

**B. Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2018**  
**SEMESTER VI – CORE (COMPUTER APPLICATIONS [TRIPLE MAIN])**  
**CAS6B07TB - OPERATIONS RESEARCH**

Time: Three Hours

Maximum Marks : 80

**Part A****I. Answer all questions. Each question carries 1 mark.**

1. Define operations research.
2. What is meant by a Iconic model?
3. What is the optimality condition for Simplex method with maximization case?
4. Define a Basic feasible solution.
5. How can we convert maximisation in a Assignment problems to a minimisation case?
6. Define an event?

(6X1=6)

**Part B****II. Answer any seven questions. Each question carries 2 marks.**

7. What are the characteristics of a good model?
8. Define Monte carlo method of simulation.
9. Define the special cases of solutions in Graphic method.
10. Write the dual of the following LPP

$$\text{Maximize } Z = 5x_1 + 3x_2$$

*Subject to constraints:*

$$3x_1 + 5x_2 \leq 15$$

$$5x_1 + 2x_2 \leq 10$$

$$x_1, x_2 \geq 0$$

11. What is an Assignment Problem?
12. Show that Transportation Problem can be considered as LPP.
13. Find the initial basic feasible solution of transportation problem by matrix minimum method.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	
O1	7	3	10	200
O2	4	8	2	100
O3	9	7	6	100
	150	100	150	

14. What are the time estimates used in PERT?
15. What are Total and Free floats?
16. What do you understand by Network diagram?

(7X2=14)

**Part C****III. Answer any five questions. Each question carries 6 marks.**

17. What are the applications of Operations Research?

18. What are the main characteristics of OR?
19. Explain graphical method to solve LPP.
20. What is the significance of duality theory in linear programming? Describe the general rules for obtaining dual of a LPP.
21. Find the assignment of men to jobs that will minimize the total time taken.

Job/Man	1	2	3	4	5
I	12	8	7	15	4
II	7	9	17	14	10
III	9	6	12	6	7
IV	7	6	14	6	10
V	9	6	12	10	6

22. Explain Vogel's approximation method.
23. What is meant by Critical Path? How we can find this path?
24. Distinguish between CPM and PERT. (5X6=30)

#### Part D

#### IV. Answer any two questions. Each question carries 15 marks.

25. Use big M method to solve

$$\begin{aligned}
 & \text{subject to} \quad \max: z = 6x_1 + 4x_2, \\
 & \quad \quad \quad 2x_1 + 3x_2 \leq 30, \\
 & \quad \quad \quad 3x_1 + 2x_2 \leq 24, \\
 & \quad \quad \quad x_1 + x_2 \geq 3, \\
 & \quad \quad \quad x_1, x_2 \geq 0
 \end{aligned}$$

26. Solve the transportation problem for minimum cost.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	
S <sub>1</sub>	2	2	3	10
S <sub>2</sub>	4	1	2	15
S <sub>3</sub>	1	3	1	40
	20	15	30	

27. Illustrate the Hungarian Method with a suitable example.
28. A project schedule has the following characteristics:

Activity	Time(in weeks)	Activity	Time(in weeks)
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

- (a) Draw the network diagram.
- (b) Identify critical path and find the total project duration. (2X15=30)