

Total No. of Questions : 4]

SEAT No. :

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T.Y. B.Com.

366F : 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.

Q1) a) Fill in the blanks of the followings (any five) [5 × 1 = 5]

- i) Longest possible time to complete the activity is known as _____ time in PERT.
- ii) CPM is _____ model.
- iii) _____ is a method of imitating the real system with artificial data using computers.
- iv) In queuing theory. Interarrival service times follows _____ distribution.
- v) We can maximize profit function by using computation of _____ function.
- vi) For cost function $C(x)$, $\frac{d}{dx}(cx) < 0$ is the condition that can be determined as _____ function.

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

- i) PERT is deterministic model.
- ii) For project, we can get only one critical path.
- iii) In simulation random sample is drawn just by specifying the average without using a statistical model.

P.T.O.

- iv) In queuing theory system means only the process of waiting in a queue.
- v) The calling population is always finite.
- vi) The cost function C for output X is given by $C = X^2 - 4X + 6$ then fixed cost is zero.

Q2) Attempt any two of the following : **[2 × 5 = 10]**

- a) Explain the following terms :
network, simulation, queue discipline, cost function, Revenue function.
- b) Explain the following terms :
Optimistic time in PERT, expected duration of project, disadvantages of simulation, traffic intensity, average cost.
- c) If $C(x) = 31x^4 + 12x^2 - 71x + 12$ is the manufacturer's total cost equation, then find the, average cost, fixed cost, variable cost, marginal cost.
- d) Explain the minima and maxima function with an illustration.

Q3) a) The following table gives the activities in a project and other relevant information : **[8]**

Activity	1-2	1-4	1-3	2-5	3-5	3-6	4-6	5-7	6-7
Duration	3	4	5	2	3	7	9	8	9

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

- b) Workers come to a tool store room to inquire 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 minutes in the queue.
 - v) expected percentage of customers who wait at least 6 minutes in queue.

Q4) a) A project has the following activities and other characteristics : **[8]**

Activity	Time estimates		
	to	tp	tm
1-2	6	24	6
1-3	6	18	12
1-4	12	30	12
2-5	6	6	6
3-5	12	48	30
4-6	12	42	30
5-6	18	54	30

- i) Draw the project network and calculate the length and variance of the critical path.
- ii) What is the probability that project will be completed within 80 days?

b) Following is the probability distribution of daily demand of cakes. **[7]**

Demand of cake	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Using random numbers given below estimate demand of cake for next 10 days : 25, 39, 65, 76, 12, 05, 73, 89, 19, 49. Also find average daily demand of cake.

