RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. FIFTH SEMESTER EXAMINATION, DECEMBER 2013

THIRD YEAR

Date : 16/12/2013 — **Economics (Honours)**

Time : 11 am – 3 pm — Paper : V — Full Marks : 100

(Use a separate answer book for each group)

Group – A

1. Answer **any four** questions from the following: (4 × 5)

   a) Prove that $r_{y\hat{y}} = |r|$, where $r_{y\hat{y}}$ is the correlation coefficient between actual y and the predicted value of $y(i.e\hat{y})$ and r is the correlation coefficient between x and y.

   b) The joint p.d.f of two continuous random variables X and Y is :-

   $$f(x,y) = 2e^{-x-2y} \quad 0 < x < \alpha,\ 0 < y < \alpha$$
   $$= 0 \qquad \text{else where}$$

   Find the marginal distributions of X and Y, Conditional distribution of X and Y.

   c) Define Net Reproduction Rate. What are its uses?

   d) i) Define the power of a test in connection with the testing of hypothesis. (1)

   ii) If $x \geq 1$ is the critical region of testing the null hypothesis $H_0 : \theta = 2$ against the alternative hypothesis $H_1 : \theta = 1$ on the basis of a single observation from the population, $f(x,\theta) = \theta e^{-\theta x};\ 0 \leq x < \alpha$, obtain the power of the test. (4)

   e) i) State the Central limit theorem. (1)

   ii) Given the discrete uniform distribution

   $$f(x) = \begin{cases} \frac{1}{3}; & x = 2,4,6 \\ 0; & \text{otherwise} \end{cases}$$

   Find the probability that a random sample of size 54, selected with replacement, will yield a sample mean greater than 4.1 but less than 4.4.

   [Note: $\Phi(1.8) = 0.9641 \& \Phi(0.45) = 0.6736$] (4)

   f) Show that Spearman's rank correlation coefficient can be derived as a product moment correlation coefficient.

   g) What do you mean by χ^2 (chi-square)? Explain the concept of degrees of freedom in this context.

2. Answer **any two** questions from the following: (2 × 15)

   a) i) If $T(x_1, x_2, ...x_n)$ be an unbiased estimator of θ, prove that it does not necessarily mean than T^2 will be an unbiased estimator of θ^2. (3)

   ii) If $x_1, x_2, ...x_n$ are the outcomes of n independent Bernoullian trials with constant probability p of success in each trial, & if

   $$\left.\begin{aligned} x_i &= 1 \text{ with probability } p, i = 1,2,...n \\ &= 0, \text{otherwise, i.e, with probability } 1-p \end{aligned}\right\}$$

   And we define $s = x_1 + x_2 + ... + x_n$, show that $\frac{s}{n}$ is an unbiased estimator for p. (4)

   iii) Find the maximum likelihood estimator (m.l.e) for θ for the distribution $f(x,\theta) = (1+\theta)x^{\theta};\ \theta \leq x \leq 1$. (8)

b) The following data is given for 20 pairs of observations on X and Y.

$\sum X = 228 \quad \sum Y = 3121 \quad \sum XY = 38927$

$\sum X^2 = 3204 \qquad \sum (Yi - \bar{Y})^2 = 19837$

i) Find the regression line of y on x. (3)

ii) Find the s.e. of the coefficients. (3 + 3)

iii) Find the 95% confidence interval of the intercept. (3)

iv) Just at 5% level that y does not depend on x. Given $t_{18, .025} = 2.101$. (3)

c) Consider a two variable linear model $Y = \alpha + \beta X + u$, where α, β are two parameters and u is the disturbance term. Calculate the ordinary least squares (OLS) estimators of α and β and show that these are the best linear unbiased estimators (BLUE). State the reasons for inclusion of the disturbance term u in the model. (12 + 3)

d) i) If the regression line is fitted through origin, what can you say about the nature of residuals? (3)

ii) Derive the approximate relation between the D-W statistic and the correlation between the errors u_t and u_{t-1}. (4)

iii) Describe a test for detecting heterosced asticity in a linear mode. (3)

iv) Derive the expression for co-variance between the intercept and the slope estimates in a two-variable linear regression model. (5)

Group – B

3. Answer **any three** questions from the following : (3 × 4)

a) What do you mean by Non Performing Asset (NPA) of a bank?

b) Mention about the main features of WTO.

c) Distinguish between plan expenditure and non-plan expenditure of the GOI.

d) What do you understand by 'capital-account convertability' in Indian context?

e) Write a short-note on Special Economic Zone in India.

4. Answer **any one** question from the following : (1 × 8)

a) Discuss about the performance of the financial sector in India after economic reform.

b) Explain briefly the reasons for decelerating agricultural growth rate in West Bengal in the post-reform period.

Or,

Write a note on the role of unorganised industrial sector in West Bengal.

5. Answer **any two** questions of the following : (2 × 15)

a) What are the basic problems in the context of efficient operation of the monetary policy of the RBI? Critically review in this context the policy of 'Controlled Expansion'. (10 + 5)

b) Critically review the problem of disproportionality between direct and indirect taxes in India. Discuss how this problem was sought to be solved in the post-reform period. (5 + 10)

c) Critically review the policy of the GOI towards foreign capital. Mention in this context the problems and prospects of FDI in India. (9 + 6)

d) Examine the share of West Bengal to all India level in terms of value added, employment and number of factories in the industrial sector. (5 + 5 + 5)