/year when should truck be replaced .Assume

that resale value is zero.

(OR)

15 b) A fleet owner finds from his past records that the costs per year of running a vehicle whose

purchase price is Rs.50,000 are as under:

year	1	2	3	4	5	6	7
Running cost(Rs)	5000	6000	7000	9000	12500	16000	18000
Resale value(Rs)	30000	15000	7500	3750	2000	2000	2000

Thereafter, running cost increases by Rs.2,000 but resale value remains constant at

Rs.2,000.At what age is the replacement due?

PART C

16 a)Use simplex method to solve the following L.P.P

$$\text{Maximize } Z = 2x_1 + 4x_2 + x_3$$

subject to the constraints

$$X_1 + 3x_2 \quad 4$$
$$2X_1 + x_2 \quad 3$$
$$x_2 + 4x_3 \quad 3$$
$$X_1, x_2, x_3 \quad 0$$

b) Solve the transportation problem

	D_1	D_2	D_3	SUPPLY
A	2	7	4	5
B	3	3	1	8
C	5	4	7	7
D	1	6	2	14
DEMAND	7	9	18	

17 a)We have six jobs, each of which must go through machines A,B,C in order ABC

Processing time (hrs) are given in the table

Job	:	1	2	3	4	5	6
Machine A	:	8	3	7	2	5	1
Machine B	:	3	4	5	2	1	6
Machine C	:	8	7	6	9	10	9

Determine the sequence of jobs that will minimize the elapsed time.

b) The project has the following time schedules.

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

    i)   Draw the Project Network

    ii)   Find the critical path.

18 a)A contractor has to supply 10,000 bearings /day to an automobile manufactures. He can produce 25000

bearings/day. The holding cost is Rs 2/year and the setup cost is Rs.180. How frequently should the

production run be made?

b)) Machine A cost Rs.9,000.Annual operating costs are Rs.200 for the first year ,and then increase by
Rs. 2,000 every year. Determine the best age at which to replace the machine. If the optimum policy is
followed, what will be the average yearly cost of owning and operating the machine?
Machine B costs Rs.10,000. Annual operating costs are Rs.400 for the first year, and then increase
by Rs.800 every year. You now have a machine of type A which is one year old. Should you replace it
with B if so when?

****

3