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(FOR THE CANDIDATES ADMITTED

20 UBI 4A5

DURING THE ACADEMIC YEAR 2020 ONLY)

REG.NO. :

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

END-OF-SEMESTER EXAMINATIONS: JULY 2022

B.Com.-BI

MAXIMUM MARKS: 70

IV SEMESTER

TIME : 3 HOURS

PART - III

OPERATIONS RESEARCH

SECTION - A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS.

(K1)

1. Which one of the following model is a physical representation of a real project on a different scale? _____.
a) Analogue model b) Symbolic model c) Iconic model d) Realistic mode
2. The dummy source or destination in a transportation problem (T.P) is introduced _____.
a) to prevent solution to become degenerate b) to satisfy rim conditions
c) to ensure that total cost does not exceed the limit d) to solve unbalanced T.P
3. If there are n workers and n jobs there would be _____.
a) n solutions b) n! solutions c) (n – 1)! solutions d) (n!)ⁿ solutions
4. If small orders are placed frequently then the total inventory cost is _____.
a) reduced b) increased
c) either reduced or increased d) minimized
5. Network problems have advantage in terms of project _____.
a) scheduling b) planning c) controlling d) all the above

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

6. Define feasible solution of a Linear programming problem
7. State the necessary conditions to reach non degeneration form of a transportation problem.
8. Write any two principle assumptions made while dealing with sequencing problem.
9. What are the four categories of stock cost?
10. Define the pessimistic time.

SECTION – B

(5 X 4 = 20 MARKS)

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

11. a) Explain the applications of Operations research.

(OR)

b) Solve graphically $2x + y \leq 20$, $x + 2y \leq 20$, $x, y \geq 0$ to maximize $z = x + 3y$.

12. a) Explain North west corner rule to find Initial Basic feasible solutions of a transportations problem.

(OR)

(CONTD....2)

b) Solve using least cost entry method:

	S1	S2	S3	S4	Availability
A	5	2	4	3	22
B	4	8	1	6	15
C	4	6	7	5	08
Demand	7	12	7	19	

13. a) Write the mathematical formulation of an assignment problem

(OR)

b) Find the optimal solution for the assignment problem with the cost matrix as below.

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

14. a) Define inventory control and explain its types.

(OR)

b) XYZ company buys lots of 2000 units which is only 3 months supply. The cost per unit is Rs. 125 and the ordering cost is Rs. 250. The inventory carrying cost is 20% of unit value. How much money can be saved by using economic order quantity?

15. a) Explain the types of float in network analysis

(OR)

b) Draw the network for the project

Activity	:	1-2	1-3	2-3	2-4	3-4	4-5
Duration	:	20	25	10	12	6	10

SECTION - C

(4 X 10 = 40 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS. (K4/K5)

(16th QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS.)

16. A project consists has following details:

Job	Activity	Duration (days)
a	(1,2)	2
b	(2,3)	3
c	(2,4)	5
d	(3,5)	4
e	(3,6)	1
f	(4,6)	6
g	(4,7)	2
h	(5,8)	8
i	(6,8)	7
j	(7,8)	4

a) Draw the network and find the critical path.

b) Calculate earliest start, earliest finish and floats.

(CONTD....3)

17. Indicate on a graph paper the region satisfying the following constraints

$$12x + 12y \leq 840$$

$$3x + 6y \leq 300$$

$$8x + 4y \leq 480, x, y \geq 0$$

under the above conditions maximize the function $5x + 7y$

18. Solve the following transportation problem whose cost matrix, availability at each plant and requirements at each ware house are given as follows

Plant	Ware house				Availability
	W1	W2	W3	W4	
P1	190	300	500	100	70
P2	700	300	400	600	90
P3	400	100	600	200	180
Requirements	50	80	70	140	

19. An operator has to perform two operations turning and threading. The time required to perform these operations for each job is known. Determine the order in which the job should be processed in order to minimize the total time required to turn out all the jobs

Job	:	1	2	3	4	5	6	7
Time for turning (mins)	:	8	10	10	6	12	1	3
Time for threading (mins)	:	3	12	15	6	10	11	9

20. The annual requirement for a product is 3000 units. The ordering cost is Rs 100 per order. The cost per unit is Rs. 10. The carrying cost per unit per year is 30% of the unit cost.

(a) Find the EOQ

(b) By using better organizational methods the ordering cost per order is brought down to Rs 80 per order. But the same quantity as determined above were ordered. What would be the change in total inventory cost?

(c) If a new EOQ is found by using the order cost as Rs 80 what would be further savings in cost?

21. Consider a project consisting of nine jobs A, B,.....I with the following precedence relations and time estimates

Job	Predecessors	Optimistic time	Most likely time	Pessimistic time
A	—	2	5	8
B	A	6	9	12
C	A	6	7	8
D	B,C	1	4	7
E	A	8	8	8
F	D,E	5	14	17
G	C	3	12	21
H	F,G	3	6	9
I	H	5	8	11

Construct the network and find the critical path.
