B. N .BANDODKAR COLLEGE OF SCIENCE, THANE.
SECOND SEMESTER END EXAMINATION MARCH 2012®
F. Y. B. Sc
USST202

DURATION:2 HOURS MAX MARKS :60

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

Q.1 a		Attempt any ONE	
	1)	Give an example of a continuous random variable.(r. v.)	1
	2)	Write any one property of probability density function (p. d. f) of continuous r. v.	1
b		Attempt any TWO	
	1)	i)Define cumulative distribution function (c. d. f) of continuous r. v. and state its properties. ii)Show that P[a < X < b]= F(b) - F(a) ;where F is c. d. f of continuous r. v. X, a < b , a, b are real numbers.	7
	2)	For a continuous r. v. X with p. d. f. , write the expressions for the following. i)Mean, ii)r th raw moment, iii) r th raw central moment , iv)Mean deviation about mean for r. v X.	7
	3)	For the following p. d . f of a continuous random variable X f(x) = 0.2 –0.02x 0 < x < 10 = 0 Otherwise find i) c. d. f F(x) ,ii) Median of X.iii)P[5 < X $\leq$ 8]	7
Q.2 a		State the following(Any ONE)	
	1)	A practical situation where exponential distribution is appropriate.	1
	2)	P. d. f of X having exponential distribution with parameter 4.	1
b		Attempt any TWO	
	1)	State any 7 properties of r. v with N(μ, σ^2).	7
	2)	A r. v. X assuming values over (0,1) has Uniform distribution . Find its i) first four raw moments, ii) first four central moments.	7
	3)	i) Write p. d. f of X having N (0,1). If F(x) = P[X$\leq$ x] is its c. d f. express. A)the area to the left of x and B) the area between –x and x in terms of F(x). ii)A r. v x has exponential distribution with parameter ɵ. Find its median	7
Q.3 a		Correct the Statement(Any ONE)	
	1)	In testing of hypothesis, the two types of errors , can not be measured.	1
	2)	In testing of hypothesis, if the alternative hypothesis is composite size of type one error is level of significance.	1
b		Attempt any TWO	
	1)	Distinguish between i)Parameter and statistic ii)Interval estimation and Point estimation iii) Type I error and Type II error	7

P.T.O

2) Give five step procedure for testing specified value of the population proportion $P=P_0$ against $P \neq P_0$, at 5% level of significance. State underlying assumptions clearly. 7

3) Explain the following and give example of each i)Critical region ii)Standard error of the estimator iii) Confidence interval 7

Q.4 a Fill in the blanks (Any ONE)

1) If F(x) is the c.d.f of continuous r.v. , then $\frac{dF(x)}{dx}$ =….. 1

2) For X having $N(\mu, \sigma^2)$ its quartile deviation is =…… 1

b Attempt any TWO

1) In context with testing of hypothesis explain following terms 7
i)Null hypothesis , ii)Composite hypothesis, iii)Critical region ,
iv)Type I error, v) Type II error, vi) Level of significance ,
vii) Power of the test.

2) Choose correct option from the square bracket and rewrite the statements. 7

i) μ_2 second central moment of r.v X is ------- [S.D ,Variance]

ii) μ_4'-4 μ_3' μ_1'+6 μ_2' $\mu_1'^2$ -3 $\mu_1'^4$ = ----- [μ_4, μ_3]

iii) Correlation coefficient is not affected by change of----[origin and scale , scale]

iv) COV(a+X, b+Y) =--- [COV(X,Y), abCOV(X,Y)]

v) β_2 = --- [$\frac{\mu_3^2}{\mu_2^3}$, $\frac{\mu_4}{\mu_2^2}$]

vi) If coefficient of skewness γ_1 is positive, distribution is -------skewed [positively, negatively] .

vii)Mode of the r,v can be obtained by solving ------
[$\frac{df(x)}{dx}$ =0 , F(x)=0.5]

3) State the following: 7
   i) Central limit theorem
   ii) Procedure for applying Normal approximation to Binomial probabilities
   iii) Sampling distribution of sample mean
   iv) Any one property of an estimator.
