Reg. No. :..

Code No. : 6521   Sub. Code : ZMAM 14

M.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2021

First Semester

Mathematics – Core

OPERATIONS RESEARCH

(For those who joined in July 2021 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. If a transportation model is unbalanced, then ____
   (a) It cannot be solved
   (b) It can't be balanced
   (c) We can add a dummy source/destination
   (d) None

2. Using North West Corner Method
   (a) we can obtain a starting basic solutions
   (b) can be used to solve a TP Model completely
   (c) is a failure method
   (d) is a cumbersome procedure

3. Equipment replacement is an example of a
   (a) shortest route model
   (b) graphical model
   (c) simplex model
   (d) an assignment model

4. Which of the following is used to solve acyclic networks
   (a) north west corner rule
   (b) least cost method
   (c) Dijkstra's algorithm
   (d) simplex algorithm

5. EOQ is refers to
   (a) lead time   (b) order quantity
   (c) price break   (d) static model

6. CPM is used to find
   (a) optimum dination of the project
   (b) critical activities
   (c) project evaluation
   (d) review techniques

7. The extra inventory maintained in addition to the required inventory corresponding to normal consumption rates is called
   (a) abundant stock
   (b) stock for discount
   (c) buffer stock
   (d) surplus stock

8. Time horizon
   (a) is always one year
   (b) five years
   (c) period over which the inventory will be controlled
   (d) period during which inventory become zero

9. When service facility includes more than one server and all servers offer the same service, the facility is said to have.
   (a) random series   (b) parallel series
   (c) servers in series   (d) FCFS

10. Jockey renege are linked with
   (a) Queuesize
   (b) calling source
   (c) human behavior in Queues
   (d) none

PART B — (5 × 5 = 25 marks)

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

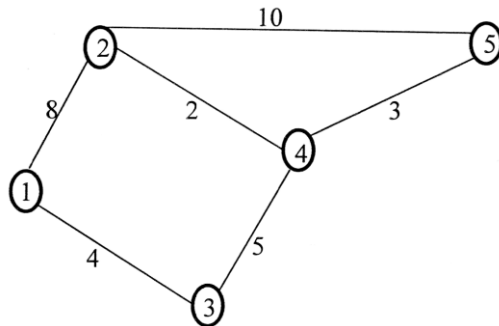11. (a) Explain transportation algorithm with an example.

Or

(b) Describe an assignment model

12. (a) Explain critical path method

Or

(b) Define optimistic time, most likely time and pessimistic time.

13. (a) Find the critical activities of the project

Or

(b) Explain PERT in detail

14. (a) With usual notations, consider the inventory model with $K = Rs.10$, $h = Rs.1$, $\beta = 5$ units, $c_1 = 2$, $c_2 = 2$, $q = 15$ units. Find the associated total cost per unit time.

Or

(b) Let $K = \$ 100$, $D = 1000$ units, $p = \$ 10$, $h = \$ 2$ and assume that the demand during the lead time follows a uniform distribution over the range 0 to 100. Find the optimum reorder level.

15. (a) Explain the roles of the Poisson and exponential distributions in Queueing Theory

Or

(b) Describe the various service disciplines in Queueing theory

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
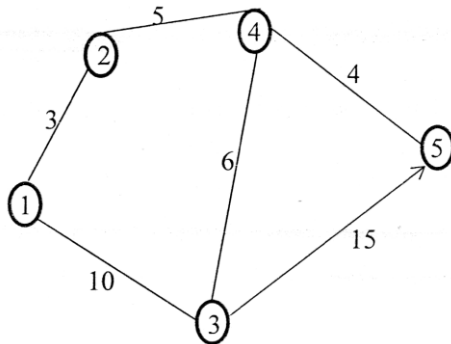
16. (a) Solve the Assignment model.

		Job			
		1	2	3	4
	1	1	4	6	3
Worker	2	9	7	10	9
	3	4	5	11	7
	4	8	7	8	5

Or

(b) Find a starting solutions to the Transportation model by any two methods.

			Supply
10	4	2	8
2	3	4	5
1	2	0	6
Demand 7	6	6	

17. (a) For the following network find the shortest routes between every two nodes. Arc (3,5) is directional. The distances are given in Kms

Or

(b) How will you formulate a shortest route problem as linear programing problem?

18. (a) Explain Cutting plain algorithm.

Or

(b) Explain Vogel's approximation method

19. (a) For the single period model with instantaneous demand and no setup cost obtain single critical number policy.

Or

(b) Find the economic order quantity formula for a single item static inventory model with instantaneous supply and shortages allowed and uniform demand.

20. (a) Explain pure birth model.

                    Or

    (b) Cars arrive at a toll gate according to Poisson distribution with mean 90 per hour Average time for passing through the gate is 38 seconds. Drivers complain of the long waiting time. Authorities are willing to decrease through passing time through the gate to 30 seconds by introducing new automatic devices. This can be justified only if under the old system the number of waiting can exceeds 5. In addition to percentage of the gate's idle time under the new system should not exceeds 10% can the new device be justified?

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