

INSTITUTE OF ACTUARIES OF INDIA

CT7 - Economics

MAY 2009 EXAMINATION

INDICATIVE SOLUTION

Solutions

- | | | |
|-----|---|-------|
| 1. | A | [1.5] |
| 2. | D | [1.5] |
| 3. | D | [1.5] |
| 4. | D | [1.5] |
| 5. | C | [1.5] |
| 6. | D | [1.5] |
| 7. | C | [1.5] |
| 8. | C | [1.5] |
| 9. | C | [1.5] |
| 10. | B | [1.5] |
| 11. | B | [1.5] |
| 12. | C | [1.5] |
| 13. | D | [1.5] |
| 14. | D | [1.5] |
| 15. | C | [1.5] |
| 16. | A | [1.5] |
| 17. | C | [1.5] |
| 18. | A | [1.5] |
| 19. | D | [1.5] |
| 20. | B | [1.5] |
| 21. | C | [1.5] |
| 22. | C | [1.5] |
| 23. | D | [1.5] |
| 24. | C | [1.5] |
| 25. | B | [1.5] |
| 26. | C | [1.5] |
| 27. | B | [1.5] |
| 28. | D | [1.5] |

29.

The Cash Reserve Ratio (CRR) is the ratio of cash reserves to deposits that a bank holds.

A central bank or government can require a minimum CRR for commercial banks to hold at all times. This will be an effective money management tool if the minimum CRR is higher than the CRR the bank would otherwise have held.

Raising the cash reserve ratio (CRR) will restrict the bank ability to expand money supply through lending. The value of the money multiplier is reduced.

Lowering the cash reserve ratio (CRR) will enhanced the bank ability to expand money supply through lending. The value of the money multiplier is increased.

[3]

30.

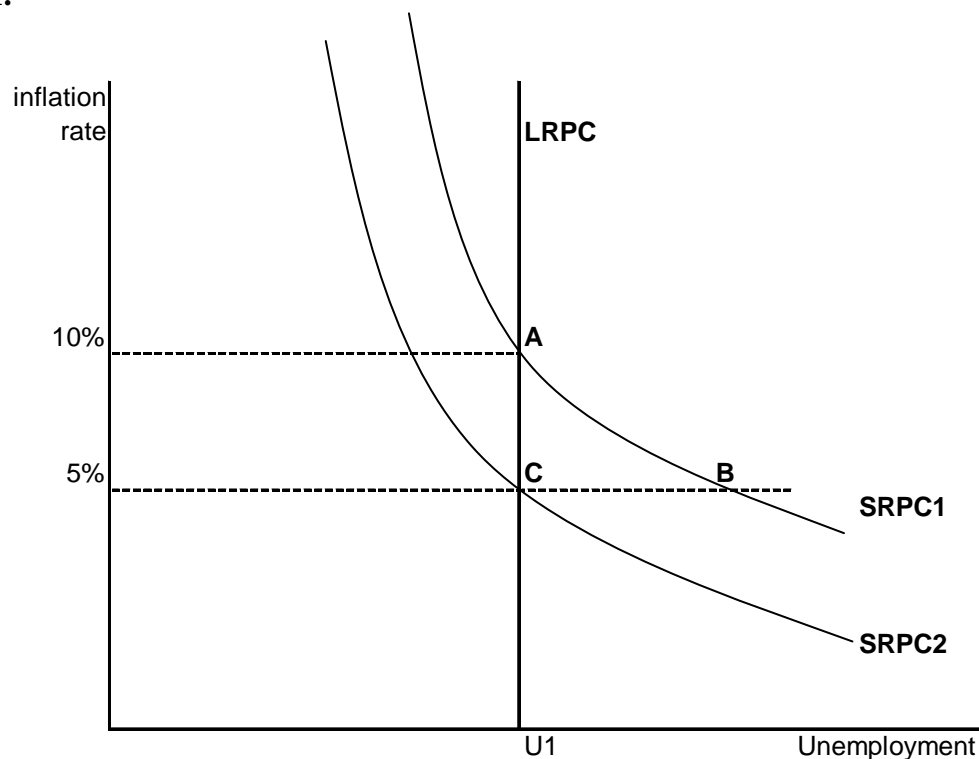
The term “Economic Growth” is used to refer to increases in real GNP or GDP. Sometimes, economists will consider GNP (or GDP) per capita, so that Economic Growth can be used to refer to real growth in GNP per person.

Economists explain economic growth in terms of increases in the quantity and productivity of the following factors used in production:

- Capital man-made resources.
- Labour i.e. human capital.
- Land.
- Raw materials e.g. oil.
- Technical knowledge e.g. invention and innovation
- Economic efficiency; being improved use of the above.

[4]

31.



Starting at point A with LRPC and SRPC1 the natural level of unemployment is U_1 and the rate of money supply growth is 10%pa. Thus actual and expected price and wage inflation are all 10% pa as well.

If the government cuts the rate of growth of the nominal money supply to say 5% but Inflation remains at a higher level the real money supply will contract. This causes interest rates to rise. Private sector investment and consumption will fall leading to higher unemployment. The economy will move right from A to B down the SRPC1 curve and unemployment will rise.

The inflation rate may reduce if the government continues to expand money supply at only 5%, as workers will eventually come to expect 5% inflation in the long run and the economy will move onto SRPC2 at point C. This will happen because falling interest rates and the expectation of future low interest rates will expand the economy, reducing unemployment. [4]

32.

(I) Deficit Rs 10,000 crs {205-175+30-50+40-60=-10}

(ii) minus Rs 5,000 crs {25- (-10+80-40)}

(iii) An increase in official reserves indicates that the Central Bank has been buying foreign currency and selling rupees in the foreign exchange market.

(iv) Marks to be awarded for any of the following approaches

Approach 1 [Holds if 'balance of trade' alludes to 'visible trade' only]: It is not possible to calculate the trade balance as this is the balance of exports in goods minus imports of goods only. The above figures are for both goods and services and we need to know the value of the services component before we can calculate the trade balance.

Approach 2: Assuming that trade balance can be thought of encompassing both goods and services, trade balance can be calculated as +30,000 crs (205-175=30) [4]

33.

i) Because the gadget and batteries are complementary goods and the gadget seller is having a sale (which will result in an increased quantity of gadget purchased), the store manager should expect to sell more batteries holding the price constant.

Cross Price Elasticity of P_G on $D_B = -1.5$

So the 10% fall in gadget prices leads to a 15% increase in demand for batteries.

Applying the formula gives

$$-1.5 = [(Q_2 - 100) / 100] / [(3600 - 4000) / 4000]$$

$$-1.5 = [(Q_2 - 100) / 100] / [-0.1]$$

$$0.15 = [(Q_2 - 100) / 100]$$

$$15 = (Q_2 - 100)$$

$$115 = Q_2$$

Therefore, the quantity of batteries sold will increase from 100 to 115.

ii) Marks to be awarded for any of the following solutions

Solution 1 [When demand curve is vertical]: Price elasticity of supply for batteries = 2.5

Supply has increased by 15%, so the price will increase by $15\%/2.5$ or 6%.

Or applying the formula gives

$$2.5 = [(115 - 100) / 100] / [(P2 - 40) / 40]$$

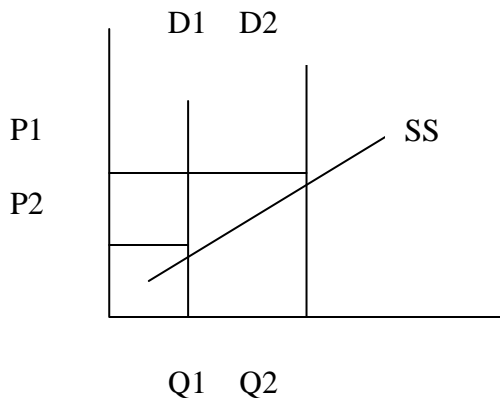
$$2.5 = [0.15] / [(P2 - 40) / 40]$$

$$[(2.5P2 - 100) / 40] = 0.15$$

$$(2.5P2 - 100) = 6$$

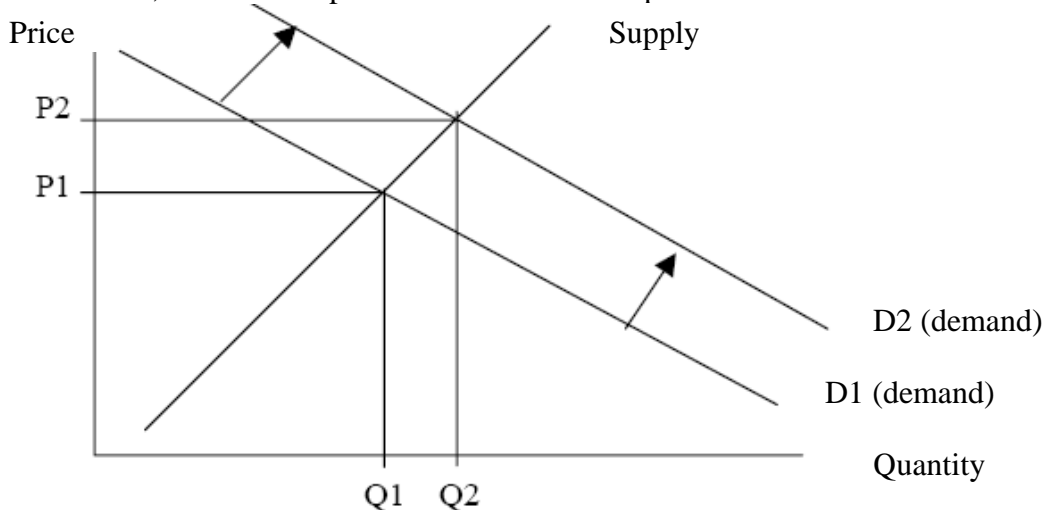
$$2.5P2 = 106$$

$$P2 = 42.4$$



As the above diagram of the demand and supply of batteries shows, the sale on gadget caused an increase in demand for batteries (these goods are complements). From part (i), we know that the quantity demanded increased from 100 (Q_1) to 115 (Q_2) batteries. Using the price elasticity of supply for batteries, we calculated that the price of a set of batteries increased from INR 40 (P_1) to INR 42.4 (P_2).

Solution 2: The solution can be found only if we assume that the own price elasticity of specialized battery is zero or the demand curve is vertical. In such a case, the maximum price increase could be calculated, else it is not possible to calculate the price.



[5]

34.

i) “GNP deflator” is an index that economists use to convert the nominal economic activities to real economic activities. The GDP deflator is similar to the consumer price index (CPI), but where the CPI only looks at change in the price of consumer goods (C), the GDP deflator considers price changes in C, I, G, X and Z (being consumer goods, investment, government spending, exports and imports respectively).

ii)

In 1980 India’s GDP at market price (measured in “current” i.e. 1980) = \$ 176bn

In 2006 India’s GDP at market price (measured in “current” i.e. 2006) = \$ 814bn

GDP index Deflator increase from 100 to 295 during 1980 to 2006

GDP deflator is = $295/100 = 2.95$

India’s GDP at constant price (i.e. 2006) = \$ 814bn * $100/295$

= \$ 275.93bn

Or

= \$ 814bn / 2.95

= \$ 275.93bn

Comparing \$ 275.93bn with \$ 176bn gives a compounded real economic growth of 1.75% p.a. in \$ terms. [3]

35.

i)

Total cost for plastic firm: $1000+2000+2200+2400+3000 = 10,600$

Total cost for transporting firm: $900+1800+2700+3600+4600 = 13,600$

Total cost for both firms: $10,600 + 13,600 = 24,200$

ii) Total units for the plastic firm: 6 units

Total units for the transporting firm: 4 units

Total combined costs for both firms: $(1000+2000+2200+2400+3000+3000) + (900+1800+2700+3600) = \$22,600$

More efficient because reduced the same amount of pollution (10 tons) for lower costs.

iii)

The government would sell 6 rights to pollute which would leave 10 units of pollution left to be eliminated by the firms.

The plastic firm would buy 2 rights to pollute. This is so it avoids paying for pollution reduction on the 7th and 8th units (therefore, it ends up reducing 6 tons of pollution). It won’t buy more rights because the transporting firm will be willing to pay more for the other 4 licences than the plastics firm’s costs to reduce the 6th ton of pollution

The transporting firm would buy 4 rights to pollute to avoid paying for pollution reduction on the 5th through 8th units.

These two methods are equally efficient if there are no costs to running the auction, because they achieve the same level of pollution reduction for the same costs. [8]

36.

i) For a fair gamble: $X = \frac{1}{4} * 2X + \frac{3}{4} * X/A$
 $A = 3/2 = 1.5$

ii) Certainty equivalent Y of this gamble is

$$Y^{0.25} = \frac{1}{4} * (2 * 1)^{0.25} + \frac{3}{4} * (2/3 * 1)^{0.25}$$

$$Y^{0.25} = .975$$

Y = INR .90 lac or INR 90,000

Certainty equivalent of the gamble is lower than the current position of contestants and hence using expected utility theorem, a rational contestant shouldn't accept this gamble

iii) Certainty equivalent Y of this gamble is

$$Y^{0.25} = \frac{1}{2} * (2 * 1)^{0.25} + \frac{1}{2} * (2/3 * 1)^{0.25}$$

$$Y^{0.25} = 1.046$$

Y = INR 1.2 lac or INR 1,20,000

Certainty equivalent of the gamble is higher than the current position of contestants and hence using expected utility theorem, a rational contestant should accept this gamble [7]

37.

Monetary policy with floating exchange rates

A reduction in the money supply increases interest rates (by shifting the LM curve to the left) and reduces price inflation (as explained by the quantity theory of money).

Under floating exchange rates, higher interest rates will increase the value of the currency.

A higher exchange rate will reduce both cost push inflation and demand pull inflation (by reducing net exports).

Thus, floating exchange rates make monetary policy more effective at controlling price rises.

Monetary policy with fixed exchange rates

If interest rates are higher in country A than in country B, with a fixed exchange rate money from abroad will flood in from country B to country A, as there is no possibility of exchange rate depreciation.

To maintain the fixed exchange rate the government will have to sell the domestic currency to meet the demand for money.

Selling the domestic currency increases the money supply and pushes interest rates down, towards the level in country B.

Thus, an independent monetary policy is not possible under fixed exchange rates.

Fiscal policy with floating exchange rates

An increase in government expenditure tends to increase interest rates (as the IS curve shifts to the right).

Under a floating exchange rate the rise in interest rates will lead to an increase in the value of the currency.

The increase in the value of the domestic currency will reduce net exports, worsening the effects of crowding out.

Thus fiscal policy is less effective with floating exchange rates.

Fiscal policy with fixed exchange rates

With fixed exchange rates, interest rates must be maintained at the world level.

Normally, when an expansionary fiscal policy is introduced, private sector consumption and investment is crowded out by higher interest rates and higher prices.

Under fixed exchange rates interest rates cannot be allowed to rise, which limits the amount of crowding out that can occur.

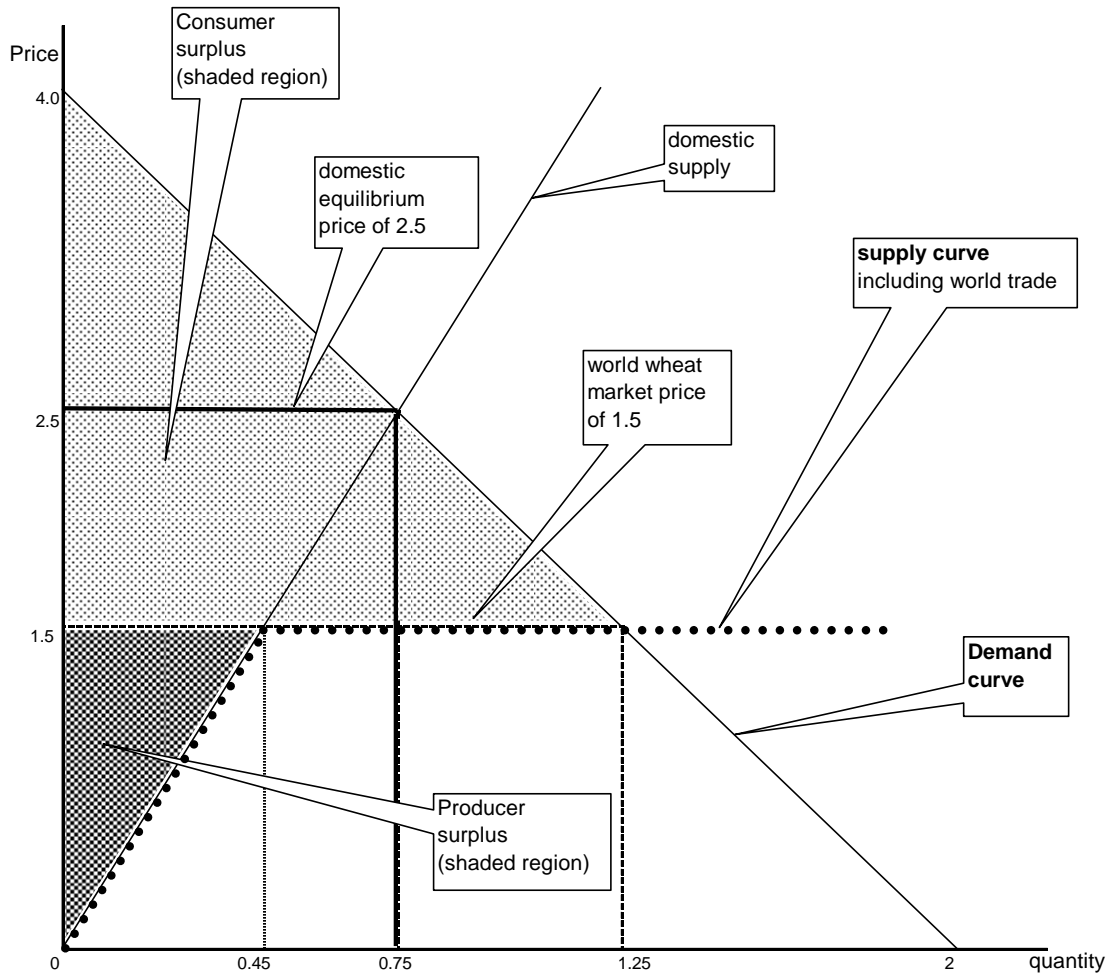
Hence fiscal policy is more effective with fixed exchange rates.

[10]

38.

(i)

a)



{ Correct diagram showing demand and supply curves }

b) Consumer surplus (CS) = $\frac{1}{2} * (4 - 1.5) * 1.25 = 1.56$

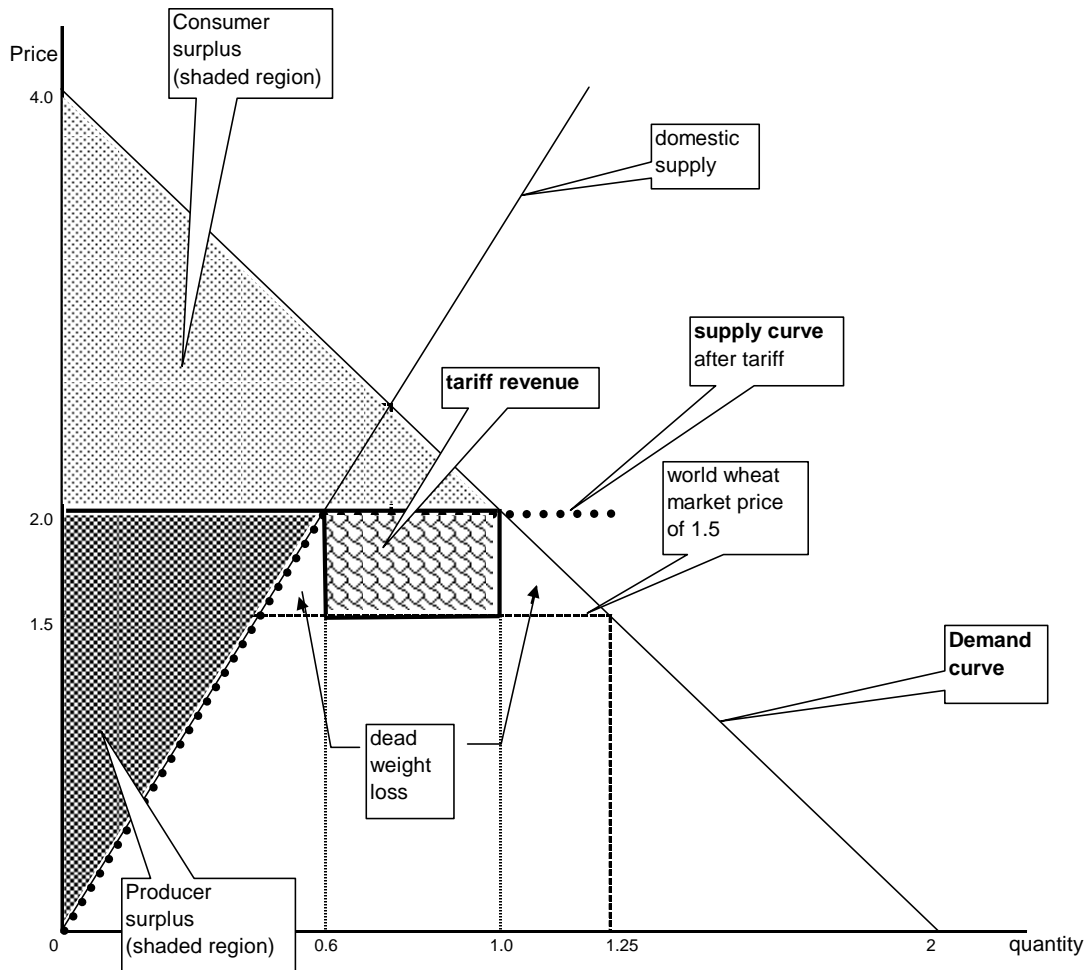
Producer surplus (PS) = $\frac{1}{2} * 1.5 * 0.45 = 0.34$

$$CS + PS = 1.9$$

{ Consumer and producer surplus – diagram and calculations }

(ii)

a)



{Diagram showing demand and supply curves}

b) Consumer surplus (CS) = $\frac{1}{2} * (4-2) * 1.0 = 1.0$

Producer surplus (PS) = $\frac{1}{2} * 2.0 * 0.6 = 0.6$

$$CS + PS = 1.6$$

{Consumer and producer surplus – diagram and calculations}

c) In part (i) $CS + PS = 1.9$

In part (ii) $CS + PS = 1.6$ so that the difference is 0.3.

Part of the difference is explained by the tariff revenue

The tariff revenue is $(2.0 - 1.5) \times (1.0 - 0.6) = 0.2$

$CS + PS + \text{tariff revenue} = 1.6 + 0.2 = 1.8$

The difference $1.9 - 1.8 = 0.1$ is the dead weight loss (or welfare cost).

In the diagram it is represented by the two small triangles.

[10]
[Total 100 Marks]
