Register Number:……..

KUMARAGURU
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GENERAL INSTRUCTIONS TO THE CANDIDATES

1. Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K_1 to K_6)
2. Candidates are strictly instructed not to write anything in the question paper other than their roll number.
3. Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.
4. Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.
5. Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

MBA DEGREE EXAMINATIONS:DEC 2014

(Regulation 2014)

First Semester

MASTER OF BUSINESS ADMINISTRATION

MBA617**:** Decision Models for Management

Time: Three Hours **Maximum Marks: 100**

Case Study:-

PART A (1 x 20 = 20 Marks)

1. A firm plans to purchase at least 200 quintals of scrap containing high quality metal X and low quality metal Y. It decides that the scrap to be purchased must contain at least 100 quintals of metal X and not more than 35 quintals of metal Y. The firm can purchase the scrap from two suppliers A and B in unlimited quantities. The percentage of X and Y metals in terms of weight in the scrap supplied by A and B is given below. [K_5]

Metal	Supplier A	Supplier B
X	25%	75%
Y	10%	20%

The price of A's scrap is Rs. 200 per quintal and that of B is Rs. 400 per quintal. The firm wants to determine the quantities that it should buy from the two suppliers so that the total cost is minimized.

Answer all the Questions:-

PART B (10 x 2 = 20 Marks)

2. Say: 'True or False': Graphical method is not possible for more than two constraints. Justify. [K_2]
3. Which method is used to evaluate the effect on an optimal solution of any LP problem due to changes in its parameters? [K_2]
4. Identify an initial basic feasible solution for the following Transportation problem by using North West Corner Rule. [K_3]

Warehouse	Factories			Warehouse requirements
	A	B	C	
1	50	40	80	800
2	80	70	40	800
3	60	70	60	900
Factory availability	800	600	1100	2500

5. Interpret two person zero sum games? [K_3]
6. Define idle time on a machine. [K_1]
7. Describe no passing rule in a sequencing problem? [K_2]
8. Mention any two importances of replacement models. [K_1]
9. State the different types of failure in replacement models. [K_2]
10. At a public telephone booth the arrivals are on the average 15 per hour. A call on the average takes 3 minutes. If there is just one phone, what is the expected number of callers in the booth at any time? [K_4]
11. Describe the alternative criteria for decision under uncertainty? [K_3]

PART C (4 x 15 = 60 Marks)

12. a) Estimate the optimal assignment for the following Assignment Problem. [K_4]

		Job				
		I	II	III	IV	V
Man	A	-32	-38	-40	-28	-40
	B	-40	-24	-28	-21	-36
	C	-41	-27	-33	-30	-37
	D	-22	-38	-41	-36	-36
	E	-29	-33	-40	-35	-39

(OR)

b) (i) Solve the following game: (10) [K_4]

		Player B				
		I	II	III	IV	V
Player A	A1	2	4	3	8	4
	A2	5	6	3	7	8
	A3	6	7	9	8	7
	A4	4	2	8	4	3

(ii) Obtain an initial basic feasible solution to the following TP using Vogel's approximation method. (5) [K_5]

Warehouse	Factories				Warehouse requirements
	A	B	C	D	
1	5	3	6	4	21
2	1	3	4	-1	25
3	3	3	4	4	17
4	3	4	3	2	17
Factory availability	34	15	12	19	80

13. a) Determine the optimal sequence of jobs which minimizes the total elapsed time based on the following information. [K_4]

Processing times on the machines A, B, C			
Job	A	B	C
1	8	5	4
2	10	6	9
3	6	2	8
4	7	3	6
5	11	4	5

(OR)

13 b) Find the optimal sequence for processing 5 jobs A, B, C, D, E on four Machines A_1, A_2, A_3, A_4. Processing times are as given below. [K_4]

	Processing times in hours			
Job/Machine	A_1	A_2	A_3	A_4
A	11	4	6	15
B	13	3	7	8
C	9	5	5	13
D	16	2	8	9
E	17	6	4	11

14. a) (i) A machine owner finds from his past records that the costs per year of maintaining a machine whose purchase price is Rs.5000 are given below: (8) [K_4]

Year	1	2	3	4	5	6	7	8
Maintenance cost(Rs.)	1500	1600	1800	2100	2500	2900	3400	4000
Resale Price	3500	2500	1700	1200	800	500	500	500

Determine at what age is a replacement due?

(ii) The cost of a new machine is Rs. 5000. The maintenance cost of n^{th} year is given (7) [K_5]

by $C_n = 500(n-1); n = 1, 2, ...$ Suppose that the discount rate per year is 0.5. After how many years it will be economical to replace the machine by a new one?

(OR)

b) A computer contains 10,000 resistors. When any one of the resistor fails, it is replaced. The cost of replacing a single resistor is Re 1 only. If all the resistors are replaced at the same time, the cost per resistor would be reduced to 35 paise. The percent of surviving by the end of month t is as follows: [K_5]

Month(t)	0	1	2	3	4	5	6
% surviving by the end of month:	100	97	90	70	30	15	0

What is the optimum plan?

15. a) (i) Explain various queue disciplines. (5) [K_3]

(ii) A duplicating machine in an office is used by people in the office who make copies, mostly by secretaries. The service rate follows Poisson distribution with a mean service rate of 10 jobs / hour. Requirements for use are random over the 8 – hour work day, but arrive at a rate of 5 / hour. If the time of a secretary is valued at Rs. 3.50 / hour, determine. (10) [K_4]

a) Equipment utilization.
b) The percentage of time that an arrival has to wait.
c) The average system time.
d) Average cost due to waiting and operating the machine.

(OR)

b) A businessman has three alternatives open to him and each which can be followed by any of the four possible events. The conditional pay-offs for each action event combination are given below: [K_5]

Action	Pay-offs conditional on events			
	A	B	C	D
S_1	8	0	-10	6
S_2	-4	12	18	-2
S_3	14	6	0	8

(i) If he adopts maximin criterion, what acts he should choose?
(ii) If the criterion of choice is minimax regret, what action should be chosen?
(iii) If he adopts maximax criterion, what acts he should choose?
(iv) If he uses EMV as his decision criterion, what action should he choose? (assume that all events have equal probability of occurrence)?

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