SET A

MA ECONOMICS
FOURTH SEMESTER
OPERATION RESEARCH
MEC – 402B
[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1 ×20=20***

1. Every mathematical model:
   a. Must be deterministic
   b. Requires computer aid for its solution
   c. Represents data in numerical form
   d. All of the above

2. A physical model is example of:
   a. An iconic model
   b. An analogue model
   c. A verbal model
   d. A mathematical model

3. The qualitative approach to decision analysis relies on.
   a. Experience
   b. Judgment
   c. Intuition
   d. All of the above

4. Operations Research, which is a very powerful tool for.....
   a. Research
   b. Decision - Making
   c. Operations
   d. None of the above,

5. Who coined the term Operations Research?
   a. J.F. McCloskey
   b. F.N. Trefethen
   c. P.F. Adams
   d. Both A and B

6. Who defined Operation Research as scientific approach to problem solving for executive management?
   a. E.L. Arnof
   b. P.M.S. Blackett,
   c. H.M. Wagner
   d. None of the above

7. The term Operations Research was coined in the year.....
   a. 1950
   b. 1940
   c. 1978
   d. 1960

8. Operation Research has the characteristics that it is done by a team of.....
   a. Scientists
   b. Mathematicians
   c. Academics
   d. All of the above

9. Who defined Operation Research as an aid for executive in marketing his decision by providing him quantitative information based on scientific method of analysis?
   a. C. Kitte
   b. H.M. Wagner
   c. E.L. Arnoff
   d. None of the above

10. This innovative science of Operations Research was discovered during.....
    a. Civil War
    b. World War I
    c. World War II
    d. Industrial Revolution

11. Operations Research approach is.....
    a. multi-disciplinary
    b. scientific
    c. intuitive
    d. collect essential data

12. A feasible solution to a linear programming problem _____.
    a. must satisfy all the constraints of the problem simultaneously
    b. need not satisfy all of the constraints, only some of them
    c. must be a corner point of the feasible region.
    d. must optimize the value of the objective function

13. If any value in XB column of final simplex table is negative, then the solution .....
    a. Feasible
    b. Infeasible
    c. Bounded
    d. No solution

14. For any primal problem and its dual.....
    a. Optimal value of objective function is same
    b. Dual will have an optimal solution iff primal does too
    c. Primal will have an optimal solution if dual does too
    d. Both primal and dual cannot be infeasible

15. An optimal assignment requires that the maximum number of lines which can be drawn through squares with zero opportunity cost should be equal to the number of.....
    a. Rows or columns
    b. Rows and columns.
    c. Rows+columns- 1
    d. Rows-columns.

16. Service mechanism in a queuing system is characterized by.....
    a. Customers behavior
    b. Servers behavior
    c. Customers in the system
    d. Server in the system

17. The objective of network analysis is to.....
    a. Minimize total project duration
    b. Minimize toal project cost
    c. Minimize production delays, interruption and conflicts
    d. Maximize total project duration

18. If there is no non-negative replacement ratio in solving a Linear Programming Problem then the solution is.....
    a. Feasible
    b. Bounded
    c. Unbounded
    d. Infinite

19. The calling population is considered to be infinite when.....
    a. All customers arrive at once
    b. Capacity of the system is infinite
    c. Service rate is faster than arrival rate
    d. Arrivals are independent of each other

20. In marking assignments, which of the following should be preferred?

a. Only row having single zero
b. Only column having single zero
c. Only row/column having single zero
d. Column having more than one zero

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Descriptive

Time : 2 Hr. 30 Mins. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. Elaborate the definition of Operations Research and highlight the Scope and Origin of Operations Research. 10

2. Explain the general formulation of Linear Programming Problem. 10

3. Solve the following LPP by graphical method 10

$$\text{Maximize, } \pi = 2X_1 + 5X_2$$
$$\text{Subject to,}$$
$$X_1 \leq 4$$
$$X_2 \leq 3$$
$$X_1 + 2X_2 \leq 8$$
$$X_1 \geq 0,\ X_2 \geq 0$$

4. Solve the following LPP graphically 10

$$\text{Minimize, } C = 12X_1 + 42X_2$$
$$\text{Subject to,}$$
$$X_1 + 2X_2 \geq 3$$
$$X_1 + 4X_2 \geq 4$$
$$3X_1 + X_2 \geq 3$$
$$X_1 \geq 0,\ X_2 \geq 0$$

5. Solve the following LPP graphically 10

$$\text{Minimize, } C = X_1 + 7X_2$$
$$\text{Subject to,}$$
$$X_1 + 2X_2 \geq 5$$
$$X_2 \geq 4$$
$$2X_1 + 3X_2 \geq 9$$
$$X_1 \geq 0,\ X_2 \geq 0$$

6. Solve the following LPP by graphical method 10

$$\text{Maximize, } \pi = 8X_1 + 3X_2$$
$$\text{Subject to,}$$
$$X_1 \leq 2$$
$$2X_1 + X_2 \leq 7$$
$$X_1 \geq 0,\ X_2 \geq 0$$

7. Elucidate the application of Operation Research. 10

8. Explain the features and limitations of Operation Research. 10

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