

**INSTITUTE OF ACTUARIES OF INDIA**  
**EXAMINATIONS**

**12<sup>th</sup> May 2008**

**Subject CT7 – Economics**

**Time allowed: Three Hours (14.30 – 17.30 Hrs)**

***INSTRUCTIONS TO THE CANDIDATES***

- 1) *Do not write your name anywhere on the answer sheet/s. You have only to write your Candidate Number on each answer sheet/s.*
- 2) *Mark allocations are shown in brackets.*
- 3) *Attempt all questions, beginning your answer to each question on a separate sheet. However, answers to objective type questions could be written on the same 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 IAI.”*

Candidates are advised that a reasonable standard of handwriting legibility is expected by the examiners and that candidates may be penalized if undue effort is required by the examiners to interpret scripts.

**AT THE END OF THE EXAMINATION**

Please return your answer sheets and this question paper to the supervisor separately.

- Q1)** Government has specified a maximum price for a commodity in a country that is below the free market price. What is the likely impact of this
- A** a shortage and black markets
  - B** a surplus
  - C** a balance between demand and supply
  - D** depends whether it is war time or not
- [1.5]**
- Q2)** An industry offers term insurance contracts with same rates for smokers and non-smokers. Suddenly, one of the firms starts offering different rates for smokers and non-smokers. What is the most reasonable reaction from other firms
- A** To avoid adverse selection, they would also start offering different rates
  - B** To avoid moral hazard, they would also start offering different rates
  - C** They would maintain their earlier rates as there is no possibility of anti-selection
  - D** None of the above
- [1.5]**
- Q3)** Government in India generally offer entertainment tax waivers for movies of national significance. The rationale for doing this is to
- A** Inducing production of more such movies by shifting supply curve
  - B** Inducing wider viewer ship by shifting aggregate demand curve
  - C** Both A and B
  - D** None of the above
- [1.5]**
- Q4)** Latest budget has lowered the direct income tax rates for individuals. Assuming no change of this on other variables, this is likely to result in
- A** Budget line being shifted outwards
  - B** Indifference curve becoming more convex
  - C** Both A and B
  - D** None of the above
- [1.5]**
- Q5)** Which of the following might represent the price-demand equation for a giffen good
- A**  $P = Q$
  - B**  $P = 1/Q$
  - C**  $P = -Q$
  - D**  $P = 1/Q^3$
- [1.5]**
- Q6)** Which of the following might not represent the income-demand equation for a giffen good where I represents income and Q represent quantity
- A**  $Q = I$
  - B**  $Q = 1/I$
  - C**  $Q = -I$
  - D**  $Q = 1/I^3$
- [1.5]**

- Q7)** The price of Good A increases. Which of the following statements is false?  
**A** If Good A is inferior or giffen, the substitution effect will be positive.  
**B** If Good A is normal, the income effect will be positive.  
**C** If Good A is inferior, the income elasticity of demand will be negative.  
**D** If Good A is inferior or giffen, the income effect will be negative. [1.5]

- Q8)** Consider Assets U and V, which offer returns as set out in the following table.

<i>Return</i>	<i>Probability Asset U</i>	<i>Probability Asset V</i>
5%	0	2/6
6%	0	0
7%	0	0
8%	4/6	2/6
9%	2/6	2/6

Which of Assets U and V should be chosen on the basis of stochastic dominance?

- A** Asset U because it first-order dominates Asset V.  
**B** Asset V because it second-order dominates Asset U.  
**C** Asset U because it second-order dominates Asset V.  
**D** Neither because neither asset first-order or second-order dominates the other. [1.5]
- Q9)** Which of the following can be said about stochastic dominance  
**A** A discrete uniform distribution with a higher mean will never display first order stochastic dominance over a discrete uniform distribution with a lower mean  
**B** A discrete uniform distribution with a higher mean will always display first order stochastic dominance over a discrete uniform distribution with a lower mean  
**C** Depends  
**D** None of the above [1.5]

- Q10)** An individual firm in an oligopolistic market may be reluctant to increase price because:  
**A** other firms will retaliate.  
**B** demand is price-inelastic.  
**C** demand is price-elastic.  
**D** marginal revenue is negative. [1.5]

- Q11)** Which of the following situations will lead to the closure of a profit-maximising firm in the short run?  
 I total revenue is less than total variable cost  
 II total cost is greater than total revenue  
 III fixed costs are greater than total revenue  
**A** I and II  
**B** II and III  
**C** I only  
**D** III only [1.5]

- Q12)** Suppose there is a war tax where every adult pays Rs 1000 per annum. What is the marginal tax rate of a person earning Rs 100,000 per year?
- A** 1%
  - B** 0%
  - C** 10%
  - D** 100%
- [1.5]**
- Q13)** If Government income is greater than government expenditure, it is termed as
- A** Public Sector Borrowing Requirement (PSBR)
  - B** Fiscal Deficit
  - C** Fiscal Surplus
  - D** Budget Deficit
- [1.5]**
- Q14)** Which if the following constitute investment in the economic sense?
- I** The building of a new school
  - II** Depositing money in a bank account
  - III** The purchase of shares from another investor
- A** I only
  - B** I and II
  - C** II and III
  - D** I, II and III
- [1.5]**
- Q15)** If Tax bands are not adjusted, inflation leads to higher tax payments. This is known as
- A** Progressive Taxation
  - B** Fiscal Surplus
  - C** Fiscal Drag
  - D** None of the above
- [1.5]**
- Q16)** An adverse trade balance can not be corrected by
- A** Reducing the value of currency
  - B** Helping exporters
  - C** Discouraging imports
  - D** Increasing the level of aggregate demand
- [1.5]**
- Q17)** Which of the following will be recorded as a positive cash flow in a country's balance of payment capital account?
- A** Borrowing money from IMF
  - B** Buying a holiday home abroad
  - C** The granting of trade credit
  - D** Selling a share in a company based in an emerging market
- [1.5]**

- Q18)** You are given the following information
- The marginal propensity to consume out of disposable income is 0.85
  - The marginal propensity to import is 0.2
  - The marginal propensity to direct tax is 0.3
- The value of Multiplier is
- A** 1.5625
  - B** 2.105
  - C** 2.222
  - D** 1.6529
- [1.5]**
- Q19)** The terms of trade for a country will improve if
- A** The cost of exported goods decreases
  - B** The cost of imported goods decreases
  - C** It becomes less expensive to produce goods for export
  - D** Its exchange rate decreases (depreciation of domestic currency)
- [1.5]**
- Q20)** Country A has comparative advantage over Country B in producing a good when
- A** The prices in Country A are lower than in Country B
  - B** The prices in Country B are lower than in Country A
  - C** Country A has a lower opportunity cost of producing that good than Country B
  - D** Country B has a lower opportunity cost of producing that good than Country A
- [1.5]**
- Q21)** If a household's disposable income increases from Rs10,000 to Rs15,000 and its consumption expenditure increases from Rs 8,000 to Rs 10,000 then the marginal propensity to consume is
- A** 0.6
  - B** 1.4
  - C** 0.4
  - D** 1.7
- [1.5]**
- Q22)** Under floating exchange rates:
- A** Domestic inflation rates are unavoidably linked across national boundaries
  - B** Domestic inflation in one country can lead to inflation in another even if the exchange rate moves to preserve purchasing power parity
  - C** Domestic inflation is dictated outside the bounds that would have constrained prices in a fixed rate regime
  - D** None of the above
- [1.5]**
- Q23)** If the total output of goods and services increases and the price index remains constant nominal Gross Domestic Product (GDP) will
- A** Rise and real GDP will fall
  - B** Stay the same and real GDP will rise
  - C** Rise and real GDP will rise
  - D** Fall and real GDP will rise
- [1.5]**

- Q24)** The introduction of a restrictive monetary policy in an open economy operating with a flexible exchange rate would most likely lead to a
- A** higher domestic interest rates and an exchange rate appreciation
  - B** higher domestic interest rates and an exchange rate depreciation
  - C** lower domestic interest rates and an exchange rate appreciation
  - D** lower domestic interest rates and an exchange rate depreciation
- [1.5]**
- Q25)** There is a new state of the art toll plaza set up in a supposed hi-tech city. The plaza is equipped with fancy sensors which can be set up to deduct the toll charges depending upon the timing of passage of vehicles i.e. a higher charge during peak traffic hours and a lower rate for off peak hours. Assume that there is only one alternate route which is tedious, but by which people can by-pass the toll and hence can reach their destination without any payments. Consider the following situations and plot the respective diagrams of the average toll and marginal toll with toll rate on one axis and vehicular traffic on the other. Note that the toll has a maximum capacity (vehicular rate per hour). Also provide suitable comments in each situation.
- (a) The alternate route is closed and people have to reach their destinations on time. (3)
  - (b) The alternate route is not closed and people do not have to reach their destinations on time. (3)
- [6]**
- Q26)** An automobile company decides to launch a new car ‘Spano’ for economically poorer sections of the society where price band of the car and other related running costs are critical. The likely volumes expected to be sold are so high that the existing road and other infrastructure might not be enough (there would be no space left, hence the name spano!) and there could be a negative externality in the form of nagging traffic jams, higher pollution and so on.
- (a) Plot as two separate simple diagrams the demand curve for this automobile version and another luxury automobile version for the respective target markets (2)
  - (b) Suggest any two practical options available to the government to efficiently contain sale of such cars (2)
- [4]**
- Q27)**
- (a) List any four ways a government can tackle market imperfections (2)
  - (b) Answer the following briefly
    - i) List any four entry barriers to an industry (2)
    - ii) Explain the existence of any two such entry barriers with respect to the telecom industry (2)
- [6]**
- Q28)** Assume that there are only two factors of a production function K (capital) and L (labour). The production function is represented as
- $$Q = S * K^a * L^b$$
- where S, a and b are constants

- (a) Constant Returns to scale is defined when a proportionate increase in all factors of production leads to same proportionate increase in output. What is the condition on constants  $a$  and  $b$  so that there is a constant returns to scale (2)
- (b) Assume that  $a=b=2/3$ . In such a case, what can be said about the returns to scale. (1)
- (c) Now (assuming  $a=b=2/3$ ), evaluate the marginal productivity of labour and capital separately and represent the marginal productivities on separate diagrams. (3)
- (d) Comment on the findings of solutions to question b and c with respect to returns to scale and individual marginal productivities (2)
- Q29)** A group of four actuaries decide to spend a vacation in a beautiful beach city. One evening they decide to visit a casino. Proud of their statistical abilities, they are sure of making a good deal out there. [8]
- (a) Actuary 1, “Very watchful” decides that he should apply his skills and figure out a fair gamble in the casino. Explain briefly why it is most likely that “very watchful” ends up playing no game at the casino and what does this indicate about the risk nature of “Very Watchful”. (2)
- (b) Actuary 2, “Reckless Random” believes that this is pure luck and places his bet on a roulette\* table on random number 4. This is a single number bet and if he wins he receives a pay off of INR 36 in lieu of every Re 1 placed. Explain with calculations, the risk nature of “Reckless Random” (2)
- (c) Actuary 3 “Smart steps” believes this is all about making smart and stepped bets and places his bets in steps of 6 on the roulette table i.e. on numbers 6,12,18,24,30,36. Hence for every 6 rupees put in, there is a payoff of Re 36 if any of the numbers win. Compare the risk nature of “Reckless Random” with “Smart Steps” (1)
- (d) Actuary 4 “Meandering mouse” is feeling lucky and is least interested in small pleasures of life and has set himself up for a Jackpot. He decides to play a special poker table\* with a sum of INR 100. The player receives 100 times of the amount betted if he wins a jackpot and nothing otherwise. Comment on fairness of the gamble. He has a utility function of  $U=e^{ax}$ . Calculate range of values of ‘a’ such that Meandering Mouse plays the gamble. (3)

[\***Roulette**: A roulette table has 37 numbers (0 to 36) where a ball is rolled in a spinning wheel and the number where the ball stops is declared a winner. Payoffs are straightforward and depend upon the bet placed

**Special poker table**: Five cards are drawn from a standard pack of cards. Player hits a jackpot if all cards are from the same suit. A standard pack of card contains 52 cards with 13 cards each of 4 suits]

[8]

**Q30)**

- (a) Explain what is meant by the Expenditure method of measuring the economic activity? (1)
- (b) Using the data in the table below, find the level of economic activity using the Income method and Output method.

	Company A	Company B	Company C		
Sales			100,000	30,000	20,000
Purchase of Raw Materials			50,000	50,000	50,000
Rent			10,000	3,000	2,000
Wages			20,000	6,000	4,000
Interest of Loan Stock			1,000	2,000	3,000
Accounting Profits			19,000	-31,000	-39,000

**(8)**  
**[9]**

**Q31)**

- (a) Explain the following briefly
- i) Crowding out (1)
  - ii) Interest rate crowding out (1)
  - iii) Price induced crowding out (1)
  - iv) Keynesian crowding out (1)
- (b) Please explain with the help of a diagram how the Keynesian crowding out can be avoided? (3)

**[7]****Q32) Explain Frictional Unemployment****[2]****Q33)**

- (a) Outline the economic benefits which arise from international trade (3)
- (b) Define the following terms
- i) Terms of trade (1)
  - ii) The balance of payments (1)
  - iii) PPP path (1)
- (c) The following transactions occurred in respect of Country X's trade with the rest of the world during 2007:
- food grains worth 50,000 were exported
  - Oil worth 20,000 was imported
  - Foreign tourists spent 5,000 in Country X
  - Expenditure by Country Y's embassy in Country X was 5,000
  - Garments worth 20,000 was exported on credit with payments due a year later
  - Dividends from overseas companies received 2,000
  - Software companies earned 10,000 through services provided in other countries
  - Shares worth 1000 were purchased from overseas
  - There was a balancing item of +100
  - A 10,000 loan was received from world bank

Assuming there were no other transactions, find the Country X's

- i) Visible trade balance (1)
- ii) Balance of trade (1)
- iii) Current Account surplus / deficit (1)
- iv) Balance of Payments (1)

**[10]**

**Q34)** Explain four potential problems caused by anticipated inflation.

**[4]**

\*\*\*\*\*