

econQuiz 5

Detailed Solution Manual

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Section A: Easy

1. Assuming wage-price flexibility, the classical economist asserted that decline in money wage price would lead to

- (a) Unemployment
- (b) Deflation
- (c) High level of employment and output
- (d) Unemployment and decline in output

Correct option: c

Wage-price flexibility is an assumption of classical economists under which an increase in labour supply leads to decrease in Money wage rate (greater than decrease in the price level) which results in decrease in real wage rate and an increase in demand for labour and thereby employment ultimately leading to an increase in output.

2. If marginal propensity to import is 0.1 and the marginal propensity to consume is 0.7, the value of the income multiplier will be:
- (a) 1.25
 - (b) 2.33
 - (c) 2.5
 - (d) 3.33

Correct option: c

It's an open economy so use the formula for open

economy multiplier.

$$K = \frac{1}{1 - MP_c(\text{Consume}) + MPM(\text{Import})}$$
$$= \frac{1}{MPS + MPM}$$

Here, $MP_c = 0.7$, $MPM = 0.1$
 $MPS = 1 - MP_c = 1 - 0.7 = 0.3$

$$K = \frac{1}{0.3 + 0.1}$$
$$= \frac{1}{0.4}$$
$$= 2.5$$

3. The theory of purchasing-power parity implies that the demand curve for foreign-currency exchange is
- (a) Downward sloping
 - (b) Horizontal
 - (c) Upward sloping
 - (d) Vertical

Correct option: b

4. As per Reserve Bank of India, present Bank Rate is 4.25% and Policy Repo Rate is 4.0%. Then which of the following is the correct denomination of Marginal Standing Facility Rate (MSF)?
- (a) 4.25
 - (b) 4.15

- (c) 4
- (d) 4.5

Correct option: a

Refer the RBI Website for key rates

5. According to Okun's Law, if the labor force grows at 2% and labor- productivity grows at 0.8%. What can you conclude?
- (a) The unemployment in this period is more than that of previous period
 - (b) The unemployment in this period is less than that of previous period
 - (c) The economy is maintaining a constant unemployment rate
 - (d) Unemployment response cannot be significantly predicted with these data

Correct option: a

Growth rate of output

$$(g_{yt}) = \text{Labor force growth} + \text{Productivity growth}$$

From Okun's law,

$$U_t - U_{t-1} = -0.4(g_{yt} - 3\%)$$

- i.e. If $g_{yt} > 3\%$, $U_t < U_{t-1}$
- If $g_{yt} < 3\%$, $U_t > U_{t-1}$
- If $g_{yt} = 3\%$, $U_t = U_{t-1}$

Section B: Medium

6. Which of the following statement/statements are correct:-
- I) There can be nominal appreciation and real depreciation during the same period
 - II) Expansionary monetary policy is ineffective if interest rate insensitive to interest rate
 - III) When there is depreciation, initial impact is rise in exports which happens steadily
 - IV) While deriving labour supply, the supply depends upon actual prices.
- (a) I, III, IV only
 - (b) II,III,IV only
 - (c) I,II only
 - (d) III, IV only

Correct option: c

Consider $e = EP/P^*$, if E increases (INR goes up in terms of dollar) and P/P^* has decreased. So if P/P^* decrease more than that of increase in E (therefore e decreases). Then we can say that there can be nominal appreciation and real depreciation. If investment does not depend on the interest rate, the IS curve. Therefore monetary policy cannot change the output level. From the

J curve, when there is depreciation it leads to increase in export but this happens slowly, initial effect depreciation is reflected more in price of import than in quantity. So deterioration of trade balance happens. Labour supply is determined by households, as they know nominal wages they don't know how much of the basket they will consume (Uncertainty). Therefore the expected price is taken into account and not the actual price.

7. Suppose that each person out of a group of 3 friends is randomly assigned to one of 6 classes. is the probability that no class has more than one person from this group?
- (a) $6!/3!$
 - (b) $5/18$
 - (c) $3!/6!$
 - (d) $5/9$

Correct option: d

$$\text{Probability is } \frac{6 \times 5 \times 4}{6 \times 6 \times 6} = \frac{5}{9}$$

8. If monopolist marginal cost increases by \$1 for all levels of output and elasticity of demand were constant along the entire demand curve, then monopoly price will :
- (a) Rise by \$1
 - (b) Rise by more than \$1
 - (c) Rise by less than \$1
 - (d) No change, profits will decrease

Correct option: a

At equilibrium we know $MR = MC$ & $P(1 + \frac{1}{e}) = MR$, so from the above $P(1 + \frac{1}{e}) = MC$, here in the question it is given that e is constant throughout demand curve implies $1 + \frac{1}{e}$ as a constant. So whatever changes in MC will be directly proportional to that of Price, Hence 1% rise in Price. If elasticity is not constant then less than 1% rise will be experienced.

9. Suppose utility function of Rahul is given by $U = 2\sqrt{w}$, Where W represents total wealth in thousand rupees. Rahul is
- (a) Risk lover
 - (b) Risk averse
 - (c) Risk Neutral
 - (d) Not enough data to predict

Correct option: b

Risk Averse, As utility function is concave (taking double derivative, it is clearly exhibiting diminishing marginal utility), which represents risk averse individual.

10. Consumer has a utility function $U(x, y) = 5(x^2 + 6xy + 3y^2) + 5$. Which one of the statement is true
- (a) The goods show quasilinear preferences

- (b) The goods are perfect substitutes
- (c) The goods are perfect complements
- (d) The goods are imperfect substitutes

Correct option: b

$x^2 + 6xy + 3y^2$ can be written as $(x + 3y)^2$ so this is just the monotonic transformation of $x + 2y$, which is a perfect substitute. So multiplying with a constant and then adding wont change the preference relation.

11. Consider the function $z = x^2 + y^2$ for $x, y \geq 0$. Which of the following statements is correct ?
- (a) z is quasi concave function
 - (b) z is quasi convex function
 - (c) z is quasi convex function
 - (d) z is quasi concave function

Correct option: b

Fixing $x^2 + y^2 = \lambda$, for $\lambda \in \mathbb{R}_+$ we get a quarter circle level curve. Now a function is said to be quasi-convex if the lower contour set of the level curve is convex. By this definition z is quasi-convex.

12. According to the Lewis- Ranis -Fei model , Which of the following is correct
- (a) The transfer of labour continues till full absorption of surplus labor phase.
 - (b) First turning point is where the supply wage of labour tilts upward
 - (c) Average agricultural surplus begins to decline only after second turning point
 - (d) Capital accumulation in traditional sector dampens rural-urban migration

Correct option: b

After the first turning point , full absorption of surplus labour takes place, which make the supply wage of labour tilts upward.

13. Consider two countries where Home country is labour abundant and foreign country is capital abundant . At any given wage rental ratio cloth production uses a higher labour-capital ratio than food production. The relative price of cloth in foreign is $\left(\frac{P_c}{P_f}\right)^1$ (P_{c^*} is the price of cloth in foreign and P_{f^*} is the price of food in foreign) before trade, $\left(\frac{P_{c^*}}{P_{f^*}}\right)^2$ after trade. In the same way $\left(\frac{P_c}{P_f}\right)^1$ is the relative price in the home country before trade and $\left(\frac{P_c}{P_f}\right)^2$ after trade. Which of the following is a true relation.
- (a) $\left(\frac{P_c}{P_f}\right)_1 > \left(\frac{P_c}{P_f}\right)_2 > \left(\frac{P_{c^*}}{P_{f^*}}\right)_2 > \left(\frac{P_{c^*}}{P_{f^*}}\right)_1$
 - (b) $\left(\frac{P_c}{P_f}\right)_1 < \left(\frac{P_c}{P_f}\right)_2 < \left(\frac{P_{c^*}}{P_{f^*}}\right)_2 < \left(\frac{P_{c^*}}{P_{f^*}}\right)_1$

- (c) $\left(\frac{P_c}{P_f}\right)_1 < \left(\frac{P_{c^*}}{P_{f^*}}\right)_2 < \left(\frac{P_{c^*}}{P_{f^*}}\right)_1$
- (d) $\left(\frac{P_c}{P_f}\right)_1 > \left(\frac{P_{c^*}}{P_{f^*}}\right)_2 > \left(\frac{P_{c^*}}{P_{f^*}}\right)_1$

Correct option: c

According to the H-O model , and from the information given above, the home country specialises in the clothing sector as it is more labour intensive and foreign in food manufacturing which is capital intensive. Before trade $\left(\frac{P_{c^*}}{P_{f^*}}\right)^1 > \left(\frac{P_c}{P_f}\right)^1$ and after trade their relative price converge , therefore the correct representation is

$$\left(\frac{P_c}{P_f}\right)^1 < \left(\frac{P_c}{P_f}\right)^2 = \left(\frac{P_{c^*}}{P_{f^*}}\right)^2 < \left(\frac{P_{c^*}}{P_{f^*}}\right)^1$$

14. Assume that an entrepreneur's short-run total cost function is $C = q^3 - 10q^2 + 17q + 66$. Compute the output elasticity of cost at the output the output level at which he maximizes profit if $p = 5$
- (a) 0.6
 - (b) 0.5
 - (c) 0.8
 - (d) 0.2

Correct option: c

Equating the MC to price: $3q^2 - 20q + 17 = 5$ and $3q^2 - 20q + 12 = 0$ Which has the roots $q = 6$ and $q = 2/3$.

At $q = 6$, $\frac{\partial^2 C}{\partial q^2} = 6q - 20 = 16 > 0$, hence this is the maximum profit solution; MC is decreasing at $q = 2/3$.

The output elasticity of cost at $q = 6$ is $\frac{C}{q} \times \frac{\partial q}{\partial C} = \frac{q^3 - 10q^2 + 17q + 66}{q} \times \frac{1}{\frac{dC}{dq}} = \frac{24}{6} \times \frac{1}{5} = 0.8$ since $\frac{\partial q}{\partial C} = \frac{1}{\frac{dC}{dq}}$

15. Consider an economy which is demand constrained . To maintain the balanced budget the government finances its expenditure by imposing a lump sum tax on households. Households consume $\frac{3}{4}$ of their disposable income . A unit investment by private investors induces the government to invest 2 units. If the government expenditure increased by 20 units. What will be the rise in income ?
- (a) 20 units
 - (b) 40 units
 - (c) 60 units
 - (d) 50

Correct option: c

$$Y = C + I + G$$

From the above statement

$$C = 0.75(Y - t)$$

$$\text{Also } I = 0.5G$$

To maintain balanced budget $T = G$ ie $t = T = G$ (lump sum transfer)
 $Y = 0.75(Y - G) + 0.5G + G$
 $0.25Y = -0.75G + 1.5G$
 $Y = 3G$
 $\Rightarrow \Delta Y = 3\Delta G$
 If G rises by 20 units $\Delta Y = 60$ units

Section C: Hard

16. Consider a production function of the form $Y_t = AK_t^a L_t^{1-a}$. Assume there is no depreciation of capital, and the labour force grows at a constant rate of 20%. A constant proportion s of total output is saved and invested in a every period, which augments the capital stock in the next period. The golden rule value of capital per worker is ($A = 20, s = 0.5, \delta = 0.5$)

- (a) 25
- (b) 2500
- (c) 5000
- (d) 10000

Correct option: b

As, $Y_t = AK_t^a L_t^{1-a}$ substituting the value we get $Y_t = 20K_t^{0.5} L_t^{0.5}$

Dividing the equation with L ,

$$\text{We get } \frac{Y_t}{L} = \frac{20K_t^{0.5} L_t^{0.5}}{L}$$

$$y = 20\left(\frac{K}{L}\right)^{0.5}$$

$$y = 20k^{0.5} \text{ (in per capita terms)}$$

We know, according to solow model at golden rule level $MPK = n + \delta$

$$y = 20k^{0.5}$$

$$MPK = \frac{\partial y}{\partial k} = 10k^{-0.5}$$

$$n + \delta = \frac{20}{100} + 0 = \frac{1}{5}$$

$$10k^{-0.5} = \frac{1}{5}$$

$$K = 50^2 = 2500$$

17. Hareendra, an insurance policy-holder can submit up to 5 claims and each claim is mutually exclusive. The probability that the policyholder submits exactly n claims is p_n , for $n = 0, 1, 2, 3, 4, 5$. It is known that (a) The difference between p_n and p_{n+1} is constant for $n = 0, 1, 2, 3, 4, 5$ and (b) 40% of the policyholders submit 0 or 1 claim. What is the probability that a policyholder submits 2 or 3 claims?

- (a) 0.26
- (b) 0.33
- (c) 0.54
- (d) none of these

Correct option: b

Given, An insurance policy-holder can submit up to 5 claims. The probability that the policyholder submits exactly n claims is p_n for $n = 0, 1, 2, 3, 4, 5$. Also, The difference between p_n and

p_{n+1} is constant for $n = 0, 1, 2, 3, 4, 5$ and 40 of the policyholders submit 0 or 1 claim.

$$\begin{aligned} \Rightarrow p_0 &= p_0 \\ \Rightarrow p_1 &= p_0 + c \\ \Rightarrow p_2 &= p_0 + 2c \\ \Rightarrow p_3 &= p_0 + 3c \\ \Rightarrow p_4 &= p_0 + 4c \\ \Rightarrow p_5 &= p_0 + 5c \end{aligned}$$

We know, $n = 0.5pn = 1$

$$\Rightarrow 6p_0 + 15c = 1 \quad (1)$$

$$\begin{aligned} \text{Pr } n = 0 \text{ or } n = 1 &= 2p_0 + c = 0.4 \\ \Rightarrow 3 \times 2p_0 + c &= 0.4 \end{aligned}$$

$$\Rightarrow 6p_0 + 3c = 1.2 \quad (2)$$

From (1) and (2) we get $c = -160$

Substituting c in (2) we get $p_0 = 54$

$\therefore \text{Pr } n = 2 \text{ or } 3$

$$\begin{aligned} &= p_2 + p_3 \\ &= 2p_0 + 5c \\ &= 2524 + 5(-160) \\ &= 0.33 \end{aligned}$$

18. Annie can grow 100 bales of cotton or 50 tons of lumber on her land. Will can grow 120 bales of cotton or 80 tons of lumber on his land. What terms of trade would both agree to if they can specialize and trade?

- (a) They will trade 1 bale of cotton for 8 / 5 of a ton of lumber.
- (b) They will trade 3 bales of cotton for 1 ton of lumber.
- (c) They will trade 1 bale of cotton for 1 / 4 of a ton of lumber.
- (d) They will trade 1 bale of cotton for 5/8 of a ton of lumber

Correct option: d

Annie and Will won't agree to trade unless the trading price makes them at least better off than they would be without trading. Suppose Will currently uses 1 / 3 of his land to produce cotton and the rest to produce lumber, which yields him 40 bales of cotton and 26 1/3 tons of lumber, and Annie splits her land between cotton and lumber, which gives her 50 bales of cotton and 25 tons of lumber. If they specialize in what they have comparative advantage in, Annie can produce 100 bales of cotton, and Will can produce 80 tons of lumber. At a trading price of 5 / 8 of a ton of lumber for each bale of cotton, Annie can trade 50 of those bales for 31.25 tons of lumber ($50 \times 5 / 8 = 31.25$), so she now has 50 bales of cotton and 31.25 tons of lumber, leaving her better off. Will now has 50 bales of cotton and 48.75 tons of lumber. Therefore, since the trading price was between the opportunity costs for each trader, both are left better off and would be willing to specialize and trade.

19. Which of the following statements is true for all real numbers a, b with a < b ?

- (a) $\cos b - \cos a \leq b - a$
- (b) $\cos a - \cos b \geq b - a$
- (c) $|\cos b - \cos a| \geq b - a$
- (d) $|\cos a - \cos b| \geq |b - a|$

Correct option: d

According to Lagrangean mean value theorem (LMVT) ,

$$F'(x) = \frac{f(b) - f(a)}{b - a}$$

Take $f(x) = \cos x$

$$F'(x) = \cos b - \cos a / b - a$$

$$F'(x) = -\sin x$$

$$-1 \leq \sin x \leq 1$$

$$1 \geq -\sin x \geq -1$$

$$|\sin x| \leq 1$$

$$|\sin x| = |\cos a - \frac{\cos b}{b-a}|$$

$$|\cos a - \frac{\cos b}{b-a}| \leq 1$$

$$|\cos a - \cos b| \leq |b - a|$$

20. Consider an economic system characterized by following $PP_f g^2 + 10x^2 = 20$ (g = public good, x is the private good). In the system there are 100 identical individuals ($i = 1, 2, 3, \dots, 100$) with utility function equals $u_i = \ln g + \ln x_i$. Consider market for g and x are perfectly competitive, then the efficient level of production of g and x are :

- (a) 2, 1.26
- (b) 3.16, 1

(c) 4.47, 0

(d) 4.18, 0.5

Correct option: b

Differentiating PP_f ,

We get,

$$2gdg + 20xdx = 0$$

$$MRT = -dx/dg = g/10x \tag{3}$$

$$MRS_i = \partial u / \partial g_i / \partial u / \partial x_i = x_i / g \tag{4}$$

In a competitive equilibrium (3) = (4)

Since all individuals are same

$$x_i = \frac{x}{100}$$

$$\frac{g}{10x} = \frac{x}{100g}$$

Also to find the efficient level of production of public good will be where the sum of MRS equals MRT .

$$MRT = \sum MRS$$

$$MRT = 100MRS \tag{5}$$

$$\frac{g}{10x} = 100 \times \frac{x}{100g}$$

$$g^2 = 10x^2 \tag{6}$$

Substituting (3) in PP_f equation, we get

$$g^2 + 10x^2 = 20$$

$$10x^2 + 10x^2 = 20$$

$$x^2 = 1$$

$$x = 1 \text{ and } g = 3.16$$