Determine :

(i) Average length of waiting time

(ii) Average time a machine spends in the system

(iii) Percentage idle time of department store room (Attendant).

———————

Reg. No. : .....

Code No. : 30950 **Sub. Code : GACA 41**

B.C.A. (CBCS) DEGREE EXAMINATION, APRIL 2014.

Fourth Semester

Computer Application — Allied

RESOURCE MANAGEMENT TECHNIQUES

(For those who joined in July 2012 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Such models can answer 'what if' type of questions, (ie) they can make predictions regarding certain events

(a) Descriptive model (b) Predictive model

(c) Prescriptive model (d) None of these

2. One of the non-basic variables (which are zero now) at one iteration becomes basic (non-zero) at the following iteration and is called an ———— variable.

(a) Entering (b) Departing

(c) Non-basic (d) All of these

3. A quantitative measure of satisfaction a person gets at the end of each play is called a ————.

(a) Payoff (b) Activity

(c) Maximin (d) None of these

4. The ———— strategy is a decision rule always to select a particular course of action.

(a) Pure (b) Mixed

(c) Payoff (d) None of these

5. All these coasts require careful study and generally amounts to 1% to 2% of the invested capital.

(a) Production costs

(b) Purchase costs

(c) Taxes and insurance costs

(d) Shortage cost

6. ———— inventories are needed for meeting out the demands during the decoupling period of manufacturing or purchasing.

(a) Cycle (b) Fluctuation

(c) Decoupling (d) Anticipation

7. When more than one activity leaves an event, such event is known as ———— event.

(a) Merge (b) Burst

(c) Merge and Burst (d) None of these

8. The activities with zero total float are known as ————.

(a) Critical event (b) Critical path

(c) Critical activities (d) Event slack

9. A system is said to be in ———— state when its operating characteristics are dependent on time.

(a) Transient (b) Steady

(c) Waiting (d) Blocked

10. If the arrivals are completely random, then the probability distribution of number of arrivals in a fixed time-interval follows a ———— distribution.

(a) Poisson (b) Erlang

(c) Gamma (d) All of these

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b) answer should not exceed 250 words.

11. (a) Explain the role of operations research in decision making.

Or

(b) Explain the general form of LPP.

12. (a) Write about mixed strategies.

Or

(b) Explain with examples of failure mechanism of items.

13. (a) Explain the various types of costs involved in inventory problems.

Or

(b) Explain the limitations of EOQ formula.

14. (a) Explain the framework of PERT and CPM.

Or

(b) Write about the dummy activities and events.

15. (a) Explain the queuing system, transient and steady states.

Or

(b) Discuss model 1 (m/m/1) : (FCFS) : Birth and death model.

PART C — (5 × 8 = 40 marks)

Answer ALL the questions, choosing either (a) or (b) answer should not exceed 600 words.

16. (a) Solve the following LP problem using simplex method.

Max $z = 7x_1 + 5x_2$

Subject to

$-x_1 - 2x_2 \geq -6$

$4x_1 + 3x_2 \leq 12$

$x_1, x_2 \geq 0$

Or

(b) Explain the phases in solving operations research problems.

17. (a) For the game with payoff matrix

Player B

$$\text{Player A} \begin{pmatrix} -1 & 2 & -2 \\ 6 & 4 & -6 \end{pmatrix}$$

Determine the best strategies for players A and B and also the values of the game for them. Is game :

(i) Fair

(ii) Strictly determinable.

Or

(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
Maintenance Cost (Rs.) :	5,000	6,000	7,000	9,000	21,500	16,000	18,000
Resale value (Rs.) :	30,000	15,000	7,500	3,750	2,000	2,000	2,000

Thereafter, running cost increases by Rs. 2,000 but resale value remains constant at Rs. 2,000. At what age is a replacement due?

18. (a) Discuss EOQ model.

Or

(b) A manufacturer produces and stocks three items which are produced in lots. The demand rate of each item may be considered constant and deterministic. Back orders are not permitted. The inventory holding cost is 30% and the policy is not to have an average investment in inventory above Rs. 25,000. Given the following additional data, find the optimal lot size for each item :

Item	1	2	3
Demand rate (unit/year)	10,000	5,000	15,000
Cost/unit (Rs.)	50	100	75
Setup cost unit (Rs.)	100	150	125

19. (a) Draw the network diagram for the following activities and find critical path and total float of activities.

Job	Job time (days)	Predecessors
A	13	–
B	8	A
C	10	B
D	9	C

Job	Job time (days)	Predecessors
E	11	B
F	10	E
G	8	D, F
H	6	E
I	7	H
J	14	G, I
K	18	J

Or

(b) Tasks A, B, C,... H, I constitute a project. The notation $x<y$ means that the task x must be finished before y can begin with this notation.

$A < D,\ A < E,\ B < F,\ D < F, C < G,\ C < H,\ F < I, G < I.$

Draw a graph to represent the sequence of tasks and find to minimum time of completion of the project when the time (in days) of completion of each tasks is as follows :

Tasks :	A	B	C	D	E	F	G	H	I
Time :	8	10	8	10	16	17	18	14	9

20. (a) We have 5 machines, each of which when running, suffer breakdown at an average rate of 2 per hour. There are 2 service men and only one man can work on a machine at a time. If n machine are out of order when $n > 2$ then $(n-2)$ of them wait until service man in free. Once a service man starts work on a machine, the time to compete the repair has an exponential distribution with mean 5 minutes. Find the distribution of the number of machine out of action at a given time. Find also the average time an act of action machine has to spend waiting for the repairs to start.

Or

(b) Weavers in a textile mill arrive at a department store room to obtain spare parts needed for keeping the looms running. The store is manned by one attendant. The average arrival rate of weavers per hour is 10 and service rate per hour is 12. Both arrival and service rate follow Poisson process.