B. N .BANDODKAR COLLEGE OF SCIENCE, THANE
FIRST SEMESTER END EXAMINATION OCTOBER 2011
USST102

DURATION:2 HOURS MARKS :60

N.B.: 1 All questions are compulsory.
2 Use of simple calculator is allowed.

Q.1 (a) Attempt any ONE
(1) Explain the term random experiment. 1
(2) Give an example Sample space of a random experiment. 1
(b) Attempt any TWO
(1) i) State Baye's Theorem. 7
ii) Write Mathematical and Statistical of probability. State their limitations.
iii)Write the expression for P[AUBUC].
(2) i) Show that $P(A\cap B)=P(A/B).P(B)$. 7
ii) If A and B are independent events , show that $\bar{A}$ and B are independent also $\bar{A}$ and $\bar{B}$ are independent.
(3) State the addition theorem on probability for two events. Further write the expression for P[AUB] in each of the following cases, stating reasons. i)A and B are mutually exclusive events ii) A is subset of B iii)B= $\bar{A}$ iv) B is subset of A . 7

Q.2 (a) Attempt any ONE
(1) Define a random variable (r.v). 1
(2) Give an example of a discrete random variable. 1
(b) Attempt any TWO
(1) i)State properties of probability mass function (p.m.f) of r.v. 7
ii) Obtain the expressions for first four central moments terms of first four raw moments.
(2) i)State and prove addition theorem on expectation. 7
ii)Define Correlation coefficient.Further state what is meant by uncorrelated r.v.s. If random variables are independent ,what will be Correlation coefficient Corr (X,Y).Are they uncorrelated?
(3) The joint probability mass function (p.m.f) of r.v.s X and Y is given below. 7

Y \ X	0	1	2
-1	0.12	0.28	0.1
1	0.18	0.12	0.2

Find i) Marginal p.m.f of Y ii)Conditional p.m.f of X given Y= 1 iii)$P[X + Y \leq 1]$ iv)Check whether X,Y are independent.

Q.3 (a) Fill in the blanks (Any ONE)
(1) Mean of Binomial distribution is greater than its …… 1
(2) Mean and ….of Poisson distribution are equal . 1
(b) Attempt any TWO
(1) For Poisson distribution with parameter m find mean and variance. 7

(2) A r.v.X has Binomial distribution with parameters n,p. 7
i)Write its p. m. f. ii) Find the recurrence relation for probabilities of Binomial distribution.iii)State its standard deviation (s.d.) iv) Give any one practical situation where it is appropriate.v) State the conditions under which it tends to Poisson r.v.

(3) A r.v.X assuming values 1,2,3,….6.has Uniform distribution . Find its first four central moments. 7

Q.4 (a) Correct the Statement(Any ONE)

(1) For a r.v X with B(7, 0.5) , Mode is =4. 1

(2) A r.v has Poisson distribution with parameter 4 , its s.d=16. 1

(b) Attempt any TWO

(1) Given the following p.m.f of a r.v find the cumulative distribution function (c.d.f) of X. Obtain its mean and S.D 7

x	-2	-1	0	1	2
P(x)	0.05	0.3	0.35	0.25	0.05

(2) Show that 7
i)E(aX+b)=aE(X) +b, ii)V(cX)= c^2 V(X)
iii)COV(X,Y) =E(XY)- E(X) E(Y)

(3) Define i) Sample space ii)An event iii)Complementary Event iv) Exhaustive events v)Equally likely events vi) Independent events vii) Conditional probability. 7

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