

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, DECEMBER 2018

THIRD YEAR [BATCH 2016-19]

ECONOMICS (Honours)

Paper : VI

Date : 24/12/2018

Time : 11 am – 3 pm

Full Marks : 80

**(Use a separate Answer book for each group)**

## Group – A

Answer any three questions

[3×10]

1. A retailer finds its sales  $Y$  are determined almost entirely by seasonal factors. It defines the following dummy variables for spring, summer, autumn, & winter:

$$D_{ki} = \begin{cases} 1 & \text{for season } k (k = 1, 2, 3, 4) \\ 0, & \text{otherwise} \end{cases}$$

The retailer is considering four ways of modelling the seasonal determination of its sales. The first is a regression that includes all four dummies but no intercept.

(i)  $Y_i = \alpha_1 D_{1i} + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \varepsilon_i$ .

The second model is

(ii)  $Y_i = \beta_1 + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_4 D_{4i} + \varepsilon_i$ .

The third model is

(iii)  $Y_i = \alpha + \beta_1 D_{1i} + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_4 D_{4i} + \varepsilon_i$ .

The fourth model is to define the qualitative variable,

$$X_i = \begin{cases} 0 & \text{for Winter} \\ 1 & \text{for Spring} \\ 2 & \text{for Summer} \\ 3 & \text{for Autumn} \end{cases}$$

- a) Explain which of these regressions can be estimated & which cannot be estimated.  
b) Explain any advantages or disadvantages of the fourth model.

[6+4]

2. Consider the following regression model:

$$Y_i = \beta_1 + \beta_2 X_i + u_i$$

where  $X_i$  = Family income of the  $i^{\text{th}}$  person.

$$Y_i = \begin{cases} 1 & \text{if the } i^{\text{th}} \text{ person owns a car} \\ 0 & \text{otherwise} \end{cases}$$

Consider  $P_i = P[Y_i = 1]$ ,  $E(u_i) = 0$ , &  $\text{Cov}(u_i, u_j) = 0$ ,  $i \neq j$ .

- a) How do you interpret  $E(Y_i / X_i)$ ?  
b) Show that the error term in the model is heteroskedastic.  
c) While estimating the model, how do you overcome the issue of heteroskedasticity?  
d) Given the interpretation of the slope parameter in the above model, why do you think it is not a logically attractive model?  
e) Suggest a model that overcomes the issues of the above model.

[2+2+2+2+2]

3. Explain the concept of multicollinearity using a suitable example. State the possible effects of the existence of multicollinearity on the unbiasedness & minimum variance properties of OLS estimates. Explain how the presence of multicollinearity can be detected using the concept of VIF (Variance Inflation Factor).

[3+2+5]

4. a) Let  $X' = [X_1 \ X_2 \ X_3]$  denote a random vector, where  $X_i \sim N(0, 2^2)$ ,  $i = 1, 2, 3$ .

Let  $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ . State the distribution of  $X'AX/4$  and hence find its expectation.

- b) In the context of a multiple linear regression model, prove the following statement:

$$\frac{R^2 / (k-1)}{(1-R^2) / (n-k)} \sim F(k-1, n-k)$$

where  $R^2$  = Coefficient of determination of the model,

$k$  = Number of unknown parameters in the model,

$n$  = Number of observations.

[5+5]

5. "Multiple regression coefficient of any single variable can also be obtained by first netting out the effect of other variable(s) in the regression model from both the dependent & independent variables." Show this.

[10]

### **Group – B**

**Answer any two questions from Question Nos. 6 to 8 :**

[2×4]

6. Explain how the following transactions would give rise to entries in both the debit and credit sides of India's Balance of Payments Accounts:

- a) An Indian investor buys a 2-year USA treasury note, pays by cheque.  
b) An Indian tourist spends euros in Spain.

[2+2]

7. 'In case of an open economy, an increase in the budget deficit may lead to an increase in the current account deficit, unless supported by a sustained increase in domestic savings.'— Verify the validity of the statement.

[4]

8. Distinguish between Expenditure-Switching and Expenditure-Reducing policies with suitable examples.

[4]

**Answer any one question from Question Nos. 9 & 10 :**

[1×7]

9. Consider an economy characterized by the following equations:

$$Y = C + I + G + TB$$

$$C = \bar{C} + (1-s)Y_d$$

$$Y_d = Y - t.Y$$

$$I = \bar{I}$$

$$G = \bar{G}$$

$$TB = \bar{X} - (\bar{M} + m.Y_d)$$

where the notations have their usual meanings.

- a) Solve for the equilibrium value of Y.
  - b) Find the open economy fiscal multiplier. Is it larger or smaller than the closed economy multiplier  $\frac{1}{s}$ ? What is the intuitive explanation?
  - c) What is the impact of fiscal expansion on the Trade Balance? [1+4+2]
10. Compare and contrast the effectiveness of monetary policy in case of an open economy under fixed and flexible exchange rate systems. [7]

**Answer any one question from Question Nos. 11 & 12 :** [1×10]

11. Under the fixed exchange rate system, no net capital flows, perfectly elastic supply curves and focus of residents only on domestic prices, show that the impact of devaluation on trade balance is uncertain. Derive the Marshal-Lerner condition in this regard. What are the implications of the J-curve effect? [4+4+2]
12. Explain, with the help of Swan Diagram, how both internal and external balances of a country are simultaneously determined. Discuss the 'Assignment problem'. [5+5]

**Answer any two questions from Question Nos. 13 to 15 :** [2×4]

13. a) Explain why watching movies in a cinema hall is not considered as a consumption of public good whereas roaming around a park can be considered as a consumption of public good.
- b) Do you think that travelling through an expressway with toll gates can be considered as a consumption of public good? [2+2]
14. Explain how aggregate demand curve is derived from individual demand curves for a private good and a public good. [4]
15. Why may provision of local public goods by a central authority lead to a welfare loss? Explain. [4]

**Answer any one question from Question Nos. 16 & 17 :** [1×7]

16. Analyse the impact of income tax on work effort under the following situations:
  - a) Marginal utility of income constant.
  - b) Marginal utility of leisure constant. [3.5+3.5]
17. What is Equal Proportional Sacrifice? What will be the nature of taxation under Equal proportional sacrifice if the utility function is  $U = wY$ ? [2+5]

**Answer any one question from Question Nos. 18 & 19 :** [1×10]

18. What do you mean by the Free Rider problem? Show with the help of an example, how such problem can arise in case of a public good. Can you design a mechanism that can eliminate such problem? [2+4+4]
19. Explain the concept of Ricardian equivalence. Under what condition may such an equivalence fail to hold? [6+4]