The Institute of Actuaries of India

Subject CT7 – Economics

14th May 2007

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.

Arpan Thanawala
Chairperson, Examination Committee

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

27.

(i) Y= C+I
Y = 500 + 0.8Y + 2000-5r
Y = 12500 – 25r
IS**:** $r = 500 - \frac{1}{25}Y$

(ii) **Slope:** If from a point on the IS, *Y* is raised by 1 unit, *r* has to be lowered by $\frac{1}{25}$ to equilibrate the goods market. Following a unit increase in *Y*, there emerges an excess supply of $.2$. r has therefore to be lowered by $\frac{.2}{5}$ to raise demand by .2 to restore equilibrium in the goods market, with the higher level of *Y*.

(iii) Suppose that the equation of the LM is given by $r = mY + M$. Two points on the LM are given. Putting those values of Y and r in the above equation, we get .
1 = 12,475m + M
2 = 12,500m + M
m = 1/25; M = -498
LM: $r = -498 + \frac{1}{25}Y; Y = 12450 + 25r$

[9]

28.

(i) Equation of an indifference curve: $\overline{U} = 0.5\log X + 0.5\log Y$, Slope: $\frac{dY}{dX} = -\frac{Y}{X}$.

The indifference curve, as is clear from the slope, has the usual shape.
[1 for drawing diagram]

(ii) $MRS_{X,Y}(X = 1, Y = 2) = 2$.
Meaning: If from the given point on an indifference curve X is raised by 1 unit, Y has to be lowered by two units to remain on the same indifference curve.

(iii) Slope of the budget line: -1.
It means that if the consumer raises her purchase of X by 1 unit, she will have to reduce her purchase of Y by 1 unit to keep the value of her purchases equal to her given budget.

[1 for drawing budget line]

(iv) The optimum bundle on her budget line is $(X = 50, Y = 50)$.
At $(X = 40, Y = 60)$, $MRS_{X,Y} = \frac{3}{2}$.
This means that she will gain by substituting X for Y along the budget line. If she consumes one additional unit of X, she will have to reduce her consumption of Y by 1 unit, given her income and prices. But to remain on the same indifference curve as before, she will have to give up $\frac{3}{2}$ units of Y following her consumption of one additional unit of X. Hence if she substitutes one additional unit of X for 1 unit of Y along the budget line, she will move over to a higher indifference curve.

[13]

29.

(i) Inverse demand function is given by $P = 50 - \frac{Q}{2}$. Total revenue,

denoted R, is therefore given by $R = 50Q - \frac{Q^2}{2}$.

Average revenue: $\frac{R}{Q} = 50 - \frac{Q}{2}$. Average revenue function is therefore

identical with the inverse demand function.

(ii) Marginal revenue $= 50 - Q$.
Profit-maximizing output is therefore $50 - Q = 10 \Rightarrow Q = 40$ and
optimum $P = 30$.

(iii) When the autonomous component of the demand function rises from
100 to 110, inverse demand function becomes $P = 55 - \frac{Q}{2}$. Therefore
$MR = 55 - Q$.

Hence optimum $Q = 45$.

Explanation: At the initial optimum $Q = 40$, marginal revenue now exceeds marginal cost by 5. It therefore pays to raise Q. Per unit increase in Q, profit goes up by the excess of marginal revenue over marginal cost. Hence monopolist will raise Q as long as $MR > MRC$. Since per unit increase in Q excess of MR over MC falls by 1 unit, MR will equal MC again, when Q is raised by 5 units.

[9]

30.

Demand curve is unchanged. Demand in the new equilibrium is larger by 40.Along the same demand curve demand goes up by 40, when price changes by

$$\frac{dp}{dQ}(demand).40 = -\frac{3}{4}.40 = -30$$, i.e., when price falls by 30 units .

[4]

31.

(a)

	Quantity of labour needed to produce on unit of…..	
	Good X	Good Y
Country A	40	10
Country B	60	30

Country A has an absolute advantage over the country B in Good X.
Country A has an absolute advantage over the country B in Good Y.

(b)

Opportunity cost of Good X in Country A = 40/10 or 4 units of Good Y.
Opportunity cost of Good Y in Country A = 10/40 or 0.25 units of Good X
Opportunity cost of Good X in Country B = 60/30 or 2 units of Good Y.
Opportunity cost of Good Y in Country B = 30/60 or 0.5 units of Good Y.
Country A has a comparative advantage in Good Y and Country B in Good X.

(c)

	Total Output Per day	
	Good X	Good Y
Country A	80 units	160 units
Country B	40 units	80 units
Total	120 units	240 units

(d)

	Total available for consumption Per day	
	Good X	Good Y
Country A	85 (65+20) units	160 (160+60-60) units
Country B	40 (40+20-20) units	100 (40+60) units
Total	125 units	260 units

After the trade, country A will produce 220 units of Good Y (160 units for own consumption and 60 units for Country B). Country A will require 2200 hours of labour to produce 220 units of Good X and it will be left with 2600 (4800-2200) hours of labour for Good X with which it will produce 65 units of Good X. Country A will receive 20 units of Good X from Country B in exchange for 60 units of Good Y. Thus in Country A:

Number of units of Good X available for consumption per day = 65+20 = 85 units

Number of units of Good Y available for consumption per day = 220 – 60 = 160 units.

After the trade, country B will produce 60 units of Good X (40 units for own consumption and 20 units for Country A). Country B will require 3600 hours of labour to produce 60 units of Good X and it will be left with 1200 (4800-3600) hours of labour for Good Y with which it will produce 40 units of Good Y. Country B will receive 60 units of Good Y from Country A in exchange for 20 units of Good X. Thus in Country B:

Number of units of Good X available for consumption per day = 60-20 = 40 units

Number of units of Good Y available for consumption per day = 40 + 60 = 100 units.

(e) The exchange rate between Good X and Good Y will lie between 1:4 and 1:2.

[l1]

32.

(a) **Firm B**

		Price Decrease	**No Price Change**
Firm A	**Price Decrease**	10, 10	100, -30
	No Price Change	-20, 30	140,25

(b) If firm B cuts prices, firm A's best strategy is also to cut prices. If firm B does not change price, firm A's best strategy is also not to make price change. Thus firm A does not have a dominant strategy.

If firm A cuts price, firm B's best strategy is also to cut price. But based on the profit number from Table, if firm A does not change price, firm B still better off with price cut because profit will be Rs. 30 crores compared to Rs. 25 crores if it does not change price. Hence firm B's dominant strategy is to cut price regardless of what firm A does. Thus firm B has a dominant strategy.
Only firm B has a dominant strategy.

(c) When one player has a dominant strategy, the game will always have a Nash equilibrium because the player will use that strategy and the other will respond with its best alternative. From the payoff in Table, the firm A best response to price cut by firm B is also to cut price.

[6]

33.

(a) Cost-push inflation occurs when increases in cost of producing goods and services shift the aggregate supply curve to the left; output falls and the price level increases.

Demand-pull inflation is the result of increase in aggregate demand which are not met by increase in output without a rise in the price level. Demand –pull inflation normally occurs when output is nearing the full-employment level.

(b) Events (i), (v) and (vi) affect aggregate demand. Events (i) and (vi) increase aggregate spending, shift aggregate demand to the right, and , with a positively sloped aggregate supply, increase the price level. Event (v) lowers aggregate spending and shifts aggregate demand to the left, lowering rather than increasing the price level. Thus, events (i) and (vi) result in demand-pull inflation.

Events (ii), (iii) and (iv) affect the cost of producing goods and services and thus shift aggregate supply. Events (ii) and (iii) will result in cost-push inflation; they raise the cost of production, shifting aggregate supply leftward and increasing the price level. Event (iv) lowers the cost of production and therefore shifts aggregate supply to the right, lowering rather than increasing the price level.

[9]

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