

Reg. No. :

Code No. : 21252

Sub. Code : JACA 41

B.C.A. (CBCS) DEGREE EXAMINATION, APRIL 2018.

Fourth Semester

Computer Application — Allied

RESOURCE MANAGEMENT TECHNIQUES

(For those who joined in July 2016 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. While solving a LP model graphically, the area bounded by the constraints is called
 - (a) feasible region
 - (b) infeasible region
 - (c) unbounded solution
 - (d) none of the above

20. (a) Solve the following game graphically.

Player B

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

Or

- (b) Anil company buys its annual requirement of 36,000 units in six installments. Each unit cost Rs. 1 and ordering cost is Rs. 25. The Inventory carrying cost is estimated at 20% of unit value. Find the total annual cost of the existing inventory policy. How much money can be saved by using EOQ?



2. Dual of the dual is _____
- (a) primal (b) dual
(c) alternative (d) none of the above
3. _____ is one of the fundamental combinatorial optimization problems.
- (a) Assignment problem
(b) Transportation problem
(c) Optimization problem
(d) None
4. According to transportation problem number of basic cells will be exactly
- (a) $m+n-0$ (b) $n+m-1$
(c) $m+n-1$ (d) none of the above
5. A set of arcs joining two distinct nodes passing through other nodes in the network is called
- (a) path (b) tree
(c) node (d) cycle
6. A set of arcs whose removal from the network disrupts flow between the source and sink node is called
- (a) node (b) cut
(c) cycle (d) none

7. The critical path
- (a) is any path that goes from the starting node to the completion node
(b) is the combination of all paths
(c) is the shortest path
(d) is the longest path
8. The _____ time is the shortest possible time in which the activity can be finished
- (a) optimistic (b) most likely
(c) pessimistic (d) none of these
9. Two person zero-sum games are also called _____ games.
- (a) square (b) cubical
(c) rectangular (d) zero
10. What can be defined as a useful idle resource which has economic value eg. Raw materials, spare parts, finished items, etc. ?
- (a) Inventory control
(b) Inventory
(c) Inventory planning
(d) None



PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

11. (a) A dealer wishes to purchase a number of fans and sewing machines. He has only Rs. 5,760 to invest and has at most for 20 items. A fan costs him Rs 360 and a sewing Rs 240. His expectation is that he can sell a fan at a profit of Rs 22 and a sewing machine at a profit of Rs. 18. Assuming that he can sell all the items that he can buy, how should he invest this money in order to maximize his profit? Formulate this problem as a Linear Programming problem and then use graphical method to solve it.

Or

- (b) Explain the procedure for simplex method.
12. (a) Solve the following transportation problem by Least cost entry method.

	S ₁	S ₂	S ₃	Availability
A	5	4	3	6
B	4	7	6	8
C	2	5	8	12
D	8	6	7	4
Demand	8	10	12	30

Or

Page 4 Code No. : 21252

- (b) Find the optimal solution for the assignment problem with the following cost matrix.

		Area			
		W	X	Y	Z
Salesman	A	11	17	8	16
	B	9	7	12	6
	C	13	16	15	12
	D	14	10	12	11

13. (a) Explain the Rules for constructing a network.

Or

- (b) Write a Procedure for determining on Sequencing of 'n' jobs on 'm' machines.
14. (a) A project has fourteen activities A through M. The relationships which obtain among these activities are given below. Construct the network and number them.

A is the first operation.

B and C can be performed in parallel and are immediate successor to A.

D, E, F follow B.

G follow E.

Page 5 Code No. : 21252



H follows D, but it cannot start until E is completed.

I and J succeed G.

F and J precede K.

M succeeds L and K.

The last operation N succeeds M and C.

Or

- (b) The following table gives the activities in a construction project and other relevant information.

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration (days)	20	25	10	12	6	10

- (i) Draw the network for the project.
- (ii) Find the critical path and the project duration.
- (iii) Find the total float for each activity.

15. (a) Solve the following using graphical method.

$$\begin{matrix} & B_1 & B_2 & B_3 & B_4 & B_5 \\ A_1 & \left(\begin{array}{ccccc} 2 & -2 & 3 & 7 & 6 \end{array} \right) \\ A_2 & \left(\begin{array}{ccccc} 6 & 5 & 1 & 4 & 0 \end{array} \right) \end{matrix}$$

Or

- (b) Discuss the various costs of inventory models?

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

16. (a) Solve the following LPP using Simplex method.

$$\text{Maximize } z = 45x_1 + 80x_2$$

Subject to

$$5x_1 + 20x_2 \leq 400$$

$$10x_1 + 15x_2 \leq 450$$

$$x_1, x_2 \geq 0.$$

Or

- (b) Write down the dual of

$$\text{Maximize } z = 7x_1 + 10x_2$$

Subject to

$$10x_1 + 13x_2 \geq 50$$

$$7x_1 + 9x_2 \leq 40$$

$$3x_1 + 5x_2 = 20$$

$$x_1, x_2 \geq 0.$$



17. (a) Solve the following transportation problem.

	A	B	C	a_i
	10	9	8	8
	10	7	10	7
	11	9	7	9
	12	14	10	4
b_j	10	10	8	

Or

- (b) Give a mathematical formulation of assignment problem.
18. (a) Solve the traveling salesman problem given by the following data

$$C_{12} = 20, C_{13} = 4, C_{14} = 10, C_{23} = 5, C_{34} = 6,$$

$C_{25} = 10, C_{45} = 20$, where $C_{ij} = C_{ji}$ and there is no route between cities i and j if a value for C_{ij} is not shown above.

Or

- (b) Discuss the types of networks.

19. (a) Consider the table having 14 activities.

Activity	A	B	C	D	E	F	G
Immediate predecessors(s)	-	-	-	B	A	A	B
Duration	2	6	4	3	6	8	3
Activity	H	I	J	K	L	M	N
Immediate predecessors(s)	C, D	C, D	E	F, G, H	F, G, H	I	J, K
Duration	7	2	5	4	3	13	7

- (i) Draw the network
(ii) Find the critical path
(iii) Find the total float, free float.

Or

- (b) A network is given

Activity	A	B	C	D	E	F	G
Preceding	-	-	A	A	A	C	C
Duration	9	3	8	2	3	2	6
Activity	H	J	K	L	M	N	
Preceding	C	B, D	F, J	E, H, G, K	E, H	L, M	
Duration	1	4	1	2	3	4	

- (i) Draw the network.
(ii) Find the critical path.
(iii) Find the total float of critical path.
(iv) Find the total float of non-critical path.

