B.N.BANDODKAR COLLEGE OF SCIENCE, THANE

Preliminary Examination February 2012

T.Y.B. Sc. STATISTICS

PAPER IV

Duration 3 hours. Marks 100

N.B.(1) All questions are compulsory.

Q.1 Attempt ANY TWO (20)

a) Explain the following life table functions

(i) d_X (ii) L_X (iii) ${}_nq_x$ (iv) T_x (v) e_x .

b) (1)Describe the four components of the time series.

(2) Write limitations of simulation technique

c) For Series system find the expressions for reliability and Mean time to failure of these system with n components having hazard rate λ for each.

Q.2 Attempt ANY TWO (20)

a) Explain the following terms(i) effective rate of interest (ii) variable annuity certain (iii) Deferred annuity due (iv) Select life table (v)Accumulated value of an immediate annuity

b)Derive the expression for following

(i) A Temporary life annuity due of 1 p.a. @ i p.a (ii) An annuity due of 1 payable p times in a year for n years certain@ i p.a

c) Define force of mortality μ_x. And show that(i)$\mu_{x+½} = m_x$ (ii)$p_x = \frac{2-m_x}{2+m_x}$

Q.3 Attempt ANY TWO (20)

a) State the basic underlying assumptions needed to derive net level premium. Obtain the expression for the level annual premium for Endowment Assurance on (x) in terms of commutation functions.

b) Describe any two assurance benefits. Derive the expressions for their p.v.s. in terms of commutation function State why they are called single premium.

c) What is office premium? Explain following (i) interest loading (ii) Mortality loading.

Q.4 Attempt ANY TWO (20)

a).Write a short note on Exponential smoothing technique.

b) What is time series? What is the importance of study of time series in business and economics?. Describe any one method of estimating Seasonal component in time series.

c) What is Simulation? Write the steps of the Monte Carlo technique of simulation.

Q.5Attempt ANY TWO (20)

a) The p.d.f of time before failure of a system is f(x) $x \geq 0$;If h(t) is its hazard rate F(x)=P [X $\leq$ x],then show that f(t) =h(t) exp{ $-\int_0^t h(x)dx$ }

Further explain the difference between increasing failure rate and decreasing failure rate ,and give an example of system with such rates.

b) What is Auto correlation? Write any one test for testing it.

c)Explain

(i) the multiple linear regression model with 3 explanatory variables.

(ii) the role of coefficient of determination in regression analysis

(iii)The need to test multi collinearity in regression analysis.
