ENTRANCE EXAMINATION, 2017

M.Phil./Ph.D.

INTERNATIONAL TRADE AND DEVELOPMENT

[Field of Study Code : ITDP (106)]

Time Allowed : 3 hours *Maximum Marks* : 80

Attempt *any* **four** questions out of the **six** questions given in Part A. In addition, also attempt *any* **four** questions out of the **six** questions given in Part B, i.e., a total of **eight** questions need to be attempted—**four** from Part A and **four** from Part B. All the questions carry equal marks.
All the Parts of the chosen questions should be answered.

PART—A

1. The average IQ of the population of region A is lower than the average IQ of the population of region B. Now there is some migration of people from B to A. After the migration, it is found that the average IQs of both regions have gone up. Is this possible? Explain. 10

2. Consider the utility maximization problem with 2 goods, x and y, which are both nonnegative. The utility function of the consumer is a function $U : R_+^2 \to R$, where $U(x, y) = \sqrt{3x + y}$. Define p_x and p_y to be the price of goods x and y respectively, and also define W to be the consumer's wealth. Assume that p_x and p_y and W are strictly positive constants.

(a) Carefully write down the Lagrangian to the Kuhn-Tucker problem. 2

(b) Solve the Kuhn-Tucker problem defined in part *(a)*. [*Hint : Taking a positive monotonic transformation of the objective function may help*]. 6

(c) The Indirect Utility Function $V(p, W)$ is defined as the maximum attainable utility of the consumer given the price vector p and wealth W. Use the envelope theorem to compute the marginal increase in $V(\cdot)$, when W increases. Explain your findings. 2

3. Consider the fixed effects model

$$y_{it} = \alpha_i + u_{it},\ i = 1, 2, \cdots,\ N;\ \ t = 1, 2, \cdots, T_i$$

where y_{it} denotes output in industry i at time t and α_i denotes the industry fixed effect. The disturbances u_{it} are assumed to be independent with heteroscedastic variances σ_i^2. Note that the data are unbalanced with different number of observations for each industry.

(a) Show that OLS and GLS estimates of α_i are identical.

(b) Let $\sigma_i^2 = \Sigma_{i=1}^N T_i\sigma_i^2 / n$, where $n = \Sigma_{i=1}^N T_i$, be the average disturbance variance. Show that the GLS estimator of σ^2 is unbiased, whereas the OLS estimator of σ^2 is biased. 10

4. In the context of econometric methodology,

(a) define what is a dummy variable; 2

(b) discuss when and how to use dummy variables in a regression model; 2

(c) explain the concept of dummy variable trap in regression; 3

(d) set up a regression model where the dependant variable is a dummy variable. 3

5. Let consumer preferences be given by the utility function

$$U(Q, m) = \sqrt{Q} + m$$

where Q is quantity consumed of a certain good x, and m is money. Let p denote price of good x, and I denote consumer's income.

(a) Derive the demand function for good x, and comment on the demand function. 3

(b) Compute elasticity of demand. 2

(c) Compute consumer surplus, and interpret the expression that you get. 5

6. In the context of macroeconomics, what is dynamic inefficiency? Explain mathematically when it holds. Can dynamic inefficiency arise in OLG (overlapping generations) models? Why or why not? 10

PART—B

7. Consider the problem of an exporting firm facing the threat of an antidumping duty. Given the period 1 import price p_1 chosen by the exporting firm, the duty imposed in period 2 equals $(1+\tau_2) = p^*/p_1$, whenever $p_1 < p^*$. The tariff is imposed with probability θ, and conversely with probability $(1-\theta)$ there will be no duty. Denote by $\pi_2^*(\tau_2)$ the value of period 2 profits when the duty is imposed, where we have $\pi_2^* < 0$. Let $\pi_2^*(0)$ denote the maximised value of period 2 profits for the foreign firm in the case of zero duty. Then the period 1 problem can be stated as

$$\text{Maximize} \quad \pi^*(p_1, q_1) + \delta[\theta\,\pi_2^*(\tau_2) + (1-\theta)\,\pi_2^*(0)]$$

$$\text{subject to} \quad (1+\tau_2) = p^*/p_1$$

The choice variable for the exporting firm here is p_1. We suppose that the home firm chooses q_1 under Bertrand competition. Derive the first-order conditions for the home and foreign firms, and show that the threatened duty leads to an increase in the foreign price p_1. 10

8. *(a)* Examine the impact of a Hicks-neutral technical progress experienced in one sector in a Heckscher-Ohlin model. 5

(b) Two countries (Home and Foreign) can produce two goods (rice and cloth) using labour. The labour availability and the labour requirements in production of the two countries are given below :

Country	*Total labour*	*Labour needed to produce*	
		1 ton of rice	*1 yard of cloth*
Home	160	10	4
Foreign	60	20	1

What is the relative price of rice in each country before trade is opened up? What is the real wage in terms of rice in Home country before trade? What would be the real wage in Home country after trade? 5

9. In a variation of the Muth model, assume that the market for a particular commodity is described by the model

$$Q_t^D = a_0 - a_1 P_t + V_t,\ a_1 > 0$$
$$Q_t^S = b_0 + b_1 P_t^e + U_t,\ b_1 > 0$$
$$Q_t^D = Q_t^S [\equiv Q_t]$$

where Q_t^D is demand, P_t is the *actual* (market clearing) price, V_t is a stochastic shock term affecting demand, Q_t^S is supply, P_t^e is the *expected* price, (i.e., the price that suppliers expect to hold in period t), U_t is the stochastic term affecting supply, and

Q_t is the actual (market clearing) quantity traded in the market. It is assumed that the two stochastic shock terms, V_t and U_t, are independent and normally distributed white noise terms (there is no correlation between these terms and both terms display no autocorrelation) : $V_t \sim N(0, \sigma_V^2)$ and $U_t \sim N(0, \sigma_U^2)$. Assume that the expectations are formed according to the adaptive expectations hypothesis (AEH)

$$P_t^e = P_{t-1}^e + \lambda[P_{t-1} - P_{t-1}^e],\ \lambda > 0$$

where λ regulates the speed at which expectations adjust.

(a) Derive the stability condition for the model. Explain both formally and intuitively what you mean by stability in this model. 5

(b) Next, replace the AEH assumption by the assumption of rational expectations hypothesis (REH). Thus the expectations are now formed according to $P_t^e = E_{t-1}P_t$, where the expectations operator E_{t-1}, denotes that agents form expectation using the information dated period $t-1$ and earlier, as well as the knowledge about the structure and parameters of the model. Derive the expressions for equilibrium output and price level for this case. Is the model stable? Explain. 5

10. Let the probability density function (p.d.f.) of a random variable X be

$$f(x, \theta) = \frac{1}{\theta} x^{\left(\frac{1-\theta}{\theta}\right)};\ 0 < x < 1;\ 0 < \theta < \infty$$

(a) Derive the maximum likelihood estimator (MLE) of θ. 5

(b) Show that the MLE is unbiased for θ. 5

11. Consider the educational signalling model. Explain the implications of the Cho-Kreps intuitive criterion for the equilibria of this model. 10

12. Does the wage productivity model explain involuntary employment and wage dispersion? How does the wage productivity theory differ from a collusive theory of unemployment? 10

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