

AVANASILINGAM INSTITUTE FOR HOME SCIENCE FOR WOMEN, COIMBATORE-641043
MASTER'S DEGREE EXAMINATION - November- 2017

I - Semester

CLASS: I PG
MAJOR: M.Com., and M.Com CA.,

MAXIMUM MARKS: 60
TIME: 3 Hrs

17MCOC05 /17MCCC05 Quantitative Techniques for Business.

Part-A

10 x ½ = 5

Choose the Correct Answer

1. If the outcome of one event does not influence another event, then the two events are-----.
a, mutually exclusive b, dependent c, independent d, equally likely
2. Two dice are thrown and the sums of numbers on the faces up are obtained. The probability of this sum being 2 is -----.
a, 1/6 b, 1/36 c, 1/18 d, None of these
3. In queuing theory, if the arrival occurs according to Poisson distribution the inter arrival time is -----
A, Poisson b, binomial c, exponential d, none of these
4. (M/M/1) model is known as -----.
a, Poisson model b, exponential model c, birth- death model d, multi- server model
5. A Transportation table, the cost element of a row are given [20 5 7 16]. What is the penalty that will be considered for this row in VAM?
a, 15 b, 2 c, 9 d, 4
6. A feasible solution to m x n Transportation problem contains -----
a, exactly m + n – 1 non negative allocations b, no more than m+ n – 1 non negative allocations
c, less than m+ n – 1 non negative allocations d, exactly m+ n non negative allocations
7. If the critical path of the network is 1-2-4-6-7 and the variances of 1-2, 2-3,2-4, 4-5 4-6, 2-6, 4-7 and 6-7 are 3, 6, 5, 7,6, 10,1 and 2 respectively, then the variance of the project length is
a, 40 b, 16 c, 17 d, 35
8. Which one of the following is wrong? If a network problem, an activity (i,j) lies in the critical path if -----.
a, $ES_i=LS_j, ES_j = LS_j$ c, $ES_j . ES_i=LS_i . LS_j = t_{ij}$ d, $ES_i = ES_j$
9. In the standard form of a general L.P.P. where the objective function is of maximization type (i) all the constraints are expressed as equations (ii) RHS of each constraint equation is non- negative (iii) All the variables are non- negative then
a, (i) & (ii) are true b, (i) & (iii) are true c, (ii) and (iii) are true d, all the three
10. Consider the following L.P.P. to Minimize $Z= 2x_1 + x_2$
subject to $3x_1 + x_2 = 3$
 $4x_1 + 3x_2 \geq 6$
 $x_1 - 2x_2 \leq 3$
and $x_1, x_2 \geq 0$
to form the initial simplex table, the number of artificial variable to be added is
a, 3 b, 2 c, 1 d, 0

Part – B

5 X 4 = 20 Marks

Answer all Questions. Each answer should not exceed 200 words or one page.

11.a, Define Trial and Event. (OR)

11.b, Two unbiased coins are tossed together. Find the probability of getting tail in both the coins.

12.a, Write the operating characteristics of a queuing system. (OR)

12.b, Explain the Application of queuing model.

13.a, Write the steps in Transportation Algorithm (OR)

13.b, Find the initial basic feasible using north west corner method
Distributions centres (Destinations)

		1	2	3	4		Supply
Plant 1	2	3	11	7	6	Total supply = 6+1+10= 17	
(Origins) 2	1	0	6	1	1		
3	5	8	15	9	10	Total requirement = 7+5+3+2=17	
Requirement	7	5	3	2	17	(Total)	

14.a, Write any three Floats. (OR)

14.b, Define Activity, Even and Path.

15.a, Write a limitations of operations research. (OR)

15.b, A company makes three products X, Y and Z which pass through three departments: Drill, Lathe and Assembly. The hours available in each department, hours required by each product in each department and profit contribution of each product are given below:

Product	Time required in hours			Profit per unit Rs
	Drill	Lathe	Assembly	
X	3	3	8	9
Y	6	5	10	15
Z	7	4	12	20
Hours available	210	240	260	

Formulate the above as an L.P.P.

Part – C

5 X 7 = 35 Marks

Answer all Questions. Each answer should not exceed 600 words or one page.

16.a, State and prove Addition Theorem and Multiplication Theorem of Probability. (OR)

16.b, What is the probability that a leap year selected at a Random has 53 Fridays?

17.a, Explain the elements of Queuing system. (OR)

17.b, A branch of Punjab National Bank has only one typist. Since the typing work varies in length (number of pages to be typed), the typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8 hour work day. If the type writer is valued at Rs 1.50 per hour determine. 1. Equipment utilization. 2. The per cent time that an arriving letter has to wait. 3. Average system time. 4. Average cost due to waiting on the part of typewriter i.e. it remaining ideal.

18.a, Find the basic feasible solution of the following of the following transportation problem by the north west corner rule. Also find the optimal transportation plan.

	1	2	3	4	5	
A	4	3	1	2	6	80
B		2	3	4	5	60
C	3	5	6	3	2	40
D	2	4	4	5	3	20
Required	60	60	30	40	10	200 Total (OR)

18.b, Solve the following transportation problem where the cell entries are unit costs.

	D ₁	D ₂	D ₃	D ₄	D ₅	Available
O ₁	68	35	4	74	15	18
Q ₂	57	88	91	3	8	17
O ₃	91	60	75	45	60	19
O ₄	52	53	24	7	82	13
Q ₅	51	18	82	13	7	15
Required	16	18	20	14	14	82/82

19.a, A project consists of serious of tasks labeled A, B, ..., H, I with the following relationship (W < X, Y means X and Y cannot start until W is completed; X, Y < W means W cannot start until both X and Y are completed). With this notation construct the network diagram having the following constraints:

A < D, E ; B, D < F ; C < G ; B < H ; F, G < I. (OR)

19.b, Draw a network for the following project and number the events according to Fulkerson's rule

A is the start event and K is the end event,

A precedes event B,

J is the successor event to F,

C and D are successor event to B,

D is the preceding event to G,

E and F occur after event C,

E precedes F,

C restraints and occurrence of G and G precedes H,

H precedes J and K succeeds J,

F restraints the occurrence of H.

20.a, A manufacturer produces two types of models M1 and M2. Each M1 model requires 4 hours of grinding and 2 hours of polishing; whereas each M2 model requires 2 hours of grinding and 5 hours of polishing. The manufacturer has 2 grinders and 3 polishers. Each grinder works for 40 hours a week and each polisher works for 60 hours a week. Profit on a M1 model Rs 3.00 and on an M2 model is Rs 4.00. Whatever is produced in a week is sold in the market. How should the manufacturer allocate his production capacity to the two types of models so that he may make the maximum profit in a week? Consider the problem and solve it by graphical method. (OR)

20.b, Solve: Maximize $Z = x_1 + x_2$

$$\begin{aligned} \text{Subject to the conditions } & -2x_1 + x_2 \leq 1 \\ & x_1 \leq 2 \\ & x_1 + x_2 \leq 3 \\ & x_1, x_2 \geq 0 \end{aligned}$$