

Total No. of Pages: 3

**6994**

Register Number:

Name of the Candidate:

**M.B.A. DEGREE EXAMINATION December 2014**

**(MANAGEMENT PRACTICES)**

**(FIRST YEAR)**

**180. OPERATIONS RESEARCH**

Time: Three hours

Maximum: 75 marks

---

**SECTION - A**

**(5×3=15)**

**Answer any FIVE questions**

1. Write the characteristics of a linear programming.
2. What are the limitations of operations research?
3. State the assumptions in utility concept.
4. Specify the characteristics of queuing theory.
5. Mention the uses of network analysis.
6. What are the assumptions of game theory?
7. Illustrate the applications of replacement concept.
8. What is factor analysis?

**SECTION - B**

**(3×10=30)**

**Answer any THREE questions**

9. A company is making two products A and B. The cost of producing one unit of product A and B is Rs.60 and Rs.80 respectively. As per the agreement the company has to supply at least 200 units of product B to its regular customers. One unit of product A requires one machine hours whereas product B has machine hours available for product A are 400 hours. One unit of each product A and B requires one labour hour each and total of 500 labour tours are available. The company wants to minimize the cost of production by satisfying the given requirements. Formulate the problem as a linear programming problem.
10. The transportation cost matrix for a given situation for supply of the commodity from sources A, B and C to the points to usage P, Q and R is given below. Work out the optimal cost solution for the problem.

	P	Q	R	Supply
A	4	8	8	76
B	16	24	16	82
C	8	16	24	77
Demand	72	102	41	

**6994**

11. A belt snapping for conveyors in an open cast mine occur at the rate of 2 per shift. There is only one hot plate available for vulcanising and it can vulcanise on an average 5 belts snap per shift.
- What is the probability that when a belt snaps, the hot plat is readily available?
  - What is the average number of belts in the system?
  - What is the waiting time of an arrival?
  - What is the average waiting time plus vulcanising time?
12. Solve the following, using the concept of dominance.

		Player B			
		B1	B2	B3	B4
Player A	A1	8	10	9	14
	A2	10	11	8	12
	A3	13	12	14	13

13. Find the sequence that minimises the total elapsed time (in hours) required to complete the following jobs on three machines M1, M2, and M3 in the order M1, M2 , M3

	Jobs				
Machines	A	B	C	D	E
M1	5	7	6	9	5
M2	2	1	4	5	3
M3	3	7	5	6	7

**SECTION-C****(1×15=15)****Answer any ONE question**

14. Use the graphical method to solve the following LP problem
- Minimise  $z = 20x_1 + 10x_2$
- s. to  $x_1 + 2x_2 + 10x_3$
- $3x_1 + x_2 \geq 30$
- $4x_1 + 3x_2 \geq 60$
- $x_1, x_2 \geq 0$

15. The estimated sales of proposed types of perfumes are as undser:

Types of perfumes	Estimated sales (units)		
	Rs.20,000	Rs.10,000	Rs.2000
A	25	15	10
B	40	20	5
C	60	25	3

Make decisions under

- Maximax
- Maximin
- Hurwicz (degree of optimism is 0.7)
- Laplace and
- Minimax regret criterion

**6994**

16. An engineering company is offered a material handling equipment A. A is priced at Rs.60,000 including cost of installation and the costs for operation and maintenance are estimated to be Rs.10,000 for each of the first 5 years , increasing every year by Rs.3000 per year in the sixth and subsequent years. The company expects a return of 10% on all its investments. What is the optimal replacement period?

**SECTION-D****(1×15=15)****(Compulsory)**

16. A project is represented by the network shown below and has the following data(time in weeks)

Task	A	B	C	D	E	F	G	H	I
$t_o$	5	18	26	16	15	6	7	7	3
$t_p$	10	22	40	20	25	12	12	9	5
$t_m$	8	20	33	18	20	9	10	8	4

Determine the following

- Expected task time and their variance.
- The critical path
- The Probability completing the task in 41.5 weeks

\*\*\*\*\*