B.N.Bandodkar College of Science, Thane.

T. Y. B. Sc. Preliminary Examination.2012

Operations Research (Applied Component)

Paper II

Duration : 3hours. Max. Marks : 60

N.B (1) All questions are compulsory.

. (2)Use of Calculators is allowed.

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Q.1 Attempt any <u>two</u> questions

a) Define independence of the events and show that i) $\bar{A}$ and B are independent **(6)**

ii) A and $\bar{B}$ are independent iii)P(A/B)=P(A),when A and B are independent.

b) i)Write short note on decision tree.

ii)State and prove any one property of the entropy function. **(6)**

c) Describe the method to obtain optimum duration at optimum cost in CPM using Cost analysis. **(6)**

Q.2 Attempt any <u>two</u> questions

a) For the following probability density function (p d f) of a continuous random variable x **(6)**

$f(x) = 6x(1-x) \quad 0 < x < 1$

$= 0$ Otherwise

Find its mean and variance . Also obtain $P[X< 0.5]$

b) The nuts in certain type of chocolate X has Poisson distribution, with $P[X = 4] = P[X = 3]$ .Find the parameter of Poisson. Hence (i) Mean of X , and (ii) the no of chocolates in lot of 500 containing at most 1 nut. **(6)**

c) A shoe manufacturing company claims that one of their popular brands follows normal distribution with 74 weeks on an average life and a standard **(6)**

deviation of 5 weeks.

(i) Find the probability that pair of shoes last for at least 79 weeks.(ii) Find the probability that pair of shoes has life between 64 weeks and 84 weeks.

(iii) What is the life of the middle 50 % of shoes?

Q.3

a) Attempt any <u>two</u> questions
Explain the following the role of following terms in decision making **(6)**

b) i)EMV ii)EPPI iii)EVPI .

c) Write short note on decision tree . **(6)**

Consider the following payoff matrix **(6)**
Obtain i)Minimax ii)Laplace iii)Maximin criteria

States of nature

Actions↓

	S_1	S_2	S_3
A_1	15	10	0
A_2	3	14	8
A_3	1	5	14
A_4	7	19	10

Q.4

Attempt any <u>two</u> questions

a) Define expected mutual information and prove that $I(XY) = H(x) - H(y/x)$ **(6)**

$= H(y) - H(x/y)$.

b) Discuss the Shannon-Fano encoding procedure. **(6)**

c) Define . i)Channel Matrix ii) Channel Capacity iii) Efficiency of channel **(6)**

iv)Redundancy of a channel v) Instantaneous code vi)Average code word.

Q.5 Attempt any <u>two</u> questions **(6)**

a) Define i) predecessor event ii) successor event.iii) start event iv) end event.

Explain Fulkerson's rule of numbering the events.

b) Explain three different time estimates for activity in a PERT network. **(6)**

c) Explain the concept of Float in CPM network .Hence explain three different Floats in CPM network. **(6)**

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