

INSTITUTE OF ACTUARIES OF INDIA

CB2 - Business Economics

November 2025 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 to 15 (2 Marks each)

1. D
2. D
3. C
4. C
5. B
6. B
7. D
8. C
9. B
10. B
11. C
12. C
13. B
14. B
15. C

Solution 16:

[Note: Solution provides detailed explanation which is not required from the candidates]

- a) The strategy that would maximize joint profit is for both Firm X and Firm Y to set a price of 2 i.e. strategy A. This results in a combined profit of 23 ($18 + 5$). [1]
- b) A dominant strategy is the best choice for a firm, regardless of what the other firm does.

Dominant strategy for Firm X

- If Firm Y prices at 2: Firm X's profit is 18 if it prices at 2. Firm X's profit is 15 if it prices at 1.8. Since $18 > 15$, Firm X's best choice is to price at 2.
- If Firm Y prices at 1.8: Firm X's profit is 6 if it prices at 2. Firm X's profit is 12 if it prices at 1.8. Since $12 > 6$, Firm X's best choice is to price at 1.8.
- Since Firm X's strategy changes with change in the strategy of firm Y, hence firm X has no dominant strategy

Dominant Strategy for firm Y

- If Firm X prices at 2: Firm Y's profit is 5 if it prices at 2. Firm Y's profit is 15 if it prices at 1.8. Since $15 > 5$, Firm Y's best choice is to price at 1.8.
- If Firm X prices at 1.8: Firm Y's profit is 6 if it prices at 2. Firm Y's profit is 4 if it prices at 1.8. Since $6 > 4$, Firm Y's best choice is to price at 2.
- Firm Y's best strategy changes depending on what Firm X does (price 1.8 if X prices at 2, but price 2 if X prices at 1.8). **Therefore, Firm Y does not have a dominant strategy.**

A dominant strategy equilibrium occurs when all players choose their respective dominant strategies. As both Firms lack a **dominant strategy**, no **dominant equilibrium** exists in this game. [1]

- c) Nash equilibrium is an outcome where no firm can improve its profit by unilaterally changing its strategy, given the other firm's strategy.

There is no Nash equilibrium here because at least one player has an incentive to change their strategy for every outcome.

If the firms choose Strategy A, firm Y will be better off with strategy C.

If the firms choose Strategy B, firm X will be better off moving to A.

If the firms choose Strategy C, firm X will be better off moving to D.

If the firms choose Strategy D, both firms will be better off moving to B.

[1]

- d) The key effect of a price-matching guarantee is that both the firms need to have the same price. This will eliminate the top right quadrant (strategy B) and bottom left quadrant (strategy C) from the payoff matrix. Both the firms will either keep their price high at 2 or low at 1.8. [1]

- e) With a price-matching clause in effect, both firms would choose the strategy of setting their price at 2 (the higher price).

The rationale behind this choice is that a price-matching clause eliminates the incentive for a firm to cut its price. If one firm were to lower its price to 1.8, the other firm would immediately match it, and both firms would end up with lower profits at the new price without gaining any additional market share.

[1]

[5 Marks]

Solution 17:

a) *Micro-economic Impact*

The Initial Equilibrium (Before GST Reduction):

Initial Supply Curve is S1: The original supply curve is upward-sloping.

Demand Curve is D1: The demand curve is downward-sloping, showing the quantity of refrigerators consumers are willing and able to buy at various prices.

Initial Equilibrium: The market is in equilibrium at the intersection of S1 and D1, with an initial price P1 and an initial quantity Q1.

The GST Reduction and Shift in the Supply Curve:

Reduced Cost of Production: A reduction in the GST on refrigerators effectively lowers the per-unit cost for suppliers. This is because the portion of the price that constitutes the tax is now lower, allowing producers to sell at a lower price for any given quantity.

Shift in Supply: This decrease in the cost of production causes the supply curve to shift downward and to the right, from S1 to S2. The vertical distance between the two supply curves represents the amount of the tax reduction per unit.

New Equilibrium Price and Quantity: The new equilibrium is established at the intersection of S2 and D1.

This results in a new, lower equilibrium price P2 and a higher equilibrium quantity Q2. The price decreases because of the lower tax, and the quantity demanded increases in response to the lower price.

[2]

b) *Impact on Surpluses, Government Revenue, and Deadweight Loss:*

- i. Consumer Surplus (CS): The GST reduction leads to a lower market price P_2 , benefiting consumers. The consumer surplus increases, as represented by the increase in the area below the demand curve and above the new equilibrium price P_2 .
- ii. Producer Surplus (PS): The effect on producer surplus is more complex. While the price paid by consumers decreases, the price received by producers (after tax) increases. This, combined with the increase in sales volume, typically leads to an increase in producer surplus. It is the area below the market price and above the supply curve S_2 .
- iii. Government Revenue: The government's tax revenue decreases per unit sold. However, the total revenue is affected by two factors: the decrease in the per-unit tax and the increase in the number of units sold. The overall impact on government revenue depends on which of these two effects is greater.
- iv. Deadweight Loss (DWL): Deadweight loss is the inefficiency caused by a tax, representing the loss of potential gains from trade. By reducing the GST, the government reduces the wedge between the price consumers pay and the price producers receive, thereby reducing the deadweight loss and moving the market closer to its efficient outcome. The deadweight loss decreases because the quantity transacted moves closer to the quantity that would be traded without a tax.

[4]

[6 Marks]**Solution 18:**

a) There are 3 degrees of Price discrimination:

1. First Degree Price discrimination - Where the seller of the product charges each consumer the maximum price they are prepared to pay for each unit. Give suitable examples.
2. Second degree price discrimination - Second-degree price discrimination involves charging consumers a different price for the amount or quantity consumed. Give suitable examples.
3. Third Degree price discrimination - Where a firm divides consumers into different groups based on some characteristics that is relatively easy to observe and informative about how much consumers are willing to pay. The firm then charges a different price to consumers in different groups, but the same price to all the consumers within a group. Give suitable examples.

[3]

b) Inertia pricing describes the concept of long term existing customers being charged more for a policy than new customers would be. This can occur because customers who have held a policy with the provider for many years are less likely to shop around in the future. Newer customers, on the other hand, are more likely to be comparing prices of a number of insurance companies, e.g. through a price comparison website.

[1]

c) The regulator could dictate that prices for existing customers be no more than prices for equivalent new customers.

The desired effect would be for renewal premium to reduce, however, it could instead result in higher prices for new customers.

[2]

[6 Marks]**Solution 19:**

a) *The government can regulate a monopoly market through*

- Antitrust laws: Antitrust laws aim to prevent monopolies from forming, breaking up existing monopolies, or regulating mergers and acquisitions.
- Price controls: Price controls can be implemented to prevent monopolists from charging excessive prices

- Regulation: while regulations can be put in place to ensure fair competition and protect consumers [3]

b) Monopoly is considered desirable due to following advantages:

Economies of Scale -The monopoly may be able to achieve substantial economies of scale due to large plant, centralised administration and the avoidance of unnecessary duplication. If this results in an MC curve substantially below that of the same industry under perfect competition the monopoly will produce a higher output at a lower price.

Possibility of lower cost curves due to more research and development and more investment - A monopolist can use part of its supernormal profits for research and development and investment. It thus has a greater ability to become efficient than has the small firm with limited funds.

Competition for Corporate control - a monopoly, with potentially low costs, which is currently run inefficiently, is likely to be subject to a takeover bid from another company. This competition for corporate control may thus force the monopoly to be efficient in order to avoid being taken over.

Innovation and new products- The promise of supernormal profits, protected perhaps by patents, may encourage the development of new (monopoly) industries producing new products. [3]

[6 Marks]

Solution 20:

a) [Note: Full Table illustration not required]

No. of Workers (L)	Total Output (Q)	Marginal Productivity(L)	Average Productivity (L)
0	0		
1	10	10	10
2	30	20	15
3	50	20	16.67
4	56	6	14
5	59	3	11.8
6	60	1	10
7	60	0	8.57
8	58	-2	7.25

i) = 20

ii) = -2

iii) = 11.8

iv) = 8.57

[1]

b) Average Productivity reaches its maximum at 3 workers and we know that the law of diminishing returns occurs just before this maximum is reached. However, since the marginal product of labour (MPL) is maximum at three units of labour, the law of diminishing returns begins to take effect with the employment of the fourth unit of labour. [1]

c) Optimal level of employment is attained where $MRP = \text{wage rate}$, and the firm would hire 4 unit of L.

If price decreases to \$10, the firm would hire only three worker, since the MRP of the fourth worker is $\$60 < \text{wage rate}$ [1]

d) Diminishing marginal returns are an effect of increasing input in the short run, while at least one production variable is kept constant, such as labour or capital.

Returns to scale, on the other hand, are the impact of increasing input on all variables of production in the long run. This phenomenon is referred to as economies of scale. [1]

e) Factors leading to economies of scale are

- specialisation
 - division of labour;
 - indivisibilities;
 - the container principle;
 - greater efficiencies of large machines, by products, multi stage production,
 - organisational economies like spreading overheads, Financial economies, economies of scope
- [1]

[5 Marks]

Solution 21:

Say's law states that supply creates its own demand. This means that the process of producing the goods creates the income to buy them. As long as economy starts from a position of full employment, there is no reason why it ought not to stay that way.

The possibility of people withdrawing their income (in the form of savings, taxes and imports) rather than spending it was covered by other parts of classical theory. The loanable funds theory suggested that savings should equal investment. The gold standard suggested that exports should equal imports. So if governments followed a balanced budget, taxation should equal government spending and hence total withdrawals would be compensated by total injections.

Therefore, Say's law together with the assumption of withdrawals equalling injections suggested that there would be no deficiency of demand and full employment would be ensured.

[3 Marks]

Solution 22:

A low unemployment rate is often seen as a positive sign of a healthy economy because it suggests high economic output and prosperity. However, this statement is not always true, as a number of complex factors must be considered, including inflation, types of unemployment, and how low is "too low".

Low unemployment and its benefits

In an expanding economy, a low unemployment rate is generally associated with increased output and rising living standards. This is because:

High economic output: When more people are employed, the economy is likely operating closer to its maximum productive capacity, or potential GDP.

Rising incomes: A tight labour market with low unemployment increases the bargaining power of workers. To attract and retain talent, companies often raise wages, which drives up incomes.

Increased spending: With higher incomes and greater job security, consumers are more confident and spend more. This boosts demand for goods and services, fuelling further economic growth.

Why a low unemployment rate is not always a sign of a healthy economy

Several scenarios illustrate why low unemployment does not guarantee a healthy economy, particularly when considering inflation and output.

1. The Phillips Curve and the inflation trade-off

The statement becomes more complex when considering inflation. The Phillips curve describes a historical inverse relationship between unemployment and inflation.

The short-run trade-off: In the short run, it was observed that policies that stimulate aggregate demand could lower unemployment at the cost of higher inflation. The conventional reasoning is that low unemployment leads to higher wages, which increases production costs for firms. These higher costs are then passed on to consumers as higher prices.

2. *Supply-side shocks*

External events, or supply-side shocks, can disrupt the inverse Phillips curve relationship, leading to high inflation and high unemployment simultaneously—a phenomenon known as stagflation.

3. *Structural and frictional factors*

The unemployment rate can be low due to non-cyclical factors unrelated to a truly healthy economy.

4. *Low productivity output:*

A low unemployment rate may mask underlying weaknesses in the economy, such as low productivity growth or misallocated labour resources. An economy could have low unemployment but low output per worker, indicating an underlying issue.

5. *Natural unemployment:*

All economies have a "natural" level of unemployment, which includes frictional unemployment (temporary job search) and structural unemployment (skill mismatches). A low reported rate may just reflect a reduction in the labour force or an unusually low natural rate, rather than robust demand.

Conclusion

While low unemployment is often a component of a healthy economy that maximizes output, it is not an absolute indicator. Its health must be evaluated in conjunction with inflation and output. A low unemployment rate can be a sign of a dynamic, expanding economy, but it can also be a warning sign of an overheating economy with unsustainable inflation. As seen during periods of stagflation, relying on low unemployment as the sole measure of economic health can be misleading and lead to misguided policy decisions.

[7 Marks]

Solution 23:

a) *Role of Central Bank*

A central bank performs several key functions to ensure macroeconomic stability:

1. It issues Notes - It issues currency, ensuring a stable and healthy flow of money within the economy.
2. It acts as a bank
 - To the government -for taxation, spending, borrowing and lending
 - To banks -
 - To overseas central banks-
3. It operates the government's monetary policy - The RBI formulates and implements monetary policy to control inflation and promote economic growth by managing the economy's money supply and credit flow.
4. It oversees the activities of banks and other financial institutions- The RBI regulates and supervises the financial system to promote a safe and sound banking environment.
5. It operates the government's exchange rate policy - By managing foreign exchange reserves, overseeing debt and money markets, and acting as the lender of last resort, the RBI aims to prevent and mitigate financial crises.

[4]

b) *The effectiveness of monetary policy*

- Central Bank can use monetary policy to restrict the growth in aggregate demand in one of two major ways:
 - Reducing money supply directly
 - Reducing the demand for money by raising interest rates
- The effectiveness of monetary policy will however depend on:
 - Economic Conditions: The effectiveness of monetary policy tools is influenced by the prevailing economic conditions. Factors like economic uncertainty, financial market instability, and the credibility of the central bank itself can affect how well policy tools work.
 - With an interest -inelastic demand for loans, however, changes in interest rates have to be very large to bring the required changes in monetary growth.
 - Time lags and imprecision: It is impossible to use monetary policy as a precise means of controlling aggregate demand in the short term.
 - Nevertheless, controlling interest rates is a rapid way of responding to changing forecasts and can be an important signal to markets that inflation will be kept under control. [2]

c) *Open Market operations:*

Open Market Operations (OMO) refer to the buying and selling of government securities (such as bonds) by the central bank to control the money supply in the economy.

To increase economic activity (Expansionary policy):

The central bank buys government securities in the open market.

This injects money into the banking system, increasing the amount of money banks can lend.

More lending leads to higher investment and consumption, thus stimulating economic activity.

To decrease economic activity (Contractionary policy):

The central bank sells government securities in the open market.

This withdraws money from the banking system, reducing banks' ability to lend.

Less lending leads to lower investment and consumption, thus slowing down economic activity.

[2]

[8 Marks]

Solution 24:

a) *Methods of restricting trade:*

{any 6, }

- Tariffs (custom duties) - These are taxes on imports and are usually ad valorem tariffs i.e. a percentage of the price of the import.
- Quotas - These are limits imposed on the quantity of goods that can be imported.
- Exchange controls - These include limits on how much foreign exchange can be made available to importers or to citizens travelling abroad or for investment.
- Import Licensing - The imposition of exchange controls or quotas often involves requiring importers to obtain licences.
- Embargoes - These are total government bans on certain imports or exports to certain countries
- Administrative barriers - custom delays and excessive paperwork
- Procurement policies - This is where government favour domestic producers when purchasing equipment's
- dumping - governments may favour domestic producers by subsidising their exports. The goods are dumped at artificially low prices in the foreign market. [3]

b) Any 6 arguments can be explained

- **Infant industry argument** - New or emerging domestic industries may require temporary protection from larger established foreign competitors to grow and achieve economies of scale. Their workers are inexperienced; they lack back-up facilities, such as communications networks and specialist suppliers. They may have limited access to finance for expansion.
- **To prevent dumping and other unfair trade practices** - Trade restrictions can be used to counter unfair practices like dumping (selling products below cost) or subsidies by other countries, ensuring a more level playing field for domestic firms.
- **Danger of establishment of a foreign based monopoly** - competition from abroad, especially when it involves dumping or predatory pricing, could drive domestic producers out of business. The foreign company, now having a monopoly of the market, could charge high prices with a resulting misallocation of resources.
- **The Senile industry argument** - Industries with a potential comparative advantage have been allowed to run down and can no longer compete effectively. They may have considerable potential, but be simply unable to make enough profit to afford necessary investment without some temporary protection.
- To spread the risk of fluctuating markets- A highly specialised economy is highly susceptible to world market fluctuations. Greater diversity and greater self-sufficiency can reduce these risks.
- To reduce the influence of trade on consumer tastes - Multinational companies through their advertising and other forms of sales promotion may influence consumer tastes. Thus some restriction on trade may be justified in order to reduce this 'producer sovereignty'.
- To prevent the importation of harmful goods - like drugs, pornographic literature and live animals
- To take account of externalities - free trade will tend to reflect private costs. Both imports and exports, however, can involve externalities. eg, mining of minerals for export may damage the health of miners
- The exploitation of market power - If a country or group of countries has a market power in supply of exports e.g. OPEC countries
- To protect declining industries
- To improve the balance of payments

[6]

[9 Marks]

Solution 25:

a) Balance Of Trades = Value of Exports- Value of Imports = \$300 - \$420 = -\$120 billion

The country has a trade deficit of \$120 billion because imports of goods are greater than exports of goods.

[1]

b) Current Account Balance = -\$120 + \$95 = -\$25 billion

The country has a current account deficit of \$25 billion.

[1]

c) Capital Account Balance = Net FDI + Net Portfolio Investment + Net External Commercial Borrowings

Capital Account Balance = \$60 + (-\$20) + \$30 = \$70 billion

The country has a capital account surplus of \$70 billion.

[1]

d) Overall BoP = Current Account Balance + Capital Account Balance + Errors and Omissions

Overall BoP = -\$25 + \$70 + \$5 = \$50 billion

[1]

- e) Under a floating exchange rate, if there is a current account deficit then the supply of the domestic currency will exceed the demand for it, and the exchange rate will fall. This will make it cheaper to invest in the domestic economy and so there will be an increase in the net inflow to the financial account. So the current account deficit will be matched by a surplus in the financial account, ensuring an overall balance.

[2]

[6 Marks]

Solution 26:**a)***Positive demand shock*

- An increase in government spending is a component of Aggregate Demand (AD).
- The AD curve shifts to the right.
- At any given price level, the total quantity of goods and services demanded increases.
- This causes both the equilibrium Real GDP and the aggregate price level to increase in the short run.

Negative supply shock

- A sudden rise in the price of a key input like oil increases the costs of production for firms.
- The Short-Run Aggregate Supply (SRAS) curve shifts to the left.
- At any given price level, the total quantity of goods and services supplied decreases.
- This leads to a higher aggregate price level and a lower equilibrium Real GDP. This combination of stagnation and inflation is known as stagflation.

The simultaneous effect

- When these two shocks occur at the same time, the ultimate effect on the economy is a combination of their individual impacts.
- Price level: Both a positive demand shock (AD shift right) and a negative supply shock (SRAS shift left) cause the aggregate price level to increase. Therefore, the simultaneous occurrence of these events will unambiguously increase the aggregate price level.
- Real GDP: The effect on Real GDP is indeterminate and depends on the relative magnitude of the two shocks.
- The positive demand shock pushes Real GDP up.
- The negative supply shock pulls Real GDP down.

[6]

b)*Effect of relative magnitude*

The size of the shift in each curve determines the final change in Real GDP.

Case 1: The positive demand shock dominates

If the AD curve shifts to the right by a greater amount than the SRAS curve shifts to the left:

The upward pressure on Real GDP from increased demand is stronger than the downward pressure from higher production costs.

Outcome: The new equilibrium will have both a higher price level and a higher Real GDP.

Case 2: The negative supply shock dominates

If the SRAS curve shifts to the left by a greater amount than the AD curve shifts to the right:

The downward pressure on Real GDP from higher production costs is stronger than the upward pressure from increased demand.

Outcome: The new equilibrium will have a higher price level and a lower Real GDP. The economy experiences stagflation.

Case 3: The shocks are of equal magnitude

If the AD and SRAS curves shift by an equal amount in opposite directions:

The upward pressure on Real GDP perfectly offsets the downward pressure.

Outcome: The new equilibrium will have a higher price level, but Real GDP will remain unchanged.

[3]

[9 Marks]
