

Institute of Actuaries of India

Subject CT7 – Business Economics

October 2015 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. B
2. D
3. A
4. A
5. B
6. B
7. C
8. C
9. B
10. C
11. A
12. D
13. C
14. A
15. D
16. D
17. D
18. B
19. B
20. C
21. D
22. D
23. B
24. A
25. A
26. C
27. B
28. A
29. C
30. A

[Q.No. 1 to 30=45 Marks]

Solution 31:

- i) Supernormal profit - **Supernormal profit** is profit in excess of normal profit. It is also referred to as **pure profit, economic profit, abnormal profit** or just **profit**.

Normal profit is the minimum return required by the owners in order to stay in the business. If they earn less than normal profit, then they will leave the business in the long run.

- ii) **Short-run shut-down point** - The firm should continue to produce in the short run provided it can cover its variable costs, ie provided that average revenue exceeds average variable cost ($AR > AVC$), so it is making some contribution to its fixed costs. This is because if it were to stop producing, although it would have no variable costs, it would still have to pay the fixed costs (in the short run). The short-run shut down point is where $AR = AVC$.
- iii) **Minimum efficient scale** - minimum efficient scale (MES) is the output level (long run) beyond which no further economies of scale can be achieved.
- iv) **Market clearing** - A market clears when supply matches demand leaving no shortage or surplus. The price at which demand equals supply is the equilibrium price.
- v) **Free market** - A free market is one in which there is no government intervention; instead, individual producers and consumers are free to make their own economic decisions. In a free market, consumers choose what to buy (or demand), while producers choose what to produce (or supply) and how to produce it.
- vi) **Nash equilibrium** - A Nash equilibrium exists if, without collusion, neither player can improve his or her payoff given the other player's strategy, so there is no incentive for either player to change position.
- vii) **Valuation ratio** – valuation ratio (or price to book ratio) – the ratio of the stock market value of the firm's shares to the book value of the firm's assets.

[3.5 Marks]

Solution 32:

To try and reduce the problems of adverse selection, insurance companies try to find out lots of information about potential policyholders. Policyholders can then be put in small, reasonably homogeneous pools and charged appropriate premiums.

For example:

- if you smoke, you may have to pay higher premiums for life insurance than a nonsmoker
- if you drive a small family car, you may pay lower premiums than someone who drives a high-performance sports car.
- Medical insurers for instance, ask a range of questions and may request medical or other reports on individuals who apply to buy insurance, so that the premium can be varied accordingly, and any unreasonably high or unpredictable risks rejected altogether.

This risk selection process is known as underwriting. In many countries, insurance law incorporates an "utmost good faith" or *uberrima fides* doctrine, which requires potential

customers to answer any underwriting questions asked by the insurer fully and honestly. Dishonesty may be met with refusals to pay claims.

In order to reduce the problems associated with moral hazard, the insurer needs to find a way to make sure that the insured's behaviour doesn't change. One way of doing this would be to make sure that the insured still suffers some sort of penalty if the insured event occurs.

Examples of this include:

- only insuring a maximum of, say, 75% of your potential loss
- making you pay the first, say, £200 of any claim
- giving the incentive of lower premiums in the future if you don't claim (eg a "no claims discount" system, as used in motor insurance)
- refusing to pay claims if you do not take reasonable care (many policies won't pay up if you leave your house or car unlocked).

[2 Marks]

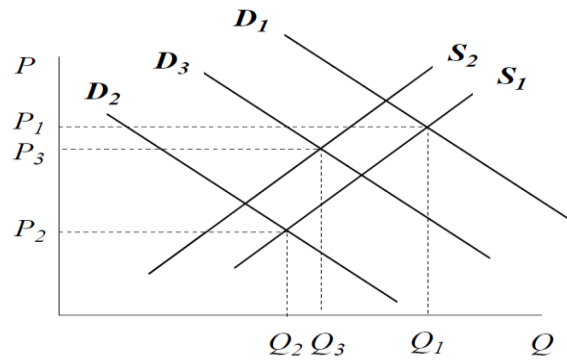
Solution 33:

Speculation is where people make trading decisions based on expectations of future price movements. Speculation is often self-fulfilling. For example, if traders expect a share price to rise, they will buy the share in anticipation that it will do so. This extra demand will itself lead to a rise in the share price.

Stabilising speculation is speculation that reduces price fluctuations. This occurs when speculators believe that the price change that has occurred is temporary.

For example, in times of plenty and low prices, farmers may hold back supplies of produce to the market in anticipation of higher prices in the future. Such action reduces the fall in the current price. Similarly, in times of shortage and high prices, farmers may release supplies (in anticipation of lower prices in the future) so that the market price rises by less than would otherwise be the case.

The following diagram shows the effect of stabilising speculation when there has been a decrease in demand for the product.



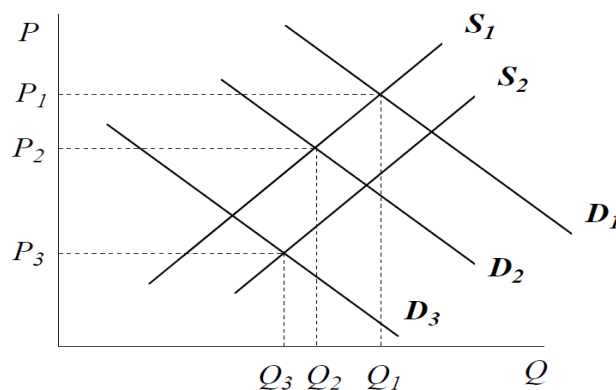
Stabilising Speculation

Starting from the initial equilibrium (P_1, Q_1), demand falls to D_2 . In the absence of speculation, the new equilibrium would be (P_2, Q_2). If the fall is expected to be temporary then suppliers cut supply to S_2 (to supply later at a higher price), and buyers increase demand back to D_3 (to buy the good while it is cheap) so the price rises back to P_3 .

Destabilising speculation is speculation that magnifies price fluctuations. It occurs when speculators believe that there will be further price changes in the same direction.

For example, if the price of oil increases and traders buy oil in anticipation of a further price rise, the increased demand will lead to a larger overall price rise than would otherwise have arisen.

The following diagram shows the effect of destabilising speculation when there has been a decrease in demand for the product.



Destabilising Speculation

Starting from the initial equilibrium (P_1, Q_1), demand falls to D_2 . If a further fall in price is expected then suppliers increase supply to S_2 (to gain sales now at the higher price), while

buyers decrease demand further to D3 (to buy later at a lower price) so the price falls further to P3.

[6 Marks]

Solution 34:

i) Profit is maximized when $MR=MC$

$$P = 10 - Q$$

$MR = 10 - 2Q$ (for any linear inverse demand function $P=a-bQ$, marginal revenue is $MR=a-2bQ$)

Setting $MR=MC$, we obtain

$$10 - 2Q = 1 + Q$$

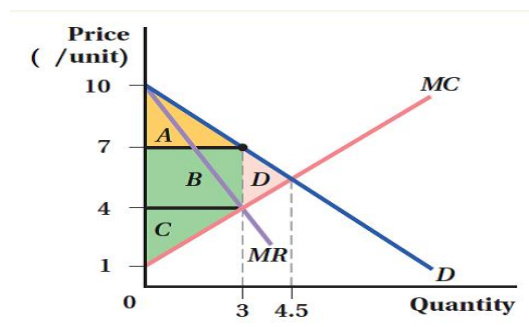
$$Q = 3$$

Plugging $Q=3$ in inverse demand equation, $P=7$

The firm sells 3 units at a price of 7 each

[2]

ii)



Consumer surplus = Area A = $\frac{1}{2} * (3) * (\text{Rs. } 10 - \text{Rs. } 7) = \text{Rs. } 4.5$

Producer surplus = Area B + Area C

To get the area of B & C, we need the MC of producing a quantity of 3:

$$MC = 1 + Q = 4$$

$$\text{So Area B} = 3 * (7 - 4) = 9$$

$$\text{Area C} = \frac{1}{2} * (3) * (4 - 1) = 4.5$$

$$\text{Producer Surplus} = 13.5$$

Deadweight loss = loss in surplus because market is not producing the competitive quantity.

To calculate competitive quantity we set $P=MC$

$$10 - Q = 1 + Q$$

$$Q = 4.5$$

$$\text{Deadweight loss} = \text{Area D} = (1/2) * (4.5 - 3) * (7 - 4) = 2.25$$

[5]

iii) If the firm practices perfect price discrimination, it will produce where $P = MC$. As we saw in part (b) above, this means that the firm will produce 4.5 units.

[1]

iv) Consumer surplus = 0

$$\text{Producer surplus} = \text{Area A} + \text{Area B} + \text{Area C} + \text{Area D} = 20.25$$

$$\text{Deadweight loss} = 0$$

[1.5]

[9.5 Marks]

Solution 35:

Possible motives for growth via vertical integration

1. Greater efficiency (ie economies of scale), due to:

- the production economies that may arise from performing complementary stages of production within the same firm
- co-ordination economies that result from savings on buying and selling costs, including marketing and advertising
- managerial economies from a single source of supervision
- financial economies, as larger firms may enjoy more bargaining power with suppliers and providers of finance.

2. Reduced uncertainty: Vertical integration gives the firm greater control over the production process and reduces uncertainty, eg with regard to the availability (timing and prices) of supplies of materials received or goods supplied to distributors and retailers.

3. Innovation: Vertical integration should improve communication between component designers and manufacturers, which may lead to increased possibilities for the development of productivity-improving innovations.

4. Increased monopoly power: The greater monopoly power arising from vertical integration may give the firm more control over the prices that it pays for supplies and receives for goods produced.

5. Creation of barriers to entry: Vertical integration may give the firm more scope to create barriers to entry by new firms, eg due to the control of inputs and the lower average costs that arise from economies of scale and the control of inputs.

Problems with vertical integration: Vertical integration may reduce the firm's ability to adapt to changing market conditions, as it may be unable to easily change suppliers and/or retailers. It may also preclude the spreading of risk gained by diversification.

[3 Marks]

Solution 36:

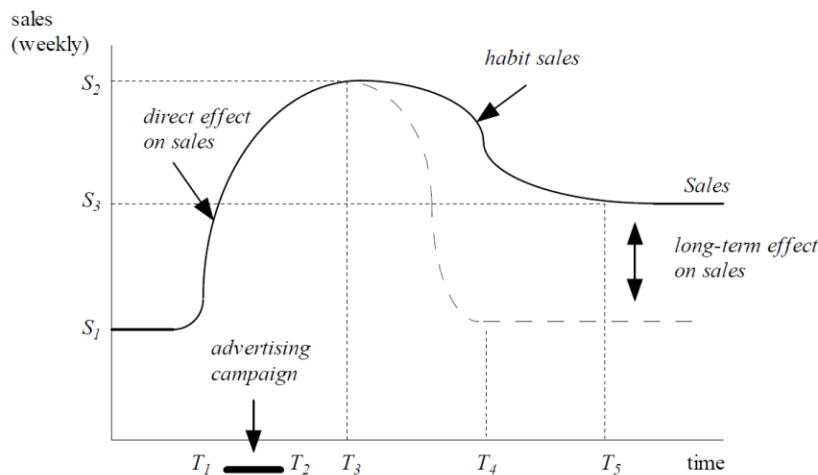
The intended effects of advertising

The effects on the demand curve

Advertising of a product is intended to:

- shift the product's demand curve to the right (by bringing the product more to consumers' attention and increasing the attractiveness and marginal utility of the product)
- make the product's demand less price-elastic (by creating brand loyalty and so reducing the number of perceived substitute goods, enabling the firm to increase prices without a substantial decrease in demand).

The effect on sales over time



An advertising campaign conducted between times T1 and T2 leads to an immediate increase in sales from S1 to S2. The direct effect of advertising wears off between times T3 and T4, but actual sales fall more slowly because new customers continue to buy out of habit. Sales level off at S3 after time T5, so the long-term effect of advertising is an increase from S1 to S3.

The most successful brands advertise consistently, even during recessions.

The effect on profit

Successful advertising should:

- increase sales volume (in the short term and in the long term)
- increase market share
- increase the ability to charge a price premium (since advertising increases the product's perceived quality and therefore increases customer utility and customer value)
- increase sales revenue (ie sales volume \times price)
- increase profit (ie the increase in revenue should exceed the increase in costs).

[4 Marks]

Solution 37:

The main aim of supply side policies is to increase an economy's potential output primarily by reducing market rigidities. In the labour market the aim would be to increase labour productivity and ensure that those who are able to work do become an active part of the workforce.

Problems might arise in relation to the lack of mobility of the workforce and that labour supply for many jobs will be very inelastic. Also, prohibitive living expenses in some areas like the South East of England further reduces geographical mobility.

Plans to encourage business investment through cuts in corporation tax do not always achieve the desired objective; associated increases in profits sometimes result in an increase in shareholder dividend rather than in further capital investment.

Attempts to reduce trade union power can result in very costly industrial action which has a negative effect upon companies and the macro-economy.

Investment grants can be costly and have to be financed by further taxation or expenditure cuts, both of which might have negative effects on economic growth.

Deregulation can introduce new competition from overseas which might have a negative effect on domestic industry.

Government's attempts to improve the infrastructure will be costly and this is likely to have a negative effect on the government's financial planning

More privatisation may lead to a fall in the demand for labour and add to unemployment.

[4 Marks]

Solution 38:

The accelerator principle states that investment is determined by the rate of change of national income and that small fluctuations in national income can lead to large fluctuations in investment demand.

In order to produce output a country needs capital goods – the amount of capital goods needed to produce one unit of output is known as the capital-output ratio. Capital goods become worn out over time and will eventually need to be replaced. When the economy is in equilibrium the investment needed each year will be that needed to replace the worn-out capital goods.

If national income rises, then there will be an increase in demand for consumer goods and services.

In order to produce these goods and services, firms need more capital equipment ie they need to increase investment.

This rise in the amount of capital needed may be large relative to the annual amount of replacement investment.

If income were to continue to rise by the same amount, then new investment would be constant, but eventually, the rate of increase in national income will slow down as the economy approaches full-capacity output, and so new investment will fall.

The accelerator principle thus helps to explain the great swings in activity in the capital goods industry.

The accelerator works with the multiplier to accentuate booms and slumps in the business cycle.

[5 Marks]

Solution 39:

The Phillips curve seems to offer policy makers the option of lower unemployment but at a cost of higher inflation. Similarly, lowering inflation will result in a rise in unemployment.

Monetarists are very critical of the idea that there is a long term trade-off between inflation and unemployment.

They believe that the inflation rate in the long term is determined by the rate by which monetary growth exceeds the rate of increase in money demand.

Any increase in the money supply that attempts to reduce unemployment by raising prices relative to wages will be doomed to failure as workers demand wage rises in line with the inflation rate such that real wages are restored to their original level.

Hence any reduction in unemployment below the long run natural rate may only be 'bought' at the cost of accelerating inflation.

The long run Phillips curve is therefore vertical at the natural rate of unemployment.

[3 Marks]

Solution 40:

- i) An increase in government spending will increase aggregate spending, shift aggregate demand to the right and with a positively sloped aggregate supply, and increase the price level. Hence an increase in government spending will result in demand-pull inflation.
- ii) An increase in corporate profit margins affects the cost of producing goods and services and thus shifts aggregate supply. This will result in cost-push inflation, as this will raise the cost of production, shifting aggregate supply leftward and increasing the price level.
- iii) An increase in nominal wages will result in cost-push inflation, as this will raise the cost of production, shifting aggregate supply leftward and increasing the price level.
- iv) A decrease in the price of raw material affects the cost of producing goods and services and thus shifts aggregate supply. A decrease in the price of raw material lowers the cost of production and therefore shifts aggregate supply to the right, lowering rather than increasing the price level. Hence no cost-push inflation or demand pull inflation

[4 Marks]

Solution 41:

i) Surplus of 10mn

$$+200-150+120-160 = 10\text{mn}$$

ii) Deficit 25 mn

$$(120 + 15 + 30 - 160 - 10 - 20)$$

iii) Surplus 25 mn

(200 + 120 + 15 + 30 – 150 - 160 - 10 - 20)

iv) 10 mn deficit (i.e. opposite sign to change in reserves)

v) 10 mn (pluses sum to 515, minuses sum to 525)

[5 Marks]

Solution 42:

The other way of reconciling the two conflicting aims of liquidity and profitability of the banks is through secondary marketing. The secondary marketing of assets is the sale of assets before maturity. This can enable banks to maintain/reduce the maturity gap for liquidity purposes, but to increase/maintain the gap for profitability purposes.

Securitisation is the main example of secondary marketing. It is the process of pooling assets, such as loans or mortgages, into marketable securities, such as bonds, backed by these assets.

Advantages

It reduces risk for the banks. If they know they can always re-sell assets for cash, they feel safer and therefore able to operate on a lower liquidity ratio and an increased maturity gap, so increasing profitability.

It enables banks to manage their exposure to risk of default on the underlying assets.

Securitisation enables banks to grow. By allowing the sale of assets for cash, it provides banks with liquidity and enables them to engage in further lending, so increasing profitability.

Securitisation may be a cheap way of borrowing for banks.

The pooling of assets reduces the cashflow risk for investors.

Disadvantages

A lower national liquidity ratio might lead to an excessive expansion of credit.

A moral hazard problem occurs, in that banks might be tempted to take greater risks in their lending, eg by softening their lending criteria and making it easier for higher-risk borrowers to borrow, because the risks are being passed on to other financial institutions.

There is an increased systemic risk of banking collapse because the fortunes of the banks are even more intertwined. A fall in the value of the assets that have been packaged affects all holders of CDOs that are backed by these assets, so all investors are exposed to the risk of the original bank's lending policy.

[6 Marks]
