

ENTRANCE EXAMINATION, 2014

M.Phil./Ph.D.

INTERNATIONAL TRADE AND DEVELOPMENT

[Field of Study Code : ITDP (106)]

Time Allowed : 3 hours

Maximum Marks : 70

Answer Question No. 1 and **any three** other questions. All the parts of the chosen questions should be answered

1. Consider the function

$$f(x, y) = xy^2$$

and the set

$$A = \{(x, y) \in R_+^2 : x + y \leq 100, 2x + y \leq 120\}$$

- (a) Formulate the Kuhn-Tucker equations that determine the maximal points of f in A . 5
- (b) Compute the solutions of the above Kuhn-Tucker equations. 5
2. (a) Oreland, a country rich in iron ore is characterized by high asset inequality and poverty. A shock to the global price of iron has reduced labour demand in Oreland. Explain, in the context of the capacity curve, why a shock to global iron prices could lead to involuntary unemployment in Oreland. Clearly state any assumptions you make in this analysis. 10
- (b) What policy options does the Government of Oreland have to address involuntary unemployment? Briefly discuss the trade-offs of your suggestions. 5
- (c) Suppose you need 8000 units of work (in capacity units) to be performed, and you can hire all the labourers that you want. Assume that all income earned by the labourers is paid to them by you, and that all income is spent on nutrition. The capacity curve for each labourer is described as follows—for all payments up to ₹ 100, capacity is zero and then begins to rise by 2 units for every additional rupee paid. This happens until an income of ₹ 500 is paid out. Thereafter, an additional rupee paid out increases capacity by only 1.1 units,

until total income paid is ₹ 1,000. At this point, additional payments have no effect on work capacity. Assume that you would like to get your work done at minimum cost. Describe how many labourers you would hire to get your work done and how much you would pay each of them.

5

3. A representative household has the utility function

$$U = \ln \left(C - \gamma \frac{N^{1+\sigma}}{1+\sigma} \right)$$

where U is utility, C is consumption, N is labour supply, and γ and σ are parameters of the function (both positive). The parameters are such that the term within parenthesis in the utility function is positive.

The household budget constraint is given by

$$PC = WN + Z_0$$

where P is the price level, W is the wage rate and Z_0 is the exogenous non-labour income.

The competitive labour demand is given by

$$\ln N = \ln K_0 - \frac{1}{1-\alpha} [\ln (W/P) - \ln \alpha]$$

where K_0 is the exogenous capital stock and α is the efficiency parameter of labour in the production function with $0 < \alpha < 1$.

(a) Derive the labour supply function. 2

(b) Show what happens to optimal consumption and labour supply, if non-labour income Z_0 increases. Explain the economic intuition underlying the result for which you may use a diagram. 5

(c) Introduce a consumption-tax at rate t_c and compute the effects it has on optimal consumption and labour supply. 5

(d) Assuming labour market clearing, compute the general equilibrium effects on employment and real wage rate of the consumption tax introduced in part (c). 8

4. (a) X_1 and X_2 are independent random variables, identically distributed as the following probability density function (pdf) :

$$f(x) = \begin{cases} e^{-x} & ; 0 < x < \infty \\ 0 & ; \text{elsewhere} \end{cases}$$

Obtain the pdf of the random variable $Y = X_1 + X_2$.

10

(b) Consider the regression equation

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + u_t; \quad t = 1, 2, \dots, n$$

where $E(X_{1t}u_t) = 0$; $E(X_{2t}u_t) \neq 0$; $E(u_t) = 0$; $E(u_t u_{t'}) = \begin{cases} 0 & ; t \neq t' \\ \sigma^2 & ; t = t' \end{cases}$

- (i) Examine the properties of the OLS (Ordinary Least Squares) estimates of β_i ; $i = 0, 1, 2$. 5
- (ii) Discuss a method to obtain consistent estimates of β_i ; $i = 0, 1, 2$ in this case. 5
5. (a) The economy of Ruritania is relatively labour abundant as compared to the economy of Salvia, which is relatively capital abundant. State the minimum necessary assumptions required for the validity of the Heckscher-Ohlin theory of trade. Suppose trade takes place as predicted by this theory. What are the necessary conditions for factor prices to be equalized between them? 5
- (b) The poorest in India are in the subsistence economy. Discuss how, if at all, they are likely to be affected by globalization. 15
6. (a) What is the relationship between the long-run average cost curve and the short-run average cost curve for a firm? Does the same relationship hold between the long-run marginal cost curve and the short-run marginal cost curve? 10
- (b) Define Pareto optimality. Define a public good. How is the concept of Pareto optimality to be applied in a model of exchange where one of the goods is a public good? 10
