(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2023 ONLY)

23UBM3A1

REG.NO. :

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

END-OF-SEMESTER EXAMINATIONS : NOVEMBER-2024

COURSE NAME : B.B.A **MAXIMUM MARKS: 75**

SEMESTER: III **TIME : 3 HOURS**

PART - III

MATHEMATICAL TECHNIQUES-II

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS. (K1)

1. Operation Research is a _____

   a) Science b) Art c) Mathematics d) Both (a) and (b)

2. Slack Variable must be added to _____constraints

   a) ≤ b) ≥ c) = d) >

3. The number of basic variables in a m x n transportation table is

   a) m + n b) m + n +1 c) m + n -1 d)mn

4. A game is said to be strictly determinable if _____

   a) $\underline{v} \neq v = \overline{v}$ b) $\underline{v} = v = \overline{v}$ c) $\underline{v} \neq v \neq \overline{v}$ d) $\underline{v} = v \neq \overline{v}$

5. What is PERT analysis based on ?

   a) Most likely time b) Optimistic time c) Pessimistic time d) All the above

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

6. What is the role of Operation Research?
7. Define Surplus variable.
8. What are all the methods to obtain initial basic feasible solution in Transportation problem?
9. Define Saddle point.
10. What are all the types of floats?

SECTION – B (5 X 5 = 25 MARKS)

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

11. a) Explain the applications of O.R.

(OR)

b) Write down the advantages of O.R Models.

12. a) Write the algorithm (procedure) of graphical method.

(OR)

b) Explain the Mathematical formulation of LPP.

(CONTD…..2)

13.a) What are the difference between transportation problem and assignment problem?

(OR)

b) Find the initial basic feasible solution of the following transportation problem

Destination						
Source		1	2	3	4	Supply
	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
	Demand	250	350	400	200	

14.a) Explain the classification of Queuing models.

(OR)

b) Solve the game whose payoff matrix is $\begin{bmatrix} 2 & 5 \\ 7 & 3 \end{bmatrix}$

15.a) Write the rules of construction Network.

(OR)

b) Construct the Network diagram for the following information.

Activity :	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration (in days)	2	8	10	6	3	3	7	5	2	8

SECTION – C **(5 X 8 = 40 MARKS)**

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

(K4 (Or) K5)

16. a) Describe the general solution methods for O.R. Models.

(OR)

b) Explain the classification of models.

17.a) Solve graphically the following LPP:
Maximize $z = 4x_1 + 3x_2$ Subject to the constraints
$2x_1 + x_2 \leq 1000$, $x_1 + x_2 \leq 800$, $x_1 \leq 400$, $x_2 \leq 700$ and $x_1 \geq 0$, $x_2 \geq 0$.

(OR)

b) Use Simplex method to solve the following LPP :
Minimize $z = x_1 - 3x_2 + 2x_3$ Subject to the constraints
$3x_1 - x_2 + 2x_3 \leq 7$, $-2x_1 + 4x_2 \leq 12$, $-4x_1 + 3x_2 + 8x_5 \leq 10$; $x_1 \geq 0$, $x_2 \geq 0$ and $x_3 \geq 0$.

18. a) Find the initial basic feasible solution of Transport problem by using Vogel's approximation method.

Destination						
Source		I	II	III	IV	Available
	A	11	13	17	14	250
	B	16	18	14	10	300
	C	21	24	13	10	400
	Demand	200	225	275	250	

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(CONTD…..3)

18.b) A departmental head has four subordinates, and four tasks to be performed. The subordinates differ in efficiency and the tasks differ in their intrinsic difficulty. His estimate of the time each man would take to perform each tasks is given in the matrix below:

Tasks	Men			
	I	II	III	IV
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

How should the tasks be allotted one to a man so as to minimize the total man - hours.

19.a) Solve the following 6 x 2 game graphically.

$$\begin{pmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{pmatrix}$$

(OR)

b) A TV repairman finds that the time spent on his jobs has an Exponential distribution withmean30 minutes. If he repairs sets in the order in which they come in and if the arrival of sets is approximately Poisson with an average rate of 10 per 8 - hour day. What is repairman's expected idle time each day? How many jobs are ahead of the average set just brought - in?

20.a) A small project consists of seven activities for which the relevant data are given below:

Activity	Preceding Activities	Activity Duration (Days)
A	-	4
B	-	7
C	-	6
D	A, B	5
E	A, B	7
F	C, D, E	6
G	C, D, E	5

(i) Draw the network and find the project completion time.

(ii) Calculate total float for each activities and highlight the critical path. **(CONTD….4)**

(OR)

20 b)A project consists of eight activities with the following relevant information:

Activity	Immediate Predecessor	Estimated duration		
		Optimistic	Most likely	Pessimistic
A	-	1	1	7
B	-	1	4	7
C	-	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D, E	3	6	15
H	F, G	1	2	3

Draw the PERT network and find out the expected project completion time.

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