26. A home resourceful decorator manufactures two types of lamps say A and B. Both lamps go through two technicians first a cutter and second a finisher. Lamp A requires 2 hours of cutter's time and 1 hour of finisher's time; Lamp B requires 1 hour of cutter's time and 2 hours of finisher's time. The cutter has 104 hours and finisher has 76 hours of available time each month. Profit of Lamp A is Rs. 6.00 and on ne B lamp is Rs.l 1.00. Formulate mathematical model.

27. Solve the following LPP graphically

$$\text{Max } Z = 140\,x_1 + 160\,x_2$$

Subject to the constraints

$$6x_1 + 12x_2 \leq 1200$$
$$3x_1 + 4x_2 \leq 43$$
$$2x_1 + 3x_2 \leq 105$$
$$x_1, x_2 \geq 0$$

28. Explain any two methods for finding the initial feasible solution

(6 x 4 = 24 Marks)

Part D

Answer any ***two*** questions. Each question carries 15 marks.

29. What are the different O.R techniques in management? Explain.

30. Solve graphically for the following problem

$$\text{Max } Z = 60x_1 + 40x_2$$
$$2x_1 + x_2 \leq 60$$
$$x_1 \leq 25$$
$$x_2 \leq 35$$
$$x_1 \geq 0,\ x_2 \geq 0$$

31. A project has the following time schedule

Job	1-2	2-3	2-4	3-5	3-6	4-6	4-7	5-8	6-8	7-8
Duration (days)	2	3	5	4	1	6	2	8	7	4

Construct network and compute (1) EST, LST.EFT and LFT of the activities

Total float for each activity (3) Critical path and its duration.

(2 x 15 = 30 Marks)

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16U445 (Pages: 3) Name: ……

Reg. No……..

FOURTH SEMESTER B.B.A. DEGREE EXAMINATION, APRIL 2018

(Regular/Supplementary/Improvement)

(CUCBCSS-UG)

CC15U BB4 C04 – MANAGEMENT SCIENCE

(Complementary Course)

(2015 Admission onwards)

Time: Three Hours Maximum: 80 Marks

Part A

Answer ***all*** questions. Each question carries l mark.

Fill in the blanks:

1. ……. is an activity based network technique.
2. North –west corner refers to …….
3. If the value of the game is zero, then the game is known as …….
4. The objective function of LP model is $3x_1+2x_2$, if $x_1=20$ and $x_2=30$, the value of the objective function is …….
5. Decision that are meant to solve repetitive and well structured problem are known as …….

Choose the correct answer:

6. ……. are called mathematical models.

   a) Iconic model b) Analogue model c) Symbolic models d) None of these.

7. Operation research is a …….

   a) Multi –disciplinary b) Scientific

   c) Initiative d) All of these.

8. According to transportation problem number of basic cells will be exactly …….

   a) m -n-1 b) n- m+1 c) m + n-1 d) none of these.

9. . ……. One can find the initial basic feasible solutions by using …….

   a) VAM ..... b) MODI c) Optimality tests d) none of these.

10. The objective function and constraints are linear relationship between …….

    a) Variables b) Constraints c) Functions d) All of these.

(10 x 1 = 10 Marks)

Part B

Answer any ***eight*** questions. Each question carries 2 marks.

11. What is Management Science?
12. What is critical path?
13. Explain the applications of Game theory.
14. A company wishes to advertise its products on local radio and TV stations. Each minute of radio advertisement will cost Rs 50 and each minutes of TV advertisement will cost Rs 600. The budget of the company limits the advertisement expenditure to Rs 25000 per month. The company decides to use radio at least twice as much as TV. Past records of the company shows that each minute of TV advertisement will generate 30 times as many sales as each minutes of radio advertisement. Formulate the problem for optimal allocation of monthly budget to radio and TV advertisement.
15. What are pay offs?
16. Draw network and project duration.

Activity	1-2	2-3	2-4	3-5	3-6	4-6	4-7	5-8	6-8	7-8
Time	4	6	10	8	2	12	4	15	14	8

17. What do you meant by slack variables?
18. The following table gives you the cost of transporting material from supply A, B, C and D to demand point E,F,G,H and I

To From	E	F	G	H	I	Supply
A	8	10	12	17	15	100
B	15	13	18	11	9	150
C	14	20	6	10	13	160
D	13	19	7	6	12	280
Demand	70	170	50	210	190	

(i) Find out the optimal allocation to minimize cost.

(ii) If in the above problem the transportation cost from A to G is reduced to 10, what will be the optimum schedule?

19. A Pen manufacturer produces a certain type of pen at a total average cost of Rs. 6 per pen and sells at a price of Rs. 10 per pen. The pen is produced over the week-end and is sold during the following week. According to the past experience the weekly demand has never been less than 156 or greater than 160 pen in this place. You are required to formulate pay off table.
20. What do you mean by unbalanced transportation problem?

(8 x 2 = 16 Marks)

Part C

Answer any ***six*** questions. Each question carries 4 marks.

21. What are the essential characteristics of Linear programming model?
22. A retail store stocks two types of shirts A and B. These are packed in attractive cardboard boxes. During a week the store can sell a maximum of 400 shirts of type A and a maximum of 300 shirts of type B. The storage capacity, however, is limited to a maximum of 600 of both types combined. Type A shirt fetches a profit of Rs. If- per unit and type B a profit of Rs. 5/- per unit. How many of each type the store should stock per week to maximize the total profit? Formulate a mathematical model of the problem.
23. Listed in the table are the activities and sequencing requirements necessary for the completion of a research project.

Activity:	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Immediate predecessors	-	-	-	B	A	A	B	C,D	C,D	E	F,G,H	F,G,H	I	J,K
Duration (month)	2	5	4	5	7	3	3	6	2	5	4	3	12	8

i) Construct the CPM net work.

ii) Determine the critical path and project completion time.

iii) Compute the total float.

24. Difference between PERT and CPM net work.
25. Define the term Decision theory. Describe decision models based on the criterion of degree of certainty.