18P254 (Pages: 3) Name:……..

Reg. No:……..

SECOND SEMESTER M.Com. DEGREE EXAMINATION, APRIL 2019

(Regular/Improvement/Supplementary)

(CUCSS - PG)

CC15P MC2 C09 - MANAGEMENT SCIENCE

(Commerce)

(2015 Admission onwards)

Time: Three Hours Maximum: 36 Weightage

Section A

Answer ***all*** questions. Each question carries 1 weightage.

1. What are the types models?
2. What is Linear Programming?
3. Give any two applications of Operations Research.
4. Explain Input process and Queue discipline.
5. What do you mean by queue length?
6. Explain dummy activity.

(6 x 1 = 6 Weightage)

Section B

Answer any ***six*** questions. Each question carries 3 weightage.

7. A computer centre has got four expert programmers. The centre needs four application programs to be developed. The head of the computer centre, after studying carefully the programs to be developed, estimates the computer time in minutes required by the respective experts in order to develop the application programs as follows. Find how assignment is to be made that will minimize the total time.

Programmers	Application Programmes			
	A	B	C	D
1	120	100	80	90
2	80	90	110	70
3	110	140	120	100
4	90	90	80	90

8. A firm engaged in producing two models viz. model X_1 and model X_2 performs only three operations – painting, assembly and testing. The relevant data are as follows:

Model	Unit Sale Price (Rs.)	Hours required for each unit		
		Assembly	Painting	Testing
X_1	50	1	0.2	0
X_2	80	1.5	0.2	0.1

Total number of hours available to each work is as follows:

Assembly	600
Painting	100
Testing	30

You are required to write up the model.

9. The following table gives the activities in a construction project and other relevant information.

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration	20	25	10	12	6	10

Find the critical path.

10. Given is the following information:

Arrival and service follow Poisson distribution.

Customers arrive at the rate of 8 per hour.

Service rate is 10 customers per hour.

Answer the following questions:

a. What is the average number of customers waiting for service?

b. What is the average time a customer to wait in the queue?

c. What is the average time for a customer to be in the system?

11. Define Management Science. Bring out its characteristics.

12. What are the different applications of Queuing Theory?

13. Distinguish between PERT and CPM.

14. Explain the steps involved in the Hungarian method of solving Assignment problems.

(6 x 3 = 18 Weightage)

Section C

Answer any ***two*** questions. Each question carries 6 weightage.

15. A firm makes two products X and Y and has a total production of 9 tonnes per day. Products X and Y require the same production capacity. The firm has a permanent contract to supply at least 2 tonnes of X and at least 3 tonnes of Y per day to another company. Each tonne of X requires 20 machine hours and each tonne of Y requires 50 machine hours; the daily maximum number of machine hours available is 360. All the output can be sold. The profit per tonne of X is Rs. 80 and per tonne of Y, Rs.120. You are required to determine the production schedule for maximum profit and to calculate the profit.

16. Solve the following Transportation problem starting with the initial solutions obtained by VAM.

	D_1	D_2	D_3	D_4	Supply
Q_1	2	2	2	1	3
Q_2	10	8	5	4	7
Q_3	7	6	6	8	5
Demand	4	3	4	4	15

17. A project has the following characteristics.

Activity	Preceding Activity	Expected Completion time (in weeks)
A	----	5
B	A	2
C	A	6
D	B	12
E	D	10
F	D	9
G	D	5
H	B	9
I	C,E	1
J	G	2
K	F,I,J	3
L	K	9
M	H,G	7
N	M	8

a. Draw a PERT network for this project.

b. Find the various paths and the critical path as well as the project completion time.

c. Prepare an activity schedule showing the Earliest start time, Earliest finish time, Latest start time, and float for each activity.

d. Will the critical path change if the activity G takes 10 weeks instead of 5 weeks? If so, what will be new critical path?

(2 x 6 = 12 Weightage)

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