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Register Number:

Name of the Candidate:

B.Sc. DEGREE EXAMINATION, May 2015

(MATHEMATICS WITH COMPUTER APPLICATIONS)

(SECOND YEAR)

(PART – III)

640: OPERATIONS RESEARCH

Time: Three hours Maximum: 100 marks

Answer any FIVE Full questions **(5 × 20 = 100)**

1. a) Explain the advantages of LPP.

   b) A firm manufactures two products A and B on which the profits earned per unit are ₹3 and ₹4 respectively. Each product is processed on two machines M1 and M2. Product A requires one minute of processing time on M1 and two minutes on M2 while B requires one minute on M1 and 5minutes on M2. Machine M1 is available for not more than 7 hours 30 minutes while machine M2 is available only for 10 hours during any working day. Find the number of units of products A and B to be manufactured to get maximum profit. Formulate the above as a LPP and solve by Graphical method.

2. Use simplex method to

   Minimize $Z= x_2-3x_3+2x_5$
   Sub to: $3x_2- x_3+2x_5 \leq 7$
   $-2x_2 +4x_3 \leq 12$
   $- 4x_2+3x_3+8x_5 \leq 10$ and
   $x_2, x_3, x_5 \geq 0$

3. a) Using simplex algorithm.

   Minimize $Z =-2x_1-x_2$
   Sub to : $x_1+x_2 \geq 2$
   $x_1+x_2 \leq 4$
   $x_1,x_2 \geq 0$

   b) Write down the disadvantage of Big M method over Two – phase method.

4. Using dual simplex method solve the LPP.

   Maximize $Z= 2x_1+3x_2$
   Sub to : $2x_1-x_2-x_3 \geq 3$
   $x_1-x_2+x_3 \geq 2$ and $x_1,x_2,x_3 \geq 0$

5. a) Solve the transportation problem by modified distribution method.

	1	2	3	4	Supply
I	21	16	25	13	11
II	17	18	14	23	13
III	32	27	18	41	19
Demand	6	10	12	15	

6. a) Distinguish between Transportation model and Assignment model.

   b) Solve the assignment problem for maximization of profit matrix (Profit given below are in rupees).

		Machines			
		P	Q	R	S
Job	A	51	53	54	50
	B	47	50	48	50
	C	49	50	60	61
	D	63	64	60	60

7. a) What is a sequencing problem?

   b) State the Principal assumptions made while dealing with sequencing problem.

   c) Explain the sequencing problem of 'n' jobs on 'm' machines.

8. a) Prove that dual of the dual is primal.

   b) Explain inventory models.

9. a) A machine owner finds from his past records that the cost per year of maintaining a machine purchase price ₹6,000 are as given below.

Year	**1**	**2**	**3**	**4**	**5**	**6**
Maintenance cost (₹)	1000	1200	1400	1800	2300	2800
Resale value (₹)	3000	1500	750	375	200	200

   Determine at what age replacement need to be done.

   b) Explain replacement problem

10 a) Explain EOQ.

   b) Solve the sequencing problem

	J1	**J2**	**J3**	**J4**	**J5**	**J6**
M1	4	13	6	3	10	12
M2	9	7	5	7	4	2
M3	13	15	10	13	9	14

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