

## **MASTER OF ARTS (ECONOMICS)**

### **Term-End Examination**

**June, 2007**

### **MEC-001 : MICROECONOMIC ANALYSIS**

*Time : 3 hours*

*Maximum Marks : 100*

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**Note :** Attempt **two** questions from Section A, **four** from Section B and **two** from Section C.

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#### **SECTION A**

Answer any **two** questions from this section.

2×20

1. (i) What is adverse selection problem ? How is it different from moral hazard problem ?
- (ii) Firm-A offers a contract to Firm-B to deliver  $x$  units of a good. Firm-B has constant marginal cost  $C$ , so that its profit is  $P - CX$  where  $P =$  payment received for the supply of the good. Firm-B's cost is its private information and may be either high ( $C_H$ ) or low ( $C_L$ ) with  $0 < C_L < C_H$ . Firm-A's prior belief about Firm-B's cost is  $\text{Prob}(C = C_L) = \beta$ . It makes a take-it-or-leave-it offer to Firm-B. That is, Firm-B makes profit zero when it does not sign the contract. Firm-A's pay-off function is denoted as  $F(x)$  which is an increasing and concave function of  $x$ .

- (a) Suppose Firm-A could observe Firm-B's cost. Derive the first-best contracts  $\{(X_L^0, P_L^0), (X_H^0, P_H^0)\}$ .
- (b) Under asymmetric information, when Firm-A cannot observe Firm-B's cost, what happens if the first-best contracts are offered to it ?
2. (i) Suppose you are inside Edgeworth box that gives two-people, two-commodity exchange scenario. Explain how will both the parties enter into trade starting with the initial endowment position.
- (ii) There are two agents (1 and 2) with utility functions given as
- $$u_1 = x_1^\alpha x_2^{1-\alpha},$$
- $$u_2 = x_1^\beta x_2^{1-\beta}$$
- for goods  $x_1$  and  $x_2$ . The initial endowments of these goods for the agents are  $w_1 = (1, 1)$  and  $w_2 = (1, 1)$ . Compute the market clearing prices.
3. (i) How do firms under Bertrand model arrive at the equilibrium price ? Why do you think that this model is different from that of Cournot's ?
- (ii) The linear demand functions faced by two firms are given as
- $$y_1 = a_1 - b_1 p_1 + c p_2$$
- $$y_2 = a_2 + c p_1 - b_2 p_2$$
- Show that quantities are always lower and prices higher in Cournot competition than in Bertrand competition.

4. What problem would you encounter in making social decisions if you want to implement the following rule ?

Rule : An allocation  $X$  is socially preferred to an allocation  $Y$  only if everyone prefers  $X$  to  $Y$ .

To overcome the problems, what alternatives would you advocate for ? Discuss their features.

**SECTION B**

Answer any **four** questions from this section. 4×10

5. Bunty and Bubli plan to spend an afternoon together in Delhi. While Bubli likes to take the metro-train and travel around, Bunty would prefer watching the cricket match being played between India and Australia. If the pay-off matrix of these two persons is given as follows, find its Nash equilibria. You are required to give the detailed steps for finding the answer.

		Bubli's Action	
		Metro-ride	Cricket
Bunty's Action	Metro ride	(2, 3)	(0, 0)
	Cricket	(1, 1)	(3, 2)

6. If the utility function of two goods, x and y, is given as  $U = xy^2$
- (i) Derive the indirect utility function of  $p_x$ ,  $p_y$  and  $M$ , where  $p_x$  and  $p_y$  are prices of x and y;  $M$  = income.
  - (ii) Use the information in (i) and derive the expenditure function.

7. Take a simplified version of the world to have two agents (Donald and Jim) and two periods. Each agent works in the first period, earns an after-tax income of Rs. 100, from which he can either consume or invest. In the second period, the agent gets a gross return of 110% from his investment (i.e., interest rate  $r = 0.1$ ), consumes all of it, and dies. If their utility functions are given by

$$U_D = C_1^{1/2} + C_2^{1/2} \quad \text{where } D = \text{Donald}$$

$$U_J = C_1^{1/2} + \frac{1}{2}C_2^{1/2} \quad \text{where } J = \text{Jim},$$

find the optimal consumption bundle of each agent.

8. Do you think that the model developed by Marris on behaviour of a firm strikes a balance between R & D expenditures and its profit maximisation ? Give reasons in support of your answer.
9. Do you agree with the view that public goods cannot be provided efficiently ? Give reasons in support of your answer.

**10.** John is a risk-averse person who has Rs. 100 monetary wealth and owns a house which is worth Rs. 300. The probability that his house is destroyed by fire (equivalent to a loss of Rs. 300) is 0.5. If he exerts an effort level  $e = 0.3$  to keep his house safe, the probability falls to 0.2. His utility function is  $u = \sqrt{w} - e$  where  $w$  is wealth and  $e$  is effort level exerted taking values zero in case of no effort and 0.3 in case of effort. There is an insurance company which is willing to insure the house against fire with a premium payment of Rs. 150. So John's choice problem is to buy the insurance or exert effort to lower the probability of fire.

- (i) Will John exert effort or not to lower the probability of fire ?
- (ii) Determine whether John would buy the insurance or exert effort to reduce the probability of fire.

### SECTION C

Answer any **two** questions from this section.

2×10

**11.** Write short notes on :

- (i) Production possibility frontier
- (ii) First welfare theorem

**12.** (i) Suppose that the demand curve for a good is given by  $q_D = 8 - p$  where  $q$  and  $p$  are quantity and price respectively. If a consumer has demand for 4 units, find the consumer surplus.

- (ii) The marginal rate of substitution between factors  $x_2$  and  $x_1$  is  $-4$ . If you plan to produce the same amount of output by reducing the use of  $x_1$  by 3 units, how many more units of  $x_2$  will you need ?

**13.** Differentiate between :

- (i) Cost function and Profit function
- (ii) Cobb-Douglas and Translog production functions