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T.Y. B.Com.

STATISTICS

Business Statistics - III

(2019 Pattern) (Semester - VI) (366(f))

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 statistical tables and calculator is allowed.***

Q1) a) Attempt Fill in the blanks any *five* of the following : **[5]**

i) We can minimize cost function by using computation of _____ function.

ii) If $C(x) = 36x^4 + 72x^3 - 27x + 122$ is the manufacturer's total cost equation then variable cost is _____.

iii) CPM is _____ model.

iv) FCFS is called _____ discipline.

v) Long form of CPM is _____.

vi) Total float is difference of earliest start and _____.

b) State whether *each* of the statement given below is true or false : **[5]**

i) In queuing theory no. of arrivals is follows Poisson distribution.

ii) PERT is non-deterministic model.

P.T.O.

iii) In queuing theory, traffic density maybe greater than one.

iv) If $C(x) = x^4 + 4x^2 - 7x + 22$ is the manufacturer's total cost equation then $x^4 + 4x^2 - 7x$ is called fixed cost.

v) When total float corresponding activity is equal to zero then such activity is called as critical activity.

Q2) Attempt any *two* of the following : **[10]**

a) Explain the following terms:

i) Network.

ii) Profit function.

iii) Simulation.

iv) Queue.

v) Traffic density.

b) If $C(x) = 13x^3 + 5x^2 - 6x + 13$ is the manufacturer's total cost equation, find the :

i) average cost

ii) fixed cost

iii) variable cost

iv) marginal cost

c) Explain the following terms:

i) Most likely time in PERT.

ii) Queuing system.

iii) Service Channel.

iv) Market Equilibrium,

v) Optimistic time in PERT.

d) Explain the minima 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	2-4	2-6	4-5	3-5	3-6	5-6
Duration	8	10	8	10	16	17	18	14	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) A road transport company has one reservation clerk on duty at a time. He handles information of bus schedules and make reservations. Customers arrive at a rate of 8 per hour and the clerk can service 12 customers on an average per hour. Under assumption of queuing theory, find: **[7]**

i) Average number of customers waiting for the service.

ii) Average number of customers in a queue

iii) Average waiting time of customer for the service.

iv) Probability that the reservation clerk is idle.

Probability that a customer has to wait before he gets service.

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

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
t_0 :	5	1	2	3	1	2	1
t_m :	6	1	4	6	1	2	4
t_p :	7	2	12	15	1	8	7

i) Draw the PERT network diagram and find expected time estimate & variance for each activity.

ii) Given the total estimated project completion time is 17 days with SD 3.14 days. What is the probability that the project will be completed within 12 days?

b) A company manufactures 200 cars cycles 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.

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