MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER

SCHOOL OF BUSINESS & ECONOMICS
MASTER OF SCIENCE IN ECONOMICS
MASTER OF ECONOMICS & STATISTICS

COURSE CODE: ECO 8102

COURSE TITLE: MACROECONOMICS I

DATE: 1/2/2024   TIME: 1430-1730 HRS

INSTRUCTIONS TO CANDIDATES

1. Answer **ALL** questions

QUESTION ONE

Consider an individual who lives for T + 1 periods. Let c_t denote the consumption in period t. Denote by y_t the exogenous income the agent receives in period t. She has the following intertemporal utility function

$$U (C_0, C_1, ..., C_T) = \sum_{t=0}^{T} \frac{1}{[1+\delta]} t \cup (C_t) \; \delta>0, u'>0, \; u''<0$$

where δ is the subjective discount rate. Assume, for simplicity, that the interest rate r = 0 and the subjective discount rate δ = 0. The agents has wealth α_0 to begin with in the first period (t = 0).

(a) Write down the intertemporal budget constraint for this agent. **1 mark**

(b) Write down the agent's optimization problem to obtain the optimal consumption plan. Describe how consumption changes with time, does it increase? Decrease? [*No need to determine the actual consumption level, just describe how it evolves on time*]   **3 marks**

(c) How important is the assumption that r = δ = 0 for your answer in (b)? Can we change part of the assumption and still get the same result for consumption?   **2 marks**

(d) What is the optimal consumption level in each period of life now? How much does the individual save in period t = 0?   **3 marks**

(e) Now suppose that the government announces in t = 0 that will tax individuals. The government implements a tax on income in each period of life such that the agent receives (1 − τ) y each period, where τ = 1/(1 + T). How much does the tax reduce the agent's per period income? How much does optimal consumption falls at t = 0?   **3 marks**

(f) Now assume that instead of a constant tax rate on each period, the government sets a tax rate τ = 1 in t = T and 0 in all the earlier periods. How much does the tax reduce the agent's per period income? How much does optimal consumption falls at t = 0?   **2 marks**

(g) Compare your answers in parts (e) and (f). Explain the intuition.
                                                                    1 mark

QUESTION TWO

(a) Explain how the Hodrick- Prescott filter is used to separate the cyclical component in output from the growth component.**5 Marks**

(b) Differentiate with details, the Diamond Model and the Ramsey Cass Koopmans Model as used in macroeconomics. Provide the details of the two models. **5 Marks**

(c) With the use of elaborate equations, present the Real Business Cycle Model. What are the postulations of this model in terms of fluctuations? **5 Marks**

QUESTION THREE

The household's utility in period t is derived from consumption and employment, which is summarized:

$$U_t = \log C_t + \psi\log(1 - N_t)$$

The budget constraint for this problem is then be expressed as;

$$P_t C_t = W_t N_t$$

where C_t, N_t, P_t and W_t refer to consumption, employment, prices of consumer goods, and wages. It is then assumed that $\psi > 0$.

(a) Derive the first order conditions for the household with respect to consumption and employment. **8 Marks**

(b) How does labour supply depend on the wage in this example? **7 Marks**

QUESTION FOUR

Suppose that the production function is Cobb-Douglas,

(a) Find expression for k*, y* and C* as function of the parameters of the model s, η, δ, g and α. **2 marks**

(b) What is the golden rule value of k? **2 marks**

(c) What saving rate is needed to yield the golden rule capital stock? **2 marks**

(d) Consider a Solow economy that is on its balanced growth path (BGP). For simplicity assume no technological progress. Suppose that the population growth falls. What happens to the BGP value of capital per worker, and consumption per worker? Sketch the paths of these variables as the economy moves to its new BGP. **4 marks**

(e) Suppose that investment as a fraction of output rises permanently from 0.15 to 0.18. Assume that capital share is 0.33. By about how much does output eventually rise relative to what it would have been without rise in investment? **2 marks**

(f) What is the immediate effect of the rise in investment on consumption? About how long does it take for consumption to return to what it would have been without the rise in investment? **3 marks**

/END/