Hall Ticket Number:

Code No. : 41426 S

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (Mech. Engg) IV Year I-Semester Supplementary Examinations, May-2019

Operations Research

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. How do you resolve degeneracy in simplex?
2. Define feasible solution.
3. Differentiate between simplex and dual simplex methods.
4. Justify the necessity of post optimal analysis.
5. Mention the condition for alternative optimal solution in transportation problem.
6. When do you obtain multiple solutions in assignment problem?
7. State the policy of replacement when money value is not taken in to account.
8. How do you identify the minimax point by graphical method in game theory?
9. List the assumptions in sequencing problem.
10. Describe the Kendal notation of a queue.

Part-B (5 × 10 = 50 Marks)

11. Solve the following LPP by graphical and simplex methods and make a comparison. [10]

Maximise $Z = 8X_1 + 4X_2$

STC $7X_1 + 7X_2 \leq 49$

$10X_1 + 5X_2 \leq 50$

$X_1 \geq 2$

$X_1, X_2 \geq 0$

12. Maximise $Z = 4X_1 + 6X_2 + 2X_3$ [10]

STC $X_1 + X_2 + X_3 \leq 3$

$X_1 + 4X_2 + X_3 \leq 9$

Also discuss the effect of change in x1 coefficient to Rs 8 in objective function.

13. There are two factories A and B transporting goods to three warehouses C, D and E. The unit transportation cost from A is Rs. 25, Rs. 17 and Rs. 25 while from B is Rs. 15, Rs. 10 and Rs. 18 respectively. The factory A can produce 300 products while B can produce 500 products per unit time respectively .The demand from C and D are 300 products each while E requires 500 items per unit time. Find optimal solution. Discuss the effect of changing the unit cost from A to C as Rs 24. [10]

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14. A company is in dilemma which of the two machines is to be bought. Machine A costs Rs 5000 and the running costs are Rs 800 for each of the first 5 years increases by Rs 200 per year thereafter, while Machine B of same capacity costs Rs 2500 and the running costs are Rs 1200 per year for first 6 years and later increases by Rs 200 per year thereafter. The money value is 10% per year which machine is to be taken. [10]

15. [10]

Job	A	b	c	d	e	f	g	h	I
Machine A	11	7	3	2	2	12	13	4	10
Machine B	4	7	10	5	6	8	8	11	3

A company works with one 8 hour shift a day for 5 days a week with Saturday and Sunday holidays .The technological order for all the jobs is B, A. Apply Johnson algorithm and find the schedule if processing starts on Monday.

16.a) Define convex and concave sets applied in LPP. [5]

b) Describe the properties of Dual obtained from primal. [5]

17. Answer any ***two*** of the following:

a) Explain the steps involved in assignment problem solution by Hungarian method. [5]

b) Two players toss one rupee coin each. If coins match one player A wins otherwise Player B wins however matching of heads has double premium Formulate as game matrix and find value. [5]

c) Explain the terms related to Queuing theory: [5]
i) Renging ii) Jockeying iii) Collusion iv) Balking