

Actuarial Society of India

EXAMINATIONS

14th June 2005 (pm)

Subject CT7 – Economics

Time allowed: Three Hours (2.30 – 5.30 pm)

INSTRUCTIONS TO THE CANDIDATES

- 1. Do not write your name anywhere on the answer scripts. You have only to write your Candidate's Number on each answer script.*
- 2. Mark allocations are shown in brackets.*
- 3. Attempt all questions, beginning your answer to each question on a separate sheet.*
- 4. Fasten your answer sheets together in numerical order of questions. This, you may complete immediately after expiry of the examination time.*
- 5. In addition to this paper you should have available graph paper, Actuarial Tables and an electronic calculator.*

Professional Conduct:

"It is brought to your notice that in accordance with provisions contained in the Professional Conduct Standards, If any candidate is found copying or involved in any other form of malpractice, during or in connection with the examination, Disciplinary action will be taken against the candidate which may include expulsion or suspension from the membership of ASI."

AT THE END OF THE EXAMINATION

Hand in both your answer scripts and this question paper to the supervisor.

- Q.1** A firm is producing 100 units of output using \bar{L} units of labour and \bar{K} units of capital where marginal productivity of capital (MPK) equals 4 and marginal productivity of labour (MPL) equals 10. The prices of capital and labour are Rs.3 and Rs.5 respectively. To produce the existing output at minimum cost, the firm should use
- A. more of either L or K and less of the other
 - B. more of K and less of L
 - C. less of K and more of L
 - D. more of only labour
- [1.5]**
- Q.2** In a two commodity world consider a consumer with a given income, prices of the commodities are also given. If x_1 (quantity of commodity 1) = 5, x_2 (the quantity of commodity 2) = 7, is a point on the budget line of the consumer, then which of the following is **necessarily** true ?
- A. $x_1 = 4, x_2 = 6$, is a point in the budget set
 - B. $x_1 = 3, x_2 = 9$, is a point on the budget line.
 - C. $x_1 = 5, x_2 = 7.5$ is a point in the budget set.
 - D. none of the above.
- [1.5]**
- Q.3** Let Q_1 be the profit maximizing level of output and Q_2 be the revenue maximizing level of output of a firm. Then $Q_1 = Q_2$, if there is
- A. no fixed cost
 - B. no variable cost
 - C. constant marginal cost
 - D. none of the above
- [1.5]**
- Q.4** If certainty equivalent for an individual is found to be equal to the expected value of the pay-off from a gamble, then
- A. the individual is risk-neutral
 - B. the individual is risk lover
 - C. nothing can be said regarding the individual's attitude towards risk
 - D. the individual is risk averter
- [1.5]**
- Q.5** Which of the following properties of the utility function describes a consumer's attitude towards risk?
- A. continuity
 - B. differentiability
 - C. increasingness
 - D. curvature
- [1.5]**
- Q.6** In a two commodity world the prices of the two commodities x_1 and x_2 are given at Rs.5 and Rs.7 respectively, to a consumer with a given budget. Suppose the commodities can be purchased and consumed in discrete quantities only. Each of x_1 and x_2 axis is found to contain a point that fully exhaust the consumer's budget. Then, which of the following is true?

- A. the consumer's budget is Rs.130;
B. the consumer's budget is Rs.150;
C. the consumer's budget is Rs. 128;
D. the consumer's budget is Rs. 140. [1.5]
- Q.7** On a downward sloping linear demand curve demand is more elastic
A. at the upper end
B. at the lower end
C. in the middle
D. any one of the above is possible [1.5]
- Q.8** In deriving the Hicks substitution effect, the purchasing power of income is kept constant following a decline in the price of the commodity by
A. keeping the consumer on the same indifference curve
B. relegating the consumer to a lower indifference curve
C. enabling the consumer to purchase the same bundle of goods as before the price-change
D. enabling the consumer to buy more of both the commodities than before the price-change [1.5]
- Q.9** The difference between perfect competition and oligopoly is that
A. in the former firms do not collude, while in the latter they necessarily do.
B. in the former there must be at least hundred firms, while in the latter number of firms cannot exceed ten.
C. in the former no firm enjoys any market power, while in the latter every firm does.
D. in the former firms compete with one another, while in the latter they do not. [1.5]
- Q.10** Suppose the technology used by a firm is given by a production function which involves two inputs and a single output and shows diminishing returns to scale. The firm is currently using given quantities of the inputs to produce a given quantity of the output. If the input levels are halved, then which one of the following is true?
A. Output produced is exactly halved.
B. Output produced declines to less than half of the previous level.
C. Output produced declines to a level more than half of the previous level.
D. It cannot be predicted without knowing the exact form of the production function. [1.5]
- Q.11** Tax structure is progressive when
A. the ratio of post-tax income to pre-tax income does not change with a change in the pre-tax income.
B. the ratio of post-tax income to pre-tax income rises with an increase in pre-tax income
C. ratio of post-tax income to pre-tax income falls with a rise in pre-tax income
D. post-tax income does not rise with an increase in pre-tax income [1.5]

- Q.12** If in an economy GDP and national income are found to be the same, which of the following is **necessarily** true?
- A. Depreciation is zero.
 - B. Net indirect taxes paid to the government is zero.
 - C. Net factor income paid to foreigners is zero.
 - D. The sum of depreciation, net indirect taxes paid to the government and net factor income from abroad is zero. [1.5]
- Q.13** (This is a question on national income accounting). In an economy in a certain year production of certain goods rises by 100 units of which only 80 units could be sold. In this context indicate which of the following statements is necessarily true?
- A. GDP will be larger by 80 units
 - B. GDP will be larger by 100 units
 - C. GDP will be larger by 100 units and investment will be larger by 20 units
 - D. GDP will be larger by 80 units, but investment may be larger or smaller [1.5]
- Q.14** Which of the following should be taken into account while computing GDP by spending approach?
- A. Rs.5lakh spent by a company on advertising.
 - B. travel and hotel expenses of a company official on the company's account
 - C. travel expenses of government ministers met by the national exchequer
 - D. none of the above [1.5]
- Q.15** Consider the standard negatively sloped IS curve. Consider a point to the left of this IS curve. Which of the following statements is true regarding the state of the economy corresponding to the given point?
- A. There exists excess demand in the commodity market and excess supply in the money market.
 - B. There exists excess supply in the commodity market and excess demand in the money market.
 - C. There exists excess demand in the commodity market and the state of the money market cannot be ascertained.
 - D. There exists excess supply in the commodity market and there may exist excess supply in the money market [1.5]
- Q.16** Which of the following statements is true?
- A. Notes and coins held by the commercial banks are a part of the high powered money.
 - B. Notes and coins held by the commercial banks are a part of M_1 .
 - C. Notes and coins held by the commercial banks are a part of M_3 .
 - D. All the three statements made above are true. [1.5]
- Q.17** Two countries will gain from trade with each other if
- A. they have the same relative prices under autarky (absence of trade).
 - B. they have different relative prices under autarky (absence of trade).
 - C. they have different factor endowments.
 - D. they have different tastes and preferences. [1.5]

- Q.18** If rupee is devalued vis-à-vis the major foreign currencies, then which of the following statements is true in a regime of free trade?
- A. imports will rise, but exports may rise or fall.
 - B. imports will fall, but exports may rise or fall.
 - C. imports will rise, but exports will fall.
 - D. imports will fall, but exports will rise. [1.5]
- Q.19** Natural rate of unemployment rises if
- A. if mobility of labour across space and industries rises.
 - B. if mobility of labour across space and industries falls.
 - C. marginal productivity of labour rises.
 - D. if people's attitude towards work improves. [1.5]
- Q.20** Following an exogenous decline in money demand in the IS-LM model,
- A. investment will fall if it is a function of interest rate alone and not of income
 - B. investment will necessarily fall
 - C. investment may remain unchanged
 - D. investment will necessarily fall if consumption does not [1.5]
- Q.21** Income elasticity of the demand is said to be negative for the commodity
- A. Which is luxury
 - B. Which is a comfort
 - C. Which is essential
 - D. Which is inferior [1.5]
- Q.22** At the tangency point between a budget line and an indifference curve:
- A. $MRS_{xy} > MRS_{yx}$
 - B. $MRS_{xy} < MRS_{yx}$
 - C. $MRS_{xy} = P_x/P_y$
 - D. $MRS_{xy} \neq P_x/P_y$ [1.5]
- Q.23** In perfect competition, shut down point of a firm refers to
- A. Minimum point of MC
 - B. Minimum point of SAC
 - C. Minimum point of AVC
 - D. Minimum point of LAC [1.5]
- Q.24** The GNP of a nation at market price is 3300, net indirect taxes equal 200, and net factor income from abroad is -150. The GDP at factor cost is:
- A. 4200
 - B. 3550
 - C. 3250
 - D. None of the above. [1.5]

- Q.25** Demand pull inflation according to Keynes is caused by:
- Excess demand for money
 - Excess demand for output
 - Excess supply of output
 - Excess supply of money
- [1.5]**
- Q.26** Increase in the holdings of the government security by commercial bank is caused by:
- Increase in bank rate
 - Increase in CRR
 - Increase in SLR
 - Increase in Bond prices.
- [1.5]**
- Q.27** An individual having a utility function over money pay-offs of the form $U = U(W); U' > 0$ and $U'' < 0$ is given a choice between two gambles (G1) which pays him Rs.900 with probability $\frac{1}{4}$ and Rs. 100 with probability $\frac{3}{4}$ and (G2) which pays him Rs.1020 with probability $\frac{1}{4}$ and Rs.60 with probability $\frac{3}{4}$.
- Which one would he prefer? **[3]**
 - If instead his utility function is given by $U = 3W + a$, then will this make any difference to his decision? **[2]**
 - An individual has wealth worth W_c . There is a probability $0 < p_2 < 1$ that he will lose L (less than W_c). The individual is found to buy an insurance policy to guard against this risk. The insurance is offered at a premium which is high enough to make the insurer's expected return positive. Has the wealth owner fully insured against the loss? **[4]**
- Total [9]**
- Q.28** Indicate which of the following propositions are monetarist and which of them are Keynesian
- Monetary policy is more effective than fiscal policy as a programme of stabilization. **[1]**
 - Fiscal policy is more effective than monetary policy as a programme of stabilization. **[1]**
 - Economic fluctuations are caused mainly by fluctuations in money supply. **[1]**
 - Economic fluctuations are mainly due to volatility of investment. **[1]**
- Total [4]**
- Q.29** Suppose in an industry the market demand and supply curves are given by $Q^D = 100 - 2P$ and $Q^S = 10 + 3P$. Now consider an individual firm of the industry having the cost function $C = 100 + 19q + 3q^2$.
- Derive the equilibrium price and quantity of the industry. **[1]**
 - Derive the average variable cost and the marginal cost functions of the given firm and present them in a diagram. **[2]**
 - What is the profit maximizing level of output of the given firm? **[2]**
- Total [5]**

Q.30 The following information are given about the market demand faced and technology used by a monopolist

Price(P)	Quantity demanded(Q ^D)	Quantity produced(Q ^S)	Total Cost at each Q ^S
20	1	1	4
18	2	2	6
16	3	3	11
14	4	4	19
12	5	5	30
10	6	6	44

Construct a table to provide the following information

- i) marginal revenue at different levels of output [1]
 - ii) marginal cost at different levels of output [1]
 - iii) derive the profit maximizing level of output, price and the maximum profit earned by the monopolist [3]
- Total [5]**

Q.31 Suppose in a simple Keynesian model without government, consumption and investment functions are given respectively by $C = 100 + .7Y$ and $I = 500$
Compute the equilibrium level of Y [1]

Using the example given above, show that (a) aggregate planned saving is equal to aggregate planned investment only at equilibrium level of Y and (b) actual aggregate saving is equal to actual aggregate investment at every level of Y. [4]

Total [5]

Q.32 Consider the following data of an economy in any given period

	Crores of rupees
New buildings produced	5
New equipments produced	10
Consumer goods produced	110
Estimated depreciation of existing buildings	10
Estimated depreciation of existing equipments	10
Inventory of consumer goods at the beginning of the year	30
Inventory of consumer goods at the end of the year	50
Consumer goods consumed	90

- Compute GDP and break it up into C and gross I [2]
 - Compute NDP and break up NDP into C and net I [2]
- Total [4]**

Q.33 In a simple Keynesian model without government, the following information are given. $I=200$. When $Y=1000$, unplanned inventory accumulation is -200 . When $Y=3000$, unplanned inventory accumulation is 200.

- Derive the consumption function. [4]
 - Compute the autonomous expenditure multiplier. [1]
- Total [5]**

Q.34 Suppose that Midwest State University (MSU) wants to reduce the athletic department's operating deficit and increase students' attendance at home football games. To achieve these objectives, a new two-tier pricing structure for season football tickets is being considered.

A market survey conducted by the school suggests the following market demand relations for two segments of the market: general public and students.

Public Demand: $P_p = 225 - 0.005Q_p$

Students Demand: $P_s = 125 - 0.00125Q_s$

Where:

P_p : price of public ticket in rupees

P_s : price of student ticket in rupees

Q_p : quantity of public tickets

Q_s : quantity of student tickets

During recent years, the football program has run on an operating budget of Rs. 1.5 million per year. This budget covers fixed salary, recruiting, insurance and facilities maintenance expenses. In addition to these fixed expenses, the university incurs variable ticket handling, facility cleaning, insurance and security costs of \$25 per season ticket holder. The resulting total cost function is:

$$TC = 1,500,000 + 25Q$$

Where $Q = Q_s + Q_p$

- a) Assuming that the university can discriminate between its two types of customers, calculate the profit maximizing prices (P_s and P_p), quantities (Q_s and Q_p) and total profits of the university. [6]
 - b) Calculate point price elasticities for each customer type at the activity levels identified in part (a). Are the differences in elasticities consistent with your recommended price differences in part (a)? Why or why not? [4]
- Total [10]**

Q.35 Explain, with the help of a diagram, how monetary policy affects output and price in the short and in the long run. [10]

- Q.36** Indicate with reasons whether the following statements are true or false
- A. Burden of direct taxes cannot be shifted [1]
 - B. Burden of indirect taxes can be shifted [1]
 - C. Taxation of food consumption is regressive [1]
 - D. Taxation of air travel is progressive [1]
- Total [4]**
