Institute of Actuaries of India

Subject CT7 – Economics
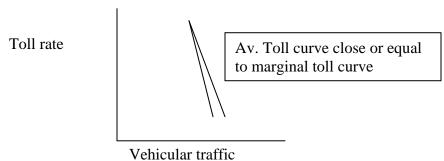
12th May 2008

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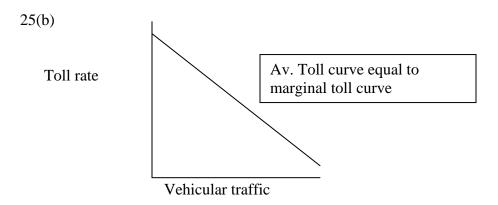
1. A
2. A
3. A
4. A
5. A
6. A
7. A
8. A
9. B
10. C
11. C
12. B
13. C
14. A
15. C
16. D
17. D
18. D
19. B
20. C
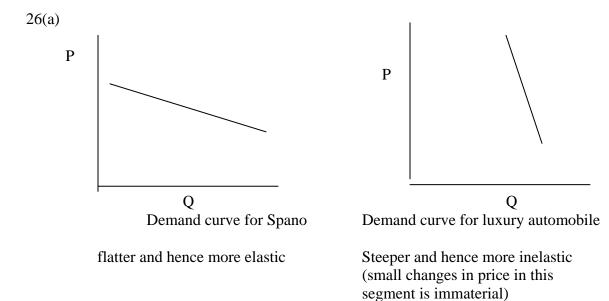21. C
22. D
23. C
24. A

[Total Marks 36]

25(a)

A very steep or even perpendicular curve because consumers have no choice but to cross the toll to reach their respective destinations. Consumers can't possibly alter their timings and hence very steep curve. The average revenue and marginal revenue curve will be very close in such a case because this is like a monopoly situation coupled with the fact that the demand is very price inelastic.

25(b)

Average toll curve would look more like a normal demand curve, because now there is an alternative route available. Timings are flexible as well, hence the toll operators can maximize their revenues by charging differential rates. The average revenue and marginal revenue curve will therefore coincide in such a case because this is more akin to price discrimination

(6 marks)

26(a)

flatter and hence more elastic

Steeper and hence more inelastic
(small changes in price in this
segment is immaterial)

26(b)
- Applying a higher tax (either flat or proportionate) in the form of registration, road charges etc.
- Increase running costs in the form of higher parking charges, tolls etc.
- Award more marks for any logical and implementable suggestions

(4 marks)

27(a)

- the use of antitrust monopoly or competition policies
- encouragement of competition by reducing barriers to entry.
- economic regulation of markets (especially natural monopolies)
- government ownership of monopoly industries.
- price controls on goods and services.
- redistributing profits via taxation.

27(b)

(i)
- Cost advantages through economies of scale
- Lower input costs
- Legal oligopolies
- Investment in spare capacity
- Product proliferation
- Extensive Brand building

(ii)
- Creation of huge infrastructure and hence exploitation of economies of scale by having a large consumer base and lower per unit charges
- Grant of licenses by government to operate in circles thereby creating legal oligopolies
- Extensive brand building

(6 marks)

28.

(a) Lets assume t is the proportionate increase in all factors of production. Hence
$$Q(t)=S*(Kt)^a*(Lt)^b$$
$$Q(t)=S*t^{a+b} K^a*L^b$$
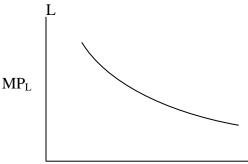For constant returns to scale, $Q(t) =Qt$
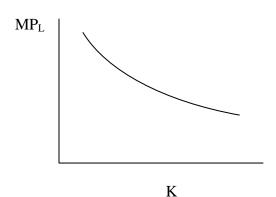Hence, $a+b=1$

(b) If $a=b=2/3$, then $a+b=4/3>1$
Looking at the equation in last part, if $a+b>1$, then this is a case of increasing returns to scale i.e. if we were to increase labour and capital together in the same proportion, the output would increase by a higher proportion

(c) For arriving at marginal productivities of individual factors of production, we need to estimate partial derivatives of the production function.

Hence, MP_L= partial derivative of Q (w.r.t. L) $=2/3*S* K^{2/3}*L^{-1/3}$
Hence, MP_k= partial derivative of Q (w.r.t. K) $=2/3*S* L^{2/3}*K^{-1/3}$

L

MP_L

L

MP_L

K

(d) With a and b =2/3, we observe that individual marginal productivities are negative. This implies that keeping one factor of production as constant, if we increase the other factor, the marginal productivity falls. Whereas, with a=b=2/3, there is an increasing returns to scale. This implies that if both factors were increased together, the output increases by a higher proportion. This observation implies that increase in one factor (without a corresponding increase in another factor) leads to a crowding or an increased pressure on the other factor (fixed resource) and hence the marginal productivity falls

(marks 8)

29.
   (a) Very watchful seems to be a risk neutral person who is trying to figure out a fair gamble at the casino. He is very likely to end up playing no game because all games at the casinos are 'loaded' in the sense that they are programmed to offer a profit to the casino and hence there are practically no fair gambles at the casino.
   (b) The probability of winning this bet for Reckless random is 1/37. However, the payoff is 36 times. So for every rupee put in, the expected return is 36/37 which is less than the initial bet of Re 1. Hence this is a loaded gamble and not a fair

gamble from a player's perspective. Because, reckless random chooses to take on this gamble, he is a risk loving person

(c) Placing stepped bets is equivalent to the behaviour of reckless random because now the probability of winning is 6/37. So for every 6 rupees put in, expected return calculated on every rupee is again 36/37

(d) A player hits a jackpot with a probability of
52/52*12/51*11/50*10/49*9/48= .001981

For 100 rupees staked, the expected payoff is =100*100*0.001981=19.81
Because the expected payoff is less than initial amount staked, this is an unfair gamble

Meandering mouse would play this gamble only if he is risk loving. But still, his certainty equivalent for this gamble should be higher than the initial mount staked to play this gamble.
Let C be the certainty equivalent, then
$e^{aC} = .001981 * e^{a10000}$
Taking natural logs
aC= ln(.001981)+10000a
C=-6.224/a+10,000
C>=100 implies a>=.000629

(marks 8)

30. a) The Expenditure method measures economic activity by summing the value of expenditure of final goods.
The intermediate goods are excluded as it would other wise be double counting.

b) Income method

Factor income of Land = 10000 + 3000 + 2000 = 15000
                    Labour   = 20000 + 6000 + 4000 = 30000
                    Capital   = 1000 + 19000 + 2000 – 31000
                                    + 3000 – 39000 = - 45000
Total of Income of three factors = 15000 + 30000 – 45000 = 0

Output method

Value added by Company A = 100000 – 50000 = 50000
Value added by Company B = 30000 – 50000 = - 20000
Value added by Company C = 20000 – 50000 = - 30000

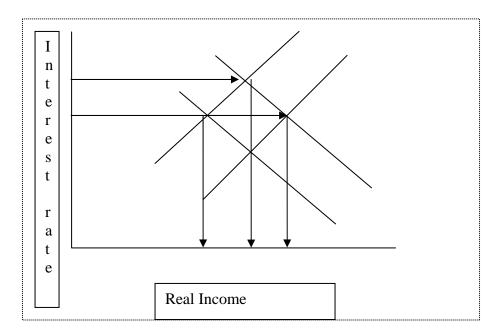Total of value of added by companies A, B and C = 50000 – 20000 – 30000
                                                                        = 0

(marks 9)

31   a)
i. Crowding out is the reduction in aggregate demand caused by the effects of an increase in aggregate demand

ii. An increase in injections increases interest rates which crowds out consumption and investment

iii. Increased aggregate demand increases Prices. This leads to a lower real value of money supply and lower wealth. Both result into further crowding out of private sector consumption and investment.

iv. If the initial injection is government spending, the interest rate crowding out is known as Keynesian Crowding out.

b) The Keynesian Crowding out can be avoided by increasing money supply to match the increase in the demand for money so that interest rates don't have to rise.

[marks 7]

32. The Unemployment that exists in a well functioning economy
    This includes people
    ➢ Left one job to look for a better job
    ➢ Difficult to employ (mentally ill)
    ➢ Who have just left education and trying to find first job
    ➢ Returning to work after a career break

[mark 2]

33 a) International trade allows the world's resources to be used in a more economically efficient way. In particular, the existence of world trade
    ➢ Allows countries to specialise in the production of the goods which they can produce relatively more efficiently than other countries.
    ➢ Increases the scope for benefits from economies of scale by increasing the size of the available markets.
    ➢ Increases the range of goods and services which consumers can buy.
    ➢ Leads to lower prices through increased competition which benefits consumers rather than producers.

b)
i.   Terms of trade for Country X is the quantity of domestically produced goods that have to be sacrificed in order to obtain a unit of imported goods.
ii.   The balance of payments is the set of accounts that records a country's economic transactions with the rest of the world.
iii.   Purchasing Power Parity path is the path that the nominal exchange rate must follow in order to offset the effect of differences in inflation levels between a country and the rest of the world, and thus to keep the real exchange rate constant.

c)
i. $50000 - 20000 + 10000 = 40000$
ii. $40000 + 5000 + 5000 = 50000$
iii. $50000 + 2000 = 52000$
iv. $52000 - 1000 + 100 = 51100$

(marks 10)

34   The potential problems caused by anticipated inflation are
  ➢ Money illusion - mistake a difference in prices caused by inflation for a real difference in price.
  ➢ Menu costs - scarce resources are wasted purely to cope with changes in prices.
  ➢ Shoe-leather costs - more frequent financial transactions so that more resources are required in the financial services industry; less cash is held which may result in missed opportunities.
  ➢ High inflation would be a problem if there was a desire to maintain the value of the currency.
  ➢ The possibility of leading to a situation of hyper-inflation.

[marks 4]

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