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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2024-25 ONLY)

SUBJECT CODE 24 UCT 2A1

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY – 2025

B.Sc. – COMPUTER TECHNOLOGY **MAXIMUM MARKS: 75**

II SEMESTER **TIME : 3 HOURS**

PART – III

MATHEMATICS -II – OPERATIONS RESEARCH

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. What is the objective of Linear Programming?
   a) Minimize or maximize a function b) Solve quadratic equations
   c) Optimize inventory levels d) None of the above

2. The Vogel's Approximation Method (VAM) prioritizes allocations based on……
   a) Lowest cost cell b) Maximum cost cell
   c) Penalty cost differences d) Random allocation

3. In deterministic inventory models, the demand rate is…….
   a) Variable b) Random c) Known and constant d) None of the above

4. The objective of sequencing problems is to…….
   a) Minimize total processing time or idle time b) Maximize machine utilization
   c) Minimize inventory levels d) None of the above

5 PERT calculations are typically used for……
   a) Deterministic projects b) Projects with uncertain activity times
   c) Sequencing problems d) Linear programming problems

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. What is the definition of a general Linear Programming Problem (LPP)?

7. What is the North West Corner Method used for in transportation problems?

8. What is Economic Order Quantity (EOQ)?

9. What is the objective of solving sequencing problems with nnn jobs and 222 machines?

10. Write the basic components of a network.

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Define the general Linear Programming Problem.

(OR)

b) Explain the steps in the Graphical Solution Method for LPP.

(CONTD …. 2)

12. a) Explain the North-West Corner Method in the transportation problem.

(OR)

b) State the steps in Vogel's Approximation Method.

13. a) What is Economic Order Quantity.

(OR)

b) Solve an EOQ problem where the rate of the demand is 1000, ordering cost is 50, and the inventory holding cost is 2.

14. a) Explain the steps to solve a 2-machine nnn-job sequencing problem.

(OR)

b) State the Johnson's rule in sequencing problem.

15. a) Write the Fulkerson's rules of network construction.

(OR)

b) State the differences between CPM and PERT.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4/K5)

16. a) Solve the following LPP using the graphical method:

Maximize $Z=3x+2y$

Subject to:
$x+y\leq 4$; $x+2y\leq 6$; and $x, y\geq 0$

(OR)

b) Solve the following LPP using the simplex method:

Maximize $Z=4x+3y$

Subject to:
$x + 2y \leq 8$; $3x + 2y \leq 12$; and $x, y \geq 0$

17. a) Solve the transportation problem using Vogel's Approximation Method.

Supply/ Demand	I	II	III	Supply
A	2	3	1	50
B	5	4	2	40
C	5	6	4	30
Demand	20	30	70	

(OR)

b) Solve the following assignment problem.

(CONTD …. 3)

Job/Workers	P	Q	R	S
A	9	2	78	8
B	5	4	3	7
C	5	8	1	8
D	7	6	9	4

18. a) A company has an annual demand of 10,000 units for a product. The cost of placing an order is Rs 200, and the holding cost per unit per year is Rs 5.Find economic order quantity, The total number of orders per year and total annual cost.

(OR)

b) The annual demand for a product is 6,000 units. Ordering cost is Rs.250 per order, and the holding cost is Rs.10 per unit per year. If the EOQ is calculated as 300 units, determine Total ordering cost per year, total holding cost per year and total cost of inventory.

19. a) Solve the sequencing problem using Johnson's Rule for minimizing the total time taken to process jobs on two machines.

Jobs	A	B	C	D	E	F	G	H
M1	6	3	4	5	6	7	9	5
M2	4	5	2	6	7	6	8	4

Determine the optimal sequence and the total time required.

(OR)

b) Five jobs must be processed through three machines A, B, and C in the given order. The processing times are as follows

Jobs	A	B	C	D	E
M1	3	8	4	2	5
M2	6	4	5	3	7
M3	7	5	6	4	8

Find the optimal sequence to minimize total processing time.

(CONTD …. 4)

20. a) Draw the network diagram for the following activities and calculate the critical path:

Activity	Predecessor	Duration
A	-	3
B	A	2
C	A	4
D	B	3
E	C	5
F	D,E	2

(OR)

b) Calculate the critical path for the following activity using PERT.

Activity	1-2	1-3	2-4	3-4	3-5	3-6	4-5	4-6	5-6	5-7	6-7
t_o	2	4	5	5	7	8	7	6	5	3	5
t_p	6	7	6	8	10	12	10	11	8	9	8
t_m	4	6	5	6	6	7	8	7	6	5	6

ETHICAL PAPER

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