Actuarial Society of India

Examinations

November 2005

CT7 – Economics

Indicative Solutions

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

Q.27)

i) expected value of pay-off from the gamble= 900.(1/4)+1000.(3/4) =300. Now $U = W^{\frac{1}{2}}$ implies $U' > 0$ and $U'' < 0 \Rightarrow$ individual is a risk averter. This implies the individual will choose the other certain alternative of Rs.300.

ii) Expected utility of the gamble= $900^{\frac{1}{2}}.(1/4)+100^{\frac{1}{2}}.(3/4)=15$. Let C be the certainty equivalent of the gamble. Therefore $U(C)=15$ or $C^{\frac{1}{2}}=15$ or C=225.

a) Hence if the other alternative is changed to 225, then the individual will be indifferent between the gamble and the certain offer.
b) If the certain offer is changed to greater than 225 but less than 300, it is still greater than the certainty equivalent. So the individual will choose the certain offer
c) If he certain offer is changed to 224, then obviously the individual will choose the gamble.

Q.28)

a) Monetarist, since in this case monetary policy is effective, but fiscal policy is not
b) Keynesian, since in this case fiscal policy is effective, but is monetary policy not
c) Keynesian, since in this case fiscal policy is effective, but is monetary policy not
d) Monetarist, since in this case LM is vertical

Q.29)

The marginal cost curve of a representative firm is given by
$mc = .8 + 4q$
The supply curve of the firm obtained from the following relation
$p = .8 + 4q^s \Rightarrow q^s = (p - .8)/4$.
The industry supply curve given by $Q^s = (100p - 80)/4 \Rightarrow Q^s = 25p - 20$.
In S.R industry equl: $25p - 20 = 100 - 5p \Rightarrow p = 4$.
and $Q = 80$.

Q.30)

(i)&(ii)

labour employed (L)	marginal product of lab: (MP_L)	marginal value product of lab: (MVP_L)
1	22	Rs.44
2	12	Rs.24
3	10	Rs.20
4	7	Rs.14
5	5	Rs.10
6	3	Rs. 6

(iii) profit is maximized at the level of L at which W=Rs 14= MVP_L .
Hence profit is maximized at L= 4 and $q = 51$.

(iv) $W = Rs.45 > MVP_L(\max)\ Rs.44 \Rightarrow L = 0, q = 0$.

Q.31)

i) Equl: level obtained from $Y = 300 + .8Y \Rightarrow equl\ \ Y = 1500$.

ii) aggregate planned demand at $Y = 1200$ is 1260>1200 $\Rightarrow$ unplanned inventory change is -60 .

iii) As autonomous part of aggregate planned investment changes by 50units
$\Rightarrow Y$ changes by $50 \times \frac{1}{1 - .8} = 250$ units. $\Rightarrow I$ changes by 50+ 250× 0.1= 75 units.

Q.32)

$C = 110$, involuntary change in inventory of consumer goods =90-110 = -20 $\Rightarrow$ gross actual investment

I= 5+10-20 =-5.

net actual inv. I (net)=-5-20 = -25,

GDP= C+gross I = 110-5=105.

NDP=105-20= 85. $\rightarrow$ C(110)+Inet(-25)

Q.33)

i) aggr. Pl. dem , Y^d at $Y = 0$, is $a + 200$. Hence, $\frac{a}{a+200} = \frac{1}{2} \Rightarrow a = 200$.

ii) Y^d *at* $Y = 1000$, is 1000+ 200 =1200.

iii) Hence, at $Y = 1000$, aggr. Pl. dem $a + bY + 200 = 400 + b \times 1000 = 1200 \Rightarrow b = .8$.

Autonomous expenditure multiplier = $\frac{1}{1-.8} = \frac{1}{.2} = 5$

Q.34)

i) The kink will be at the point, where Q = Q'

$60 - P = \frac{80}{3} - \frac{P}{3}$

180 – 3P = 80 – P

P = Rs. 50

Q (in thousands) = 60 – 50 = 10 or Q = 10,000 units

ii) Over the range from 0 to 10,000 units of output:

$P_1 = 60 - Q_1$

$TR_1 = 60Q_1 - Q_1^2$

$MR_1 = \frac{dTR_1}{dQ_1} = 60 - 2Q_1$

When output exceeds 10,000 units

$P_2 = 80 - 3Q_2$

$TR_2 = 80Q_2 - 3Q_2^2$

$MR_1 = \frac{dTR_2}{dQ_2} = 80 - 6Q_2$

$TC = 100 + 20Q + 0.5Q^2$

$MC = \frac{dTC}{dQ} = 20 + Q$

When $Q_1 = Q_2 = Q = 10{,}000$ units

$MR_1 = 60 - 2x10 = 40$

$MR_2 = 80 - 6x10 = 20$

MC = 20 + 10 = 30

At Q = 10,000 units, MC (30) lies between MR_1 (40) and MR_2 (20). That is, MC curve MR curve in its discontinuous vertical portion.
Thus profit maximizing level of output is Q = 10,000 units.
P = 60 – 10 = Rs. 50 per unit
$TC]_{Q=10}$ (in thousands) = 100 + 20x10 + 0.5x10^2 = 350
Profit (in thousands) = ? = 50x10 – 350 = 150

iii) The optimal price would increase if marginal cost at Q = 10,000 units becomes more than RS. 40 (MR_1). That is, marginal cost must rise by more than Rs. 10 before optimal price optimal price would increase.
The optimal price would decrease if marginal cost at Q = 10,000 units becomes less than Rs. 20. That is, marginal cost must fall by more than Rs. 10 before optimal price would decrease.

Q.35)

Equation of the Phillips Curve

$\Pi = \Pi^e + l(U_N - U)$

In the short run Π^e is given. Therefore in the short run Π falls with a rise in U. Hence Phillips curve is downward sloping in the short run.
This means in the short run there is a trade-off between inflation and unemployment.

In the long run $\Pi = \Pi^e$. Hence in the long run equation of the Phillips curve reduces to $U = U_N$
Hence long run Phillips curve is vertical.
This means that there is no trade-off between inflation and unemployment in the long run.
Answer to the last part to be given in the framework of the AD-AS model

Q.36)

(A) False, since the tax is on goods and not on individuals
(B) False, since the tax is on individuals and not on goods
(C) False, since expenditure on sports cars rises more than proportionately with income
(D) False, since expenditure on kerosene rises less than proportionately with income

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