

<b>HOCHSCHULE PFORZHEIM</b>	
<b>– Faculty of Economics and Law –</b>	
<b>- Written Examination -</b>	
<b>Department: Economics</b>	
<b>Subject: Macroeconomics (Bachelor)</b>	<b>Semester:</b>
	<b>Date:</b>
<b>Examinant:</b>	<b>Prof. Dr. Rainer Maurer</b>
<b>Time:</b>	<b>60 Minutes</b>
<b>Auxiliary Means:</b>	<b>Dictionary, Non-Programmable Calculator</b>

**Notes:**

(1) Please check the number of sheets and questions for completeness. You should find 7 questions and 6 sheets (inclusive the front page).

(2) Please use these sheets to answer the questions. **If you need more space, use the back of the preceding page!** Should these not be sufficient, use additional sheets and staple them at the end. Please take care for a correct numbering of all additional sheets.

(3) A correct answer yields the number of points noticed in the side column of each question. To pass the examination 50% of all available points have to be reached (= 30 Points).

(4) Please give complete and comprehensible answers. Illegible answers cannot be accepted.

(5) If you use charts, please take care for a complete labeling.

**Name:** \_\_\_\_\_

**Matriculation-Number:** \_\_\_\_\_

**Result:** \_\_\_\_\_

1. (a) What is the difference between real and nominal GDP?
- (b) How does agricultural subsistence production affect the level of GDP?
- (c) How do legal environmental protection constraints, which make the usage of water clarification plants, air cleaner etc. necessary, affect the level of GDP?

*(a) To calculate real GDP, the prices of goods and services of a given base year are chosen; to calculate nominal GDP, the prices of the current year are chosen.*

*(b) As subsistence farming produces only goods for home requirements, it does not cause market transactions. Therefore is not covered by the normal calculation of GDP. The GDP of countries with a large share of subsistence sector is therefore systematically underestimated.*

*(c) Environmental protection requirements consume inputs for the production of environmental protection (for example air filters, sewage treatment plants ...). However, this is production of environmental protection is not sold via markets and therefore not recorded in the normal calculation of GDP. If the inputs were used for the production of products traded over markets, they would be recorded and this would increase GDP. A country with low environmental standards therefore has a higher GDP than an otherwise identical country with less environmental protection. However, since less environmental protection can be at the expense of personal wellbeing, welfare in the country with less environmental protection may be lower, even though its GDP is larger.*

<p>2. What consequences has an increase of consumption demand under the assumptions of the neoclassical Model? Explicate the complete causal chain.</p> <p><i>If there is a permanent increase in consumer demand, the supply of credit (= the savings) of households will decrease, <math>S \downarrow = Y - C \uparrow</math>. This causes a rise in the interest rate, so that the demanded amount of investment goods decreases. By the end of the day, this drop in the demand for investment goods, caused by the rise in interest rates, will cause total demand for goods (<math>C \uparrow + I \downarrow</math>) to be just as high as before the rise in consumer demand.</i></p>	5
<p>3. Assume a general market equilibrium in a neoclassical model of a closed economy and explain the adjustment process, which follows a <i>decrease</i> of money supply by the central bank. How does this policy finally affect the level of GDP, the interest rate, the price of goods and the nominal wage?</p> <p><i>Under the assumptions of the neoclassical model, a reduction in the nominal money stock (<math>M \downarrow</math>) at initially unchanged prices leads to a decline in the real money supply (<math>M \downarrow / P</math>). This decline in the real credit supply then causes an increase in the real real interest rate (<math>i \uparrow</math>). The rise in real interest rate then causes a decline in aggregate demand for goods (<math>YD (i \uparrow) \downarrow = \text{capital goods demand } I (i \uparrow) \downarrow + \text{consumer goods demand } C (i \uparrow) \downarrow</math>).</i></p> <p><i>However, since the supply of goods <math>YS (K, L)</math> is fixed because the amount of labor (<math>L</math>) used in the production of goods is determined by the equilibrium in the labor market and the capital stock (<math>K</math>) is unchangeable within a production period, there is an excess supply of goods: <math>YS (YS) K, L) &gt; YD (i \uparrow) \downarrow</math>. This excess supply then causes companies to lower their prices (<math>P \downarrow</math>).</i></p> <p><i>The decline in the price of goods then causes an increase in the real credit supply (<math>M / P \downarrow \uparrow</math>). This increase in the real credit supply then leads in turn to a decline in the real real interest rate (<math>i \downarrow</math>). The decline in real real interest rates then causes an increase in the aggregate demand for goods (<math>YD (i \downarrow) \uparrow = \text{capital goods demand } I (i \downarrow) \uparrow + \text{consumer goods demand } C (i \downarrow) \uparrow</math>). As a result, the excess supply of goods decreases again. This process continues until the commodity price level is so high that the real money supply (<math>M / P</math>) equals the real demand for money (<math>RD (Y)</math>). If that's the case, the surplus supply of goods is zero again.</i></p> <p><i>At the same time, the real wage is crowding in the labor market (<math>w / P \downarrow \uparrow</math>) due to the fall in prices. This then causes an excess supply of work, which immediately leads to a decline in the nominal wage (<math>w \downarrow</math>), so that at the end of the old real wage level prevails (<math>w \downarrow / P \downarrow</math>).</i></p> <p><i>The analysis thus shows that under the assumptions of the neoclassical model, monetary policy can only influence the price level and the nominal wage level. Real interest rates, real wages and the level of real gross domestic product can not be influenced by monetary policy.</i></p>	10

4. (a) What are the basic differences between the Keynesian and the neoclassical model and what consequences do these differences have in the Keynesian model?  
 (b) Assume that the economy of a country faces a period of economic boom (= actual GDP is larger than full-employment GDP). Explain the adjustment process that occurs in this situation in the long-run version of the Keynesian model, when firms start to adjust their prices.

*(a) 1. In the Keynesian model, firms adjust their production volumes to the commodity demand in the short term and keep the prices constant, while in the neo-classical model prices are flexible and the supply of goods depends only on the level of the capital stock and the equilibrium amount of labor input. In the Keynesian model, this has the consequence that changes in the demand for goods cause changes in the production of goods and thus cause to economic fluctuations.*

*(a) 2. In the Keynesian model, household consumption only depends on disposable household income, whereas in the neoclassical model, consumer demand depends also on the rate of interest. In the Keynesian model, this means that economic policies which increase household disposable income also increase consumption demand of households (multiplier effect).*

*(b) Starting point is a boom situation in which companies have responded to an increase in demand for goods in the short term with an increase in production volumes but not yet with a rise in prices. Due to the increase in production volume, companies' production costs rise above the price of goods. In order to maximize profit, companies have an incentive to increase their prices. In the long term, therefore, the price of goods will start to rise. This is causing a decline in the real value of the money supply offered by the central bank ( $M/P \uparrow$ )  $\downarrow$ . This means that the real supply of credit on the capital market will decline. As a result of this decline in real credit supply, the capital market interest rate starts to rise so that investment demand falls. The decline in the demand for capital goods means that demand for goods is also falling. Companies are now adapting their supply of goods to lower demand, so that their labor demand (and other factors of production ...) falls. This reduces the remuneration of the factors of production, so that household income also falls. Due to the lower income, households are asking less consumer goods so that the demand for goods is falling again and a negative multiplier effect arises.*

*The production of goods thus continues to decline and with it the demand for labor. If the demand for labor has fallen so far that the companies experience at the prevailing real wage no more incentive to increase their prices, the price increase ceases. Then the job market is back in its long-term equilibrium.*

*Now it has to be taken into account that the decline in GDP on the one hand reduces household savings by  $\Delta S = \Delta Y * (1-c)$  and on the other hand the cash demand decreases  $RD (Y \downarrow) \downarrow$ . This will then once again lead to a decline in the supply of credits on the capital market and, at the same time, to a decline in demand for credit.*

*If the decline in demand for credit is not enough to offset the decline in the supply of credit, the capital market interest rate will rise again, with a corresponding decline in investment. The process then continues until the decline in money demand is enough to absorb the decline in savings. After all these adjustment processes, the economy is again in a general market equilibrium without unemployment.*

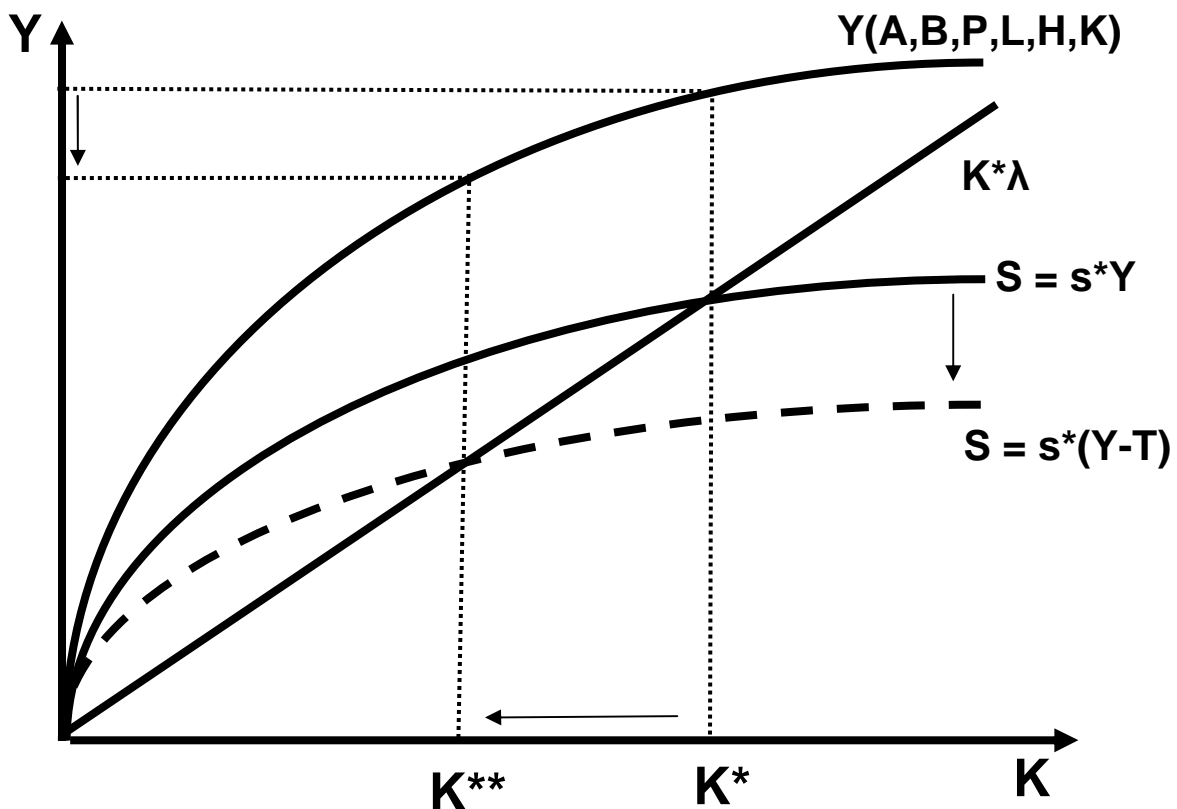
5. Explain how frictional unemployment evolves.

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*Search unemployment arises from normal adjustment processes in the labor market. At a given point in time, some companies are always dismissing workers, because of company-specific or industry-specific adjustment processes. At the same time, some companies are always hiring new workers. Here, too, company-specific or industry-specific reasons are deciding. Dismissed workers need time to find a new job: they need time to obtain information about available jobs that match their qualifications. They must provide information about their qualifications to companies with job vacancies. Companies need to evaluate this information. Therefore, dismissed workers never find a new job immediately, but are unemployed until these search processes are completed.*

6. Explain with the help of the following diagram of the Solow-Swan model, how the introduction of a tax  $T$  on household income  $Y$  affects the steady state level of GDP. Give a short comment on your result.

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*The tax reduces the disposable income of households, so that household savings fall. In a closed economy this leads to a decrease of the investments, so that starting from a steady state situation the capital stock and thus also GDP falls.*

7. (a) Explain the standard procedure used by the European Central Bank to inject money into the economy (main refinancing operation).  
 (b) Explain *two* reasons, which speak in favour of an inflation target larger than zero.

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*(a) This is done at weekly online auctions in the form of an American interest rate tender: the ECB sets a minimum bid rate. On the basis of this, banks have to submit an interest rate  $\geq$  minimum bid rate and their demand for credit at this rate. The ECB ranks the banks' bids in decreasing order of the interest rates and, starting from the highest bid, allocates loans until the credit volume, it wants to supply, is reached. The individual banks receive the loan at their respective individual interest rate. The interest rate at which the last bank still receives an allotment is called the "marginal interest rate". It can be higher than the minimum bid rate. So, if a bank submits a too low an interest rate offer, it risks to receive no credit.*

*(b) Two of the following arguments:*

*1. Danger of a deflationary spiral: With deflation it is possible for households to further reduce their consumption because they expect to be able to buy more goods in the future for their savings due to the negative price trend. This however, causes a lower consumption rate and the recession intensifies. If the target inflation rate is zero, then it is easily possible that in recessions deflation emerges and risk of such a deflation spiral results. However, if the target inflation rate is larger than zero, then recessions will result in lower inflation, but the inflation rate will not be immediately negative. The danger of a deflationary spiral is then significantly lower.*

*2. Possibility to exploit psychological effects in case of fixed nominal wages: Laboratory experiments show that ordinary people are typically suffer from money-illusion: they are more willing to accept a real wage reduction if this is accompanied by a nominal wage increase than if it is accompanied by a nominal wage reduction. Since structural change always involves industries that need to lower their real wages to prevent unemployment, inflation above zero can increase the "social acceptance" of such real wage cuts. However, critics argue that this implies a deception of the workers - an exploitation of mental weaknesses.*

*3. Possibility to generate negative real interest rates: Negative real interest rates are a strong incentive to increase commodity demand. This can help overcome severe recessions. In order to generate a negative real interest rate, the nominal interest rate must be lower than the inflation rate:  $i_t < (P_{t+1} - P_t) / P_t$ . The lowest nominal interest rate that a central bank can generate with normal monetary policy is  $i_t = 0$ . Therefore, at an inflation rate of zero,  $(P_{t+1} - P_t) / P_t = 0$ , the desired incentive can not be created:  $i_t < (P_{t+1} - P_t) / P_t = 0$ . Consequently, the central bank needs an inflation rate above zero in order to be able to reduce the nominal interest rate below the inflation rate in a severe recession.*