B. N .BANDODKAR COLLEGE OF SCIENCE, THANE.
SECOND SEMESTER END EXAMINATION .MARCH 2012(Additional)
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) What is meant by continuous random variable.(r. v.) 1

2) Give an example of a continuous r. v. 1

b Attempt any TWO

1) For a continuous r. v. X. write the expressions for the following. 7
i)Mean,
ii)r^{th} raw moment,
iii) r^{th} raw central moment ,
iv)Mean deviation about mean for r.v X.

2) i)Define probability density function (p. d. f) and cumulative distribution function (c. d. f) of a continuous r. v. 7
ii)State how do you find A) p. d f from c. d. f .B)Mode from p. d. f .
C) Standard deviation (S.D) from Variance.

3) For the following p. d . f of a continuous r. v X 7
$f(x) = 0.5 - 0.5x \quad -1 < x < 1$
$= 0$ Otherwise
Find i) c. d. f F(x) ,
ii) Median of X.
iii)P[X < 0.5]

Q.2 a Attempt any ONE

1) Sketch p. d. f of r. v X having U(1, 2) 1

2) Write p. d. f of X having exponential distribution with parameter 2. 1

b Attempt any TWO

1) Write p. d. f of r. v with $N(\mu, \sigma^2)$ and state its any 5 properties . 7

2) A r. v has exponential distribution with parameter ɵ. Find its i) c. d. f 7
ii)Median iii) Mean.

3) i)Obtain P[X < 0] if X follows N(0, 1) and state distribution of 2X+3 7
ii) Find Mean and Variance of X having U(1,3)

Q.3 a Correct the Statement(Any ONE)

1) A sample of size 25 or more is statistically regarded to be large sample. 1

2) Under certain conditions distribution of sample mean is approximately Uniform, irrespective of its parent population. 1

b Attempt any TWO

1) Define 7
i) Population
ii) Sample
iii) Parameter

P.T.O

iv) Estimator
v) Estimate
vi) Sampling distribution of an estimator
vii) Standard error(S. E) of an estimator.

2) What is testing of hypothesis? In context with testing of hypothesis distinguish between 7
   i) Null hypothesis and Alternative hypothesis.
   ii) Simple hypothesis and Composite hypothesis
   iii) Type I error and type II error. P.T.O

3) The test of significance of the population parameter $\mu = \mu_0$, a specified value against $\mu > \mu_0$, is to be carried out at 5% level of significance ,for this test state following i)Underlying assumptions, ii)Test statistic iii) Decision rule for acceptance or rejection. What will be change in iii) if alternative is two sided that is $\mu \neq \mu_0$? 7

Q.4 a Complete the following statements (Any ONE)

1) Level of significance is ---------- 1

2) Normal approximation can be used for Poisson probabilities ,if---------- 1

b Attempt any TWO

1) State any two properties of 7
   i) Correlation coefficient
   ii) C.d. f of r. v
   iii) Variance of a r. v.
   iv) An estimator

2) i)What are assumptions underlying for test of significance for testing equality of two population means? 7
   ii)State Central limit theorem and state one of its application.
   iii)State Additive property of the normal distribution.

3) X is a continuous r. v . f(x) is its p. d. f 7

$$f(x) = A(1-x^2) \quad -1 < x < 1$$
$$= 0 \quad \text{otherwise}$$

Find i) A. (ii) third central moment μ_3 of X (iii) $P[0.25 \leq X \leq 0.5]$.
