STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2016-17 and thereafter)
SUBJECT CODE: 16CM/AC/OR45

B.B.A. DEGREE EXAMINATION APRIL 2019
BUSINESS ADMINISTRATION
FOURTH SEMESTER

COURSE : ALLIED – CORE
PAPER : OPERATIONS RESEARCH
TIME : 3 HOURS **MAX. MARKS: 100**

Section A

Answer ALL the questions. **(10 x 2 = 20)**

1. Define Operation Research.
2. Mention any two limitations of Operation Research.
3. What do you mean by Feasible solution?
4. What is meant by Optimal solution?
5. What is Network Analysis?
6. Draw the graphs of the following simultaneous inequalities and indicate the solution set:
   $5x + 3y \leq 15, 3x + 4y \leq 12, and\ x \geq 0, y \geq$
7. Develop a network based on the following information:
   Activity: A B C D E F G H
   Immediate predecessor:- - A B C,D C,D E F
8. Draw the following logic network: activities C and D both follow A, activity E follows C, activity F follows D, activity E and F precedes B.
9. Find the maximin value for the following pay-off matrix.
   $$\begin{bmatrix} 1 & 3 & 6 \\ 2 & 1 & 3 \\ 6 & 2 & 1 \end{bmatrix}$$
10. Construct a network diagram for the following situation:
    A < D, E; B, D < F; C < G and B < H.

Section B

Answer Any FIVE questions. **(5 x 8 = 40)**

11. Solve the following LPP by graphical method:
    Minimize Z = $x_1 + x_2$; subject to the constraints:
    $2x_1 + x_2 \geq 4$, $x_1 + 7x_2 \geq 7$ and $x_1 \geq 0$, $x_2 \geq 0$.
12. Obtain an initial basic feasible solution to the following transportation problem, using least cost method:

	D_1	D_2	D_3	D_4	Supply
O_1	1	2	3	4	6
O_2	4	3	2	0	8
O_3	0	2	2	1	10
Demand	4	6	8	6	

13. Solve the following assignment problem:

Men / Task	I	II	III
A	9	26	15
B	13	27	6
C	35	20	15
D	18	30	20

14. For what value of γ, the game with following pay-off matrix is strictly determinable?

Player B (B_1, B_2, B_3)

Player A (A_1, A_2, A_3) $\begin{bmatrix} \gamma & 6 & 2 \\ -1 & \gamma & -7 \\ -2 & 4 & \gamma \end{bmatrix}$

15. Solve the following 2 X 2 game by odds method:

Players B (B_1, B_2)

Player A (A_1, A_2) $\begin{bmatrix} 1 & 5 \\ 4 & 2 \end{bmatrix}$

16. Construct an arrow diagram comprising of activities A, B, C, …. Such that the following relationships are satisfied: a) Clear the site. b) Survey and layout. c) Rough grade. d) Excavate for sewer. e) Excavate for electrical manholes. f) Install sewer and baskfill. g) Install electrical manholes. h) Construct the boundary wall.

17. A project consists of activities A, B, C, …..M, N. The notation X<Y means that the activity X must be completed before Y can start and X, Y < W means that will start only after the completion of both activities X and Y. With this notation construct the network diagram having the following constraints:

A < D, H; B < E; C < I; D < G; H, L < M; E, I < L; E, F < K; E, I < J; G, J, K < N.

Section C

Answer Any TWO questions. **(2 x 20 = 40)**

18. Determine an initial basic feasible solution to the following transportation problem using north-west corner rule:

	D_1	D_2	D_3	D_4	Availability
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Requirement	6	10	15	4	35

Here O_i and D_j represent i^{th} origin and j^{th} destination respectively.

19. Three jobs P, Q and R are to be assigned to three machines X, Y and Z. The processing cost for each job-machine combination is shown in the matrix given below. Determine the allocation that minimizes the overall processing cost:

Machine (X Y Z)

Job (P Q R) $\begin{bmatrix} 17 & 25 & 31 \\ 10 & 25 & 16 \\ 12 & 14 & 11 \end{bmatrix}$ (Cost is in ` per unit)

20. Consider the game G with the following pay-off

Players B (B_1, B_2)

Player A (A_1, A_2) $\begin{bmatrix} 2 & 6 \\ -2 & \gamma \end{bmatrix}$

a) Show that G is strictly determinable whatever γ may be.
b) Determine the value of G.

21. The following table gives the characteristics of a project:

Job	A	B	C	D	E	F	G	H
Predecessors	-	-	B	A,C	A,C	D	E	F,G
Duration (days)	10	5	3	4	6	6	5	5

Draw the network diagram and find the critical path.

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