K24P 3864

Reg. No. : .....

Name : .....

I Semester M.Com. Degree (C.B.C.S.S. – O.B.E. – Reg./Supple./Imp.) Examination, October 2024
(2023 Admission Onwards)
CMCOM 01C02 : QUANTITATIVE TECHNIQUES AND OPERATIONS RESEARCH

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **any five** questions. **Each** question carries **three** marks. (5×3=15)

1. Explain the methodology for simulation process.
2. What are the features of a binomial distribution ?
3. A single card is chosen at random from a standard deck of 52 playing cards. What is the probability of choosing a king or a club ?
4. What is meant by Jockeying, Balking and Reneging ?
5. State the multiplication theorem of probability.
6. What are the time estimates used in PERT ?

SECTION – B

Answer **any three** question. **Each** question carries **five** marks. (3×5=15)

7. Differentiate PERT and CPM.
8. Explain different phases of Operations Research.
9. Solve the following assignment problem to get maximum profit.

		Machines			
		A	B	C	D
Job	1	35	27	28	37
	2	28	34	29	40
	3	35	24	32	28
	4	24	32	25	28

P.T.O.

10. A box contains 5 black, 7 red and 6 green balls. Three balls are drawn from this box one after the other without replacement. What is the probability that the three balls are
    1) all black balls
    2) of different colours
    3) two black and one green black ?

11. Draw a network diagram for the project whose activities and their predecessor relationships are given below :

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor Activity	–	–	–	A	B	B	C	D	F	H, I	F, G

SECTION – C

Answer **any three** questions. **Each** question carries **ten** marks. **(3×10=30)**

12. A company has three production facilities S1, S2 and S3 with production capacity of 7, 9 and 18 units (in 100s) per week of a product, respectively. These units are to be shipped to four warehouses D1, D2, D3 and D4 with requirement of 5, 8, 7 and 14 units (in 100s) per week, respectively. The transportation costs (in rupees) per unit between factories to warehouses are given in the table below :

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	34

Minimize the total transportation cost. Use North-West Corner Method (NWCM) to find an initial basic feasible solution.

13. In a certain neighbourhood,90% of children fell ill due to the flu and 10% due to measles, with no other diseases reported. The probability of observing rashes for measles is 0.95 and for the flu is 0.08. If a child develops rashes, find the probability of the child having the flu.

14. A project consists of seven activities with the following time estimates. Find the probability that the project will be completed in 30 weeks or less.

Activity	Predecessor Activity	Optimistic time estimate (days)	Most likely time estimate (days)	Pessimistic time estimate (days)
A	–	2	5	8
B	A	2	3	4
C	A	6	8	10
D	A	2	4	6
E	B	2	6	10
F	C	6	7	8
G	D,E,F	6	8	10

15. Consider the problem of assigning four sales persons to four different sales regions as shown below such that the total sales are maximized.

		Sales Region			
		1	2	3	4
Sales person	A	5	11	8	9
	B	5	7	9	7
	C	7	8	9	9
	D	6	8	11	12

The cell entries represent annual sales figures in crores of rupees. Find the optimal allocation of the salespersons to different regions.

16. Define the following:
    a) Trial
    b) Event
    c) Mutually exclusive event
    d) Exhaustive event
    e) Independent event.

    Also explain different schools of thought on probability.