DIPLOMA INDUCTION: MACROECONOMICS SOLUTIONS

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Q1:

(a) $g_y = \frac{1}{3} g_k$
(b) $g_y = \frac{1}{3} g_k + \frac{2}{3} g_n$
(c) $g_y = g_h + \frac{1}{3} g_k + \frac{2}{3} g_n$
(d) $g_y = g_h + \frac{1}{4} g_k + \frac{3}{4} g_n$
(e) $g_y = g_h + \frac{3}{4} g_k + \frac{1}{4} g_n$
(f) $g_y = \frac{1}{2}(g_k + g_n + g_h)$
(g) $g_y = \frac{1}{4}(g_k + g_n) - \frac{3}{4} g_h$

Q2:

(a) True output falls to a new, lower level - policy makers accidentally create a recession
(b) Given that the economy is in a recession, we may observe an increase in unemployment.

Q3:

(a) See table below

Year	Actual Output, Y_t	Potential Output, $\overline{Y}_t$	Output gap, x_t	Growth rate of actual output
2014	18.00	18.00	0	-
2015	18.20	18.45	-0.0136	1.11%
2016	18.50	18.911	-0.021	1.65%
2017	19.50	19.384	0.0060	5.41%
2018	20.00	19.869	0.0066	2.5%

(b) Actual output is below potential output in 2015 and 2016. In 2017 and 2018 the economy recovers: actual output is above potential output (positive output gap).
(c) Students here should be making reference to and discussing Okun's Law.

Q4: The BoE is not just worried about inflation but also output gap. It is likely that the MPC is still worried about the state of the economy and that a contractionary monetary policy aimed to keep inflation under control would affect the UK economy slow recovery. These fears may come from Brexit and the issues this creates related to uncertainty.

Q5: A central bank's loss function captures the costs it incurs of being away from the inflation target and from equilibrium output. This produces the policy maker's indifference curves in output-inflation space (see lecture notes for graphs) and shows what the policy maker would choose to do.

Q6:

(a) β is the relative weight attached to the loss from inflation, and thus central bank's preferences with higher β will be associated with higher inflation aversion. An inflation averse central bank (β > 1) will accept a large increase in unemployment in order to reduce inflation sharply.
(b) The inflation averse central bank's strategy of pushing unemployment up high initially entails a larger negative output gap and more disruption to the economy as firms lay off workers. According to the model, there is higher unemployment but for a shorter time than in the case of the unemployment averse central bank. It is not clear which is likely to have the most damaging effects on the welfare of workers, their skills and on the economy in the longer run.

Q7:

(a) Multiplier = 2.5
(b) It will reduce the effect of an increase in autonomous spending on income
(c) **IS:** $Y = 2981.25 - 1250i$; **LM:** $Y = 2400 + 500i$
(d) i = 0.33; Y = 2565
(e) Income will increase while the interest rate will decrease.

Q8:

(a) An improvement in consumer confidence, modelled as an increase in autonomous consumption, shifts the IS to the right. With output above equilibrium, inflation is pushed above target and the government will have to cut government spending to shift the IS curve back and get the economy back onto the monetary/policy rule curve, the policy maker then gradually eases the fiscal contraction to guide the economy back to the equilibrium, with output at equilibrium and inflation at target. The student should consider the incentives of the government to repress a spike in consumer confidence in order to maintain inflation close to target, or whether this task is better left to the central bank through monetary policy. Very likely a CB that aims to keep inflation under control will increase the policy rate. If there is a good working CB, monetary policy is generally preferred a stabilisation policy.
(b) The negative shock will shift the IS curve the left. This will be the opposite situation as described before. However, if the shock is large and permanent and the CB hits the zero lower bound, there may be the case that fiscal policy is needed to bring the economy back to target. Students may also discuss the deflation trap.

Q9:

(a) The IS curve shifts to the left for one period in which output is below its potential. If the central bank's objective is to maintain inflation close to the target, it will lower interest rate.
(b) Students need to describe the case of deflation. The IS curve shifts to the left and remains there. If the shock is so large that the CB cannot achieve its desired interest rate (i.e. the one indicated by the monetary rule), the economy may fall in deflation trap. Students may explain unconventional monetary policies such as quantitative easing but also they may explain the role of fiscal policy.

Q10:

(a) $H_d = R + CU = \theta D^d + cM_d = \theta(1-c)M_d + cM_d = M_d(c + \theta(1-c)$ or $M_d = \left(\frac{1}{c+\theta(1-c)}\right) H_d$

(b) The Money multiplier is given by $\left(\frac{1}{c+\theta(1-c)}\right)$. This can be solved as

$$m = \left(\frac{1}{0.5 + 0.4(1-0.5)}\right) = 1.43$$

It represents the multiplier that can be applied to Central Bank (M0) money's impact on the economy. In the presence of private banks there is demand for both deposits and for reserves as set out above. If we sub in Central Bank money supply to the equation where CB money supply must equal CB money demand then we can see CB money supply has a multiplier impact on the standard money supply demand equilibrium we drew previously. Students might explain this more practically and less mathematically by discussing the way money is deposited in banks and then only a small amount is held as reserves and the rest loaned back out again creating a multiplier effect on the amount of (M1) money supplied.

(c) $M_d = \frac{1}{0.7} H_d \quad \rightarrow \quad H_d = H_s \quad \rightarrow \quad 0.7M_d = H_s = 630$

$$M_d = P(Y - 500i) = (950 - 500i) \quad \rightarrow \quad 0.7(950 - 500i) = 630$$

$$i = 0.1 \; or \; 10\%$$

(d) $M_d = \frac{1}{0.7} H_d \quad \rightarrow \quad H_d = H_s \quad \rightarrow \quad 0.7M_d = H_s = 595$

$$M_d = P(Y - 500i) = (950 - 500i) \quad \rightarrow \quad 0.7(950 - 500i) = 595$$

$$i = 0.2 \; or \; 20\%$$

Students should explain this using either the money supply demand equilibrium figure with a shift in money supply or simply using intuition that a fall in CB money will create an excess demand for money/excess supply for bonds pushing down bond prices and raising the yields (interest rates).

(e) The Money Multiplier will shrink because the deposit ratio (1-c) will fall. Holding all else constant this will decrease the multiplier applied to the CB money supply equilibrium so that CB money supply will fall causing a rise in interest rates just as in the previous question. This will lower output unless the CB increases the money supply by enough to exactly offset the fall in the multiplier effect.