Total No. of Questions : 4]

SEAT No. :

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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.***

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

i) Node is the collection of two or more than two _____.

ii) CPM is _____ model.

iii) _____ numbers are used in simulation theory.

iv) In queuing theory, no. of arrivals follows _____ distribution.

v) If $c(x) = x^4 + 92x^2 - x + 120$ is the manufacturer's total cost equation then the variable cost is _____.

vi) We can maximize profit function by using Computation of _____ function.

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

i) For project, we can get morethan one critical path.

ii) Cost function can be determined as minimum function.

iii) PERT is deterministic model.

iv) Simulation is a method of imitating the real system with artificial data using computer.

v) Expected length of queue is not same as average length of system.

vi) If $c(x) = 31x^4 + 12x^2 - 71x + 12$ is the manufacturer's total cost equation then fixed cost is 12.

P.T.O.

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

a) Explain the following terms:
Critical path,
Simulation,
Traffic intensity,
Demand function,
Supply function

b) Explain the following terms :
Most likely time in PERT,
Expected duration of project,
Advantages of simulation,
Service rate,
Profit function

c) State the condition that cost function can be determined as maxima and minima function.

d) If $C(x) = 2x^4 - x^3 + 7x - 12$ is the manufacturer's total cost equation, then find the:
Average cost, Fixed cost,Variable cost, Marginal cost

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, earliest finish, latest start, latest finish, toatal float, free float and independent float for each activity. Also find critical path.**[8]**

b) Customers arrive at a certain petrol pump in city A in a poisson process with an average time of 5 minutes between arrivals. The time intervals between services at the petrol pump follows exponential distribuiton and the mean time taken to service a vehicle is 2 minutes. **[7]**

i) Find the probability that the pump is idle.
ii) What would be expected queue length?
iii) What is expected length of the system?
iv) What would be average waiting time in the queue?
v) Obtain average time spent by a customer in the system.

Q4) a) Following is the probability distribution of daily production of items.

Production	0	5	10	15	20	25
Probability of Production	0.04	0.22	0.16	0.42	0.10	0.06

Using random numbers given below estimate production for next 10 days: 35, 52, 50,13, 23,73, 34, 57, 35, 83. Also find average daily production. **[8]**

b) Given below is the information about a project regarding different activities. All time estimates are in days. **[7]**

Activity	1-2	2-3	2-4	2-5	3-6	4-6	5-7	6-7
to	1	1	1	5	2	5	4	1
tm	5	7	5	11	6	7	6	5
tp	3	4	3	8	4	6	5	3

i) Determine expected time estimate and variance for each activity.

ii) What is the probability that the project will be completed within 15 days.

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