

Institute of Actuaries of India

Subject CT7 – Business Economics

September 2018 Examination

INDICATIVE SOLUTION

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

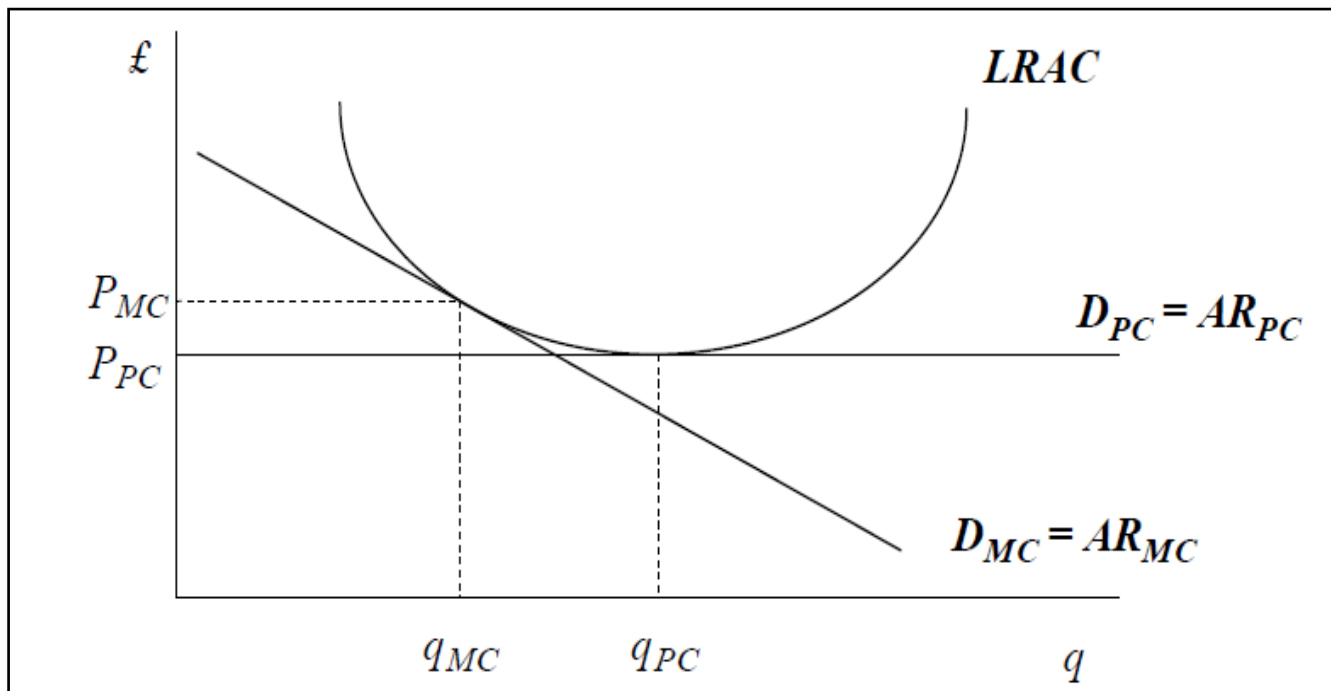
Solution: 1.5 Mark to each answer

1. A
2. C
3. D
4. A
5. D
6. A
7. A
8. D
9. B
10. D
11. C
12. B
13. C
14. A
15. D
16. A
17. B
18. C
19. C
20. B
21. C
22. C
23. A
24. D
25. C
26. B
27. C
28. C
29. D
30. A

Solution 31:

Monopolistic competition leads to a less efficient allocation of resources than under perfect competition.

Diagram:



q_{PC} is quantity produced by perfectly competitive firms at price P_{PC} .

q_{MC} is quantity produced by monopolistic firm at price P_{MC} .

Firms operating in monopolistic competition will:

1. Produce lower quantities than firms operating in perfectly competition i.e. less than social optimum
2. Produce at higher price than firms in perfect competition.
3. have excess capacity
4. produce at an output below which minimizes average cost per unit in the long run.

Hence, it is stated that monopolistic competition leads to a less efficient allocation of resources than under perfect competition. [4 Marks]

Solution 32:

i) $MR = 520 - 4Q$
 $MC = 100 + 2Q$

$$520 - 4Q = 100 + 2Q$$

$$Q = 70 \text{ units of output}$$

$$P = 520 - 2Q = 520 - 2(70) = 380 \text{ per unit of output}$$

[2]

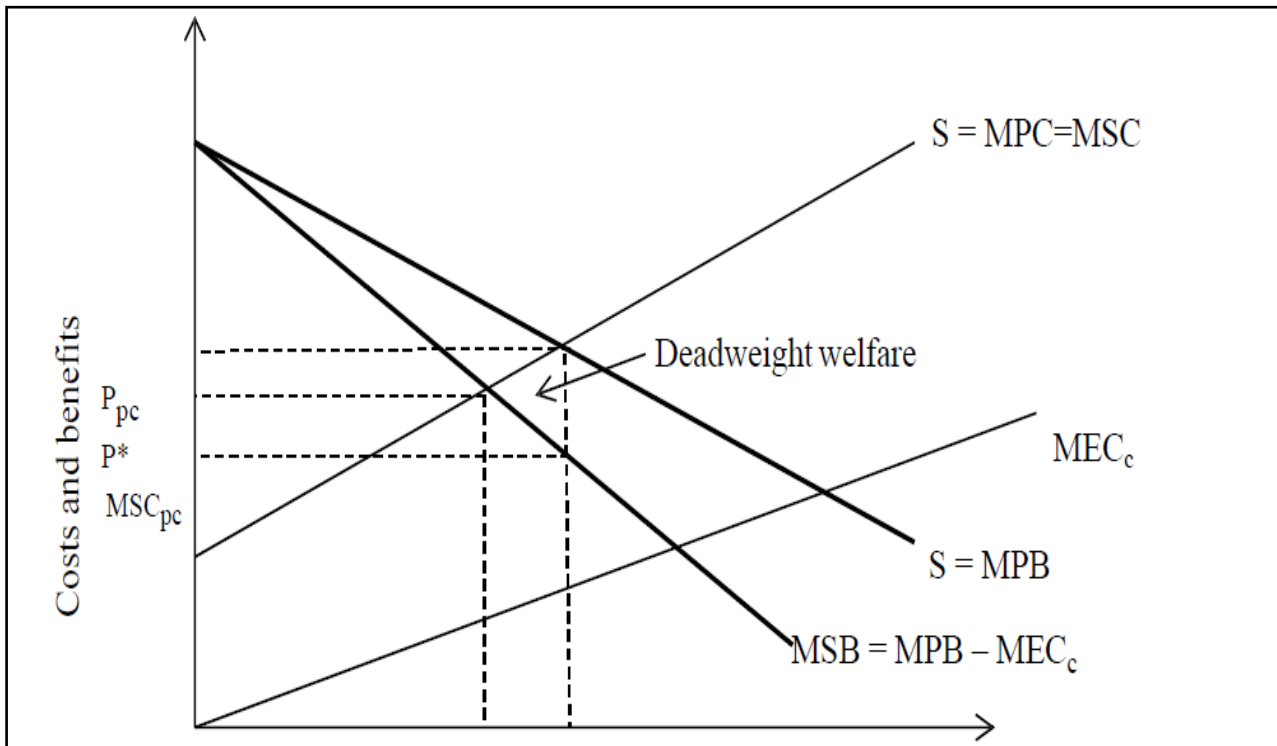
- ii) Profit = TR – TC
 TR = P*Q = (380 per unit)(70 units) =26,600
 TC = 100Q + Q² + 50 = 100(70) + (70)(70) + 50 = 11,950
 Profit =14650 [2]
- iii) To answer this question we first need to write an expression for ATC.
 ATC = TC/Q = 100 + Q + (50/Q)
 Then replace Q with 70 to find the average total cost of producing 70 units of output.
 ATC= 100 + 70 + (50/70) = 170.71 per unit [1]
- iv) Profit per unit = Price per unit – ATC per unit when producing 70 units of output
 Profit per unit = 380 –170.71 = 209.29 per unit [1]
- [6 Marks]**

Solution 33:

- i) Loss leaders are products which are priced below average cost. The aim of pricing some products in this way is to encourage customers to come to a store and as well as buying some products which have been priced at a loss, buy other products. The purchase of products which have been priced at a full profit markup will result in an overall net gain in profits.

A key consideration for this pricing strategy is for the firm to know the price elasticity of demand for its products. [1.5]

- ii) **Plant economies of scale include:**
- **specialisation and the division of labour**
 - **indivisibilities**
 - the “*container*” principle
 - the *greater efficiency of large machines*
 - the production of *by-products*, in sufficient amounts that they can be sold profitably
 - *multistage production*, which saves the time and cost involved in moving unfinished goods between locations.
- [3]
- [4.5 Marks]**

Solution 34:

Q*

Qpc

1. MSC- Marginal Social cost
2. MPC- Marginal Private Cost
3. MPB- Marginal Private Benefit
4. MSB- Marginal Social Benefit
5. MECc- Marginal External Cost of consumption
6. Q*- Socially optimum level of output at price P*
7. Qpc- Market level of output at price Ppc.
8. Deadweight loss of social welfare happens when $MSC > MPC$
9. Social welfare loss occurs as $Qpc > Q^*$

1. As plastic is causing environmental pollution, it has social cost. Individuals are using plastic as it is convenient for them. Therefore, Marginal Social Cost (MSC) differs from Marginal Personal Cost (MPC).

2. Plastic usage cause environmental pollution and animals may die due to consumption of plastic bags. Therefore, there is Marginal external Cost which may be incurred to keep water bodies clean and to protect animals from consumption of plastic.

3. Therefore, MSB is lower than MPB. $MSB = MPB - MEC_c$. This is represented by MSB curve below MPB curve in the diagram. Market will have equilibrium position at Q_{Pc} with Price P_{pc} . At socially optimal equilibrium at output Q^* of price P^* , $MSB = MSC$.

4. The external cost of consumption result in level of output above socially optimum level, $Q_{Pc} > Q^*$. From society's point of view, too many plastic bags are being produced and consumed. This results in a dead weight welfare loss caused by overconsumption and represented by a triangle in diagram A.

[5 Marks]

Solution 35:

The following advantages of price discrimination is in favor of public interest.

Advantages:

1. Effect on output- Price discrimination may lead to additional output. With introduction of first degree price discrimination, output increases to social optimum and therefore, welfare is maximized.
2. The profits obtained from price discrimination, enables the firm to invest in new products, enter new markets, fight price wars, thus increases competition.

The following disadvantages of price discrimination are against the public interest

1. Anti -competitive Effects:

Predatory pricing occurs when a firm (a monopolist or oligopolist) sets its price below its average cost in order to drive other firms out of business. It may do this by cross subsidizing losses in one market with profits elsewhere, *ie* by price discrimination.

Although consumers gain from lower prices in the short run, prices will rise once the competitors have been driven from the market. Predatory pricing is illegal in many countries.

2. Misallocation effects

The introduction of *third degree price discrimination* could lead to a misallocation of resources. If total sales remain constant and the product is reallocated from those who were prepared to pay a higher price to those with a lower willingness to pay, then assuming that price reflects utility, total welfare would fall.

If total sales increase, then the positive impact of the extra sales would have to be compared with the negative impact of the misallocation effect.

3. Distributional effects

The *consumer surplus gained* by the consumers who are able to purchase a good that they would otherwise not be able to buy, or who pay a lower price than would otherwise be the case, could be

compared with the *consumer surplus lost* by the consumers who have to pay more than would otherwise be the case.

If we assume that the price a consumer is prepared to pay is a good indicator of marginal utility, then a calculation can be made about the overall effect of the policy on welfare. However, the price the consumer is prepared to pay is influenced partly by the consumer's income, and therefore might not adequately reflect the value of the product to the consumer.

[4 Marks]

Solution 36:

An oil and natural gas company might form a strategic alliance with a research laboratory to develop more commercially viable recovery processes for following reasons:

1. *New markets* – A strategic alliance may be a convenient way of entering a new market, taking advantage of the expertise and resources of the existing firm(s). i.e. The oil and natural gas company may enter into new market by developing new viable recovery processes.
2. *Risk sharing* – A strategic alliance can enable the sharing of risk between firms, particularly in new markets or with large projects.
3. *Capital pooling* – It may be easier for an alliance of firms to raise the large amounts of capital needed to undertake large projects, particularly those with high start-up costs.
4. *Cost* – Strategic alliances are often a quicker and cheaper way to grow or enter a new market than a potentially costly merger or takeover.
5. *Experience* – Firms may learn from various processes designed by a research laboratory.

[4 Marks]

Solution 37:

Let the disposable income (Y_d) = $Y + Tr - T$.

$$Y_d = Y + 5 - 10$$

At the equilibrium level of national income $Y = C + I + G$

Where, $C = 40 + 0.8 Y_d$

$$\text{Or, } C = 40 + 0.8 (Y + 5 - 10)$$

$$I = 60 \text{ and } G = 10$$

Therefore, at equilibrium level,

$$Y = 40 + 0.8 (Y + 5 - 10) + 60 + 10$$

$$\text{or, } Y = 40 + 0.8Y - 4 + 60 + 10$$

$$\text{or, } Y - 0.8Y = 106$$

$$\text{or, } Y (1 - 0.8) = 106$$

$$\text{or, } Y = 106 / 0.2 = 530$$

[4 Marks]

Solution 38:

- a. **Net Domestic Income = Mixed Income of the Self-employed + Operating Surplus + Compensation of Employees**
= Rs 28,000 crore + Rs 10,000 crore + Rs 24,000 crore = Rs 62,000 crore
Ans. Rs 62,000 crore.
- b. **Gross Domestic Income = Net Domestic Income + Depreciation**
= Rs 62,000 crore + Rs 1,700 crore =Rs 63,700 crore
Ans. Rs 63,700 crore.
- c. **Net National Income = Net Domestic Income + Net Factor Income from Abroad**
= Rs 62,000 crore + (-Rs 300 crore) = Rs 61,700 crore
Ans. Rs 61,700 crore.
- d. **Net National Product at Market Price = Net National Income + Indirect Taxes – Subsidies**
= Rs 61,700 crore + Rs 9,000 crore – Rs 1,800 crore = Rs 68,900 crore
Ans. Rs 68,900 crore.

[4 Marks]**Solution 39:****i) Differences between the Central Bank and the Commercial Bank**

If we review the function of the Commercial banks and the Central Bank, we can identify some fundamental differences between the Central Bank and the Commercial banks of any country. These are stated below:

1. The principal objective of any commercial bank is to earn maximum profit through banking business. However, main objective of the Central Bank is to maximize economic welfare of a country.
2. Any commercial bank acts as a banker to many individuals who keep deposits with that commercial bank. However, the Central Bank acts as a banker to all such commercial banks and does not accept public deposit.
3. Only the Central Bank has the supreme authority to print currency notes on behalf of the Government of any country. But the commercial banks do not possess this authority.
4. The Central Bank is owned and controlled by the Government. But any commercial bank may either be owned by the state or by private bodies.

5. One of the principal functions of the Central Bank is to stabilize the external value of the domestic currency (through the purchase and sale of foreign currency, foreign exchange control, etc.). But the commercial banks do not have the responsibility to maintain the external value of the domestic currency.
6. The Central Bank does not provide credit facilities to the public directly. However, the commercial banks extend such facilities directly to the public.
7. The Central Bank act as a banker to the Government of a country and gives loan facilities to the Government. However, the commercial banks give loan facilities to their customers.
8. The Central Bank has the power to control/change Interest rates in order to maintain the level of Inflation in the economy, whereas the commercial banks do not possess this authority.

[4]

ii)

- a) This is a particular variety of the credit control policy of the central bank of any country. It wants to control the flow of credit on the basis of the quality of credit, i.e., on the basis of the purpose for which the credit facility is extended by commercial banks or on the basis of the credit worthiness of the borrowers in a selective manner. According to this policy guidelines, commercial banks can charge relatively higher rates of interest while giving loans to the richer sections of the people and relatively lower interest rates in the case of the poorer sections of the people.

[1.5]

- b) The Central Bank generally uses three types of selective credit control, instruments:

1. Margin money : This implies the minimum margins (say, 30% of the loan amount) to be kept by the borrowers with commercial banks while borrowing money against specific securities from commercial banks. In case of secured or less risky loans, the margin money requirement is kept at a low level.
2. Credit authorisation : This shows the ceiling on the amount of credit for certain purposes (which needs prior sanction of the Central Bank).
3. Differential Rates of Interest (DRI) : This scheme relates to the discriminatory rate of interest charged on certain lines of advances provided by commercial banks.

[3]

[8.5 Marks]**Solution 40:**

- i) An exchange rate index or the effective exchange rate is a weighted average of the exchange rate of a particular currency against all other currencies, where the weights are based on the proportion of transactions between each country.
- ii) This is because a less developed country depends on developed countries for the import of plant and machinery (and related technology) for its development programs. This causes a situation of adverse or negative balance of payments for the less developed countries. Accordingly, their forex reserves are low while the need for such reserves (to cope with rising imports) continues to be high. High exchange rate (or paying more and more for a dollar in

[1]

the international market) is the obvious consequence.

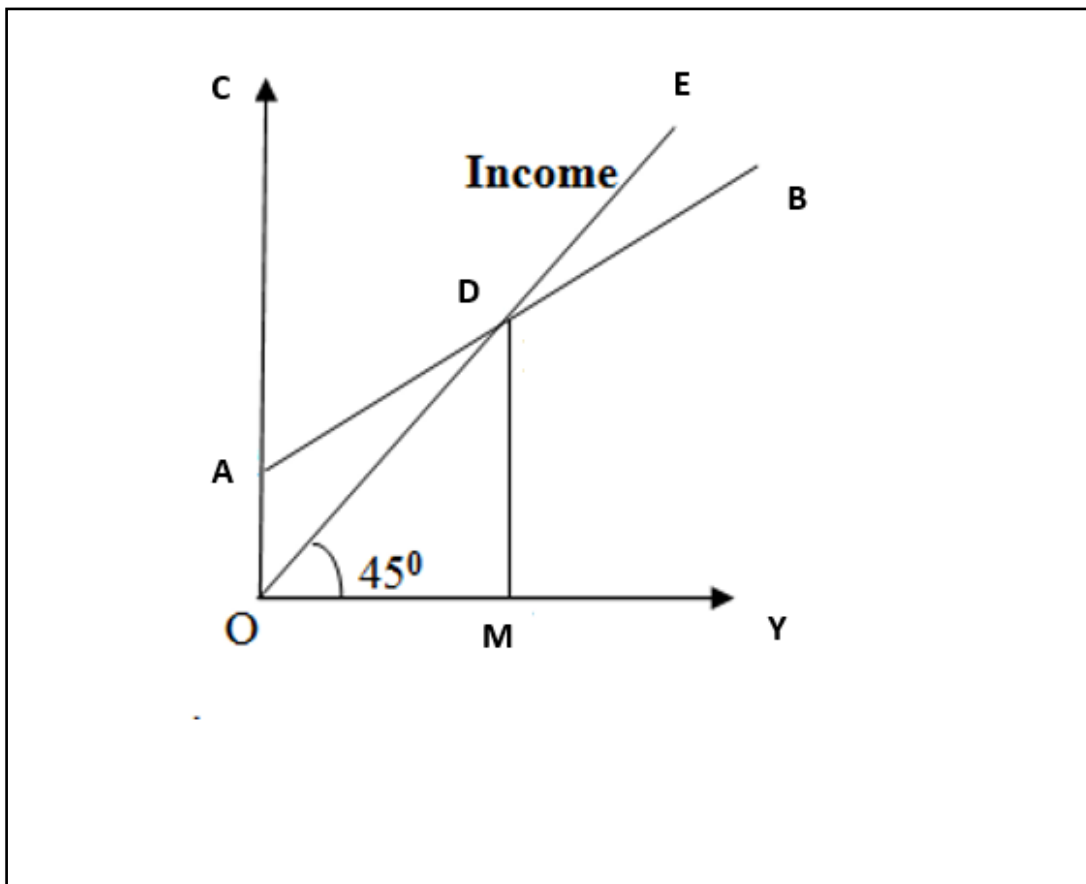
[2]

[3 Marks]

Solution 41:

The figure below is used to explain what will be the shape of the consumption function curve to satisfy the four characteristics which Prof. Keynes mentioned.

In the figure below, national income (Y) is measured on the horizontal axis and total consumption expenditure (C) is measured on the vertical axis. In this diagram OE is the 45° line i.e. the line OE makes 45° angle at the origin O. In the diagram AB is the upward rising straight line consumption function curve. This consumption function curve cuts the vertical axis positive part at point A and intersect the 45° line from above at point D. Here we discuss the four characteristics of consumption function as mentioned by Prof. Keynes with the help of the consumption function curve AB



1. Fixed and specific relationship among national income and total consumption function exist as the consumption function curve AB is straight line. Because the amount of the total consumption expenditure can be known specifically from the straight line AB for any fixed level of national income. Thus the straight line consumption function curve AB satisfies the characteristics (A) of Keynesian consumption function.

2. Slope of the consumption function curve AB is the marginal propensity to consume. The slope of this line is positive of the straight line is upward rising.

This means that the value of the marginal propensity to consume is positive ($\Delta C / \Delta Y > 0$). Again consumption function curve AB cuts the 45° line from above, so the steepness of this curve is less than the 45° line i.e. slope of AB is less than the slope of the 45° line. But the slope of 45° line ($\tan 45^\circ = 1$) is one. So the slope of the line AB is less than one i.e. the value of marginal propensity to consume is less than one ($\Delta C / \Delta Y < 1$). Thus it is seen that in case of consumption function curve AB, the value of marginal propensity to consume is greater than zero i.e. positive but less than one i.e. $0 < \Delta C / \Delta Y < 1$. Thus the straight line consumption function curve AB satisfies the characteristics (B) of Keynesian consumption function.

3. Average propensity to consume at any point on consumption curve AB is the slope of the straight line obtained by joining that point with the origin. For example, at point D on straight line AB, national income (Y) = OM and total consumption expenditure (C) = DM. So at point D, average propensity to consume (APC) = $C/Y = DM/OM =$ slope of the line OD or OE = slope of the 45° line = 1. So average propensity to consume at point D = 1. But to the left of the point D total consumption expenditure (C) is greater than national income (Y) i.e. $C > Y$. Because at any level, national income is the distance from 45° line to the horizontal axis and total consumption expenditure at that level is the distance from the line AB to the horizontal axis. So the value of average propensity to consume ($C/Y > 1$) is greater than one. In the same manner to the right of the point P, total consumption expenditure (C) is less than the total national income i.e. $C < Y$, so the value of average propensity to consume ($C/Y < 1$) is less than one. Therefore, it is seen that the value of average propensity to consume will decrease if we move continuously to the right along the consumption function curve AB. Thus in case of consumption function curve AB average propensity to consume decreases as national income increase. Thus straight line consumption function curve AB satisfies the characteristics (C) of the Keynesian consumption function.

4. Since the consumption function curve AB is straight line, slope at all the points on that line are equal. This means that marginal propensity to consume be always remain constant. So in case of consumption function curve AB, marginal propensity to consume remains constant even though national income increases. Thus the straight line consumption function curve AB satisfies the characteristics (D) of the Keynesian consumption function.

From the analysis it is seen that if the consumption function curve (a) is straight line, (b) is upward rising, (c) cuts vertical axis positive point and (d) cuts 45° line from above then it satisfies all the four characteristics of Keynesian consumption function. **[8 Marks]**
