

[6439]-323
T.Y. B.Com.

366(f) : BUSINESS STATISTICS - III
(2019 Pattern) (Semester - VI)

Time : 2½ Hours**[Max. Marks : 50]****Instructions to the candidates:**

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of calculator and statistical table is allowed.
- 4) Symbols have their usual meanings.

Q1) a) Fill in the blanks. (Any Five) : [5 × 1 = 5]

- i) Longest possible time to complete the activity is known as _____ time in PERT.
- ii) Node is collection of two or more than two _____.
- iii) If the total float is zero then corresponding activity is called as _____ activity.
- iv) FCFS is called _____ discipline.
- v) Total float is difference of earliest start and _____.
- vi) Long form of CPM is _____.

b) State whether each of the following statement is true or false.(any five) [5 × 1 = 5]

- i) Random numbers are not used in simulation theory.
- ii) CPM is deterministic model.
- iii) Collection of critical activities is called critical path.
- iv) In queuing theory, we always assume that, average no. of arrivals is more than average no. of departures.
- v) In queuing theory, traffic density may be less than one.
- vi) The calling population is always finite.

Q2) Attempt any two of the following :

[2 × 5 = 10]

a) If $C(x) = 2x^4 - x^3 + 7x - 12$ is the manufacturer's total cost equation, then find :
average cost, fixed cost, variable cost, marginal cost

b) Explain the terms : Project network,
Revenue function,
Simulation,
Service rate,
Calling Population

c) Explain the minima and maxima function with an illustrations.

d) Explain the terms : Most likely time in PERT,
Pessimistic time in PERT,
Optimistic time in PERT,
Traffic density,
Market Equilibrium

Q3) a) The following table gives the activities in a project and other relevant information :

Activity	1-2	1-3	2-5	2-4	3-4	4-5	4-6	5-6	6-7
Duration	5	9	14	4	3	10	12	6	10

Find the earliest start, earlist finish, latest start, latest finish, total float, free float and independent float for each activity. Also find critical path.

[8]

b) A company manufacturers 200 cars per day which changes according to availability of raw material : **[7]**

Production	196	197	198	199	200	201	202	203	204
No. of days	5	9	12	14	20	15	11	8	6

Consider the following sequence of random numbers :

82, 89, 78, 24, 52, 61, 18, 45, 04, 23, 50, 77

Using the sequence, simulate the production for next 12 days. Use Monte-Carlo simulation method.

Q4) a) Given below is the information about a project regarding different activities. All estimates are in days. [8]

Activity	Time estimates		
	t_o	t_m	t_p
1-2	2	5	8
1-5	3	12	21
2-3	6	9	12
2-4	5	14	17
3-4	5	8	11
4-5	3	6	9
5-6	1	4	7

- i) Determine expected time estimate and variance for each activity.
- ii) Given the total estimated completion time is 32 days with variance 5 days, what is the probability that the project will be completed within 29 days?
- b) Workers come to a tool store room to inquiry about the special tools for a particular job. Customers arrive at the store have poisson distribution with average rate of 30 customers per hour. The average service time is minute and a half per customer. [7]

Find

- i) Average queue length.
- ii) average waiting time of workers in the queue.
- iii) Expected no. of workers in the system.
- iv) Probability that customer wait at least 12 mins. in the queue.
- v) Expected percentage of customers who wait at least 6 minutes in queue.

