



HERBERT CHITEPO SCHOOL OF LAW AND BUSINESS SCIENCES

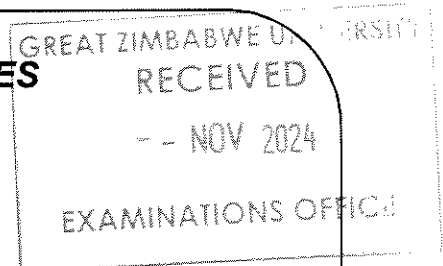
DEPARTMENT OF ECONOMICS AND FINANCE

MAIN EXAMINATION

MASTER OF COMMERCE DEGREE IN ENVIRONMENTAL AND DEVELOPMENT ECONOMICS	PART 1 SEMESTER 2
MACROECONOMICS MODELS AND POLICY	MED528
DATE	2024
DURATION	3 HOURS

INSTRUCTIONS TO CANDIDATES

- 1. Answer any four questions*
- 2. All questions carry equal marks*
- 3. Start each answer on a fresh page*
- 4. Show all workings, where applicable*



QUESTION 1

- (a) Given that $N' = g \left[zF \left(\frac{L}{N}, 1 \right) \right] N$, explain how population evolves over time in equilibrium in a Malthus growth model. [9 marks]
- (b) With the help of well labelled diagrams and equations, discuss the impact of an increase in total factor productivity in a Malthusian growth model. [9 marks]
- (c) Discuss how the Malthusian growth model can be improved to provide a useful guide in formulation of growth-oriented policies in developing countries. [7 marks]

[Total 25 marks]

QUESTION 2

- (a) Using the Shapiro-Stiglitz (1984) labour model, explain why in the absence of minimum wages aren't wages bid down sufficiently by job seekers so that everyone who wants a job finds one. [15 marks]
- (b) Using the four-quadrant diagram, derive and illustrate an economy's long-run aggregate supply curve. [10 marks]

[Total 25 marks]

QUESTION 3

Consider an economy represented by the Solow-growth Cobb-Douglas production function $Y_t = K_t A L_t^{1-\alpha}$ where A is technology, K is capital, L is labour, t is time and α is the share of output produced using capital.

- (a) Explain the assumptions underlying the production function and hence express it in per effective-worker terms. [5 marks]
- (b) Consider an economy with the steady state per effective worker production and savings functions:

$$f(k_t) = c_t + (n + \delta + g)k_t ; \quad S = I = sf(k_t)$$

Where c is consumption, n , δ and g are constant and exogenous population growth rate, depreciation rate and technology growth rate respectively. S is savings, I is investment and s is the savings rate.

- (i) Using graphical illustrations, explain the effect of a once-off permanent rise in the savings rate on the economy's steady state growth rate. [10 marks]
- (ii) Using your explanation in b (i) above, discuss the major policy implications of the Solow growth model. [10 marks]

[Total 25 marks]

QUESTION 4

Consider the following simple version of the Romer model:

- (i) Production function: $Y = K^\alpha (AL_y)^{1-\alpha}$,
- (ii) Capital accumulation: $\dot{K} = s_K Y - dK$,
- (iii) Population growth: $\frac{\dot{L}}{L} = n$,
- (iv) Creation of new ideas: $\dot{A} = \delta A^\phi L_A^\lambda$,
- (v) Proportion of labor in research: $\frac{L_A}{L} = s_K$.

Suppose further that $\lambda < 1$ and $\phi > 0$.

- (a) Solve for the growth rate of total factor productivity (TFP) (or ideas, A) in this model. [8 marks]
- (b) What is the steady-state growth rate of technology in this model? Does the growth rate of technology tend to converge towards its steady-state rate? [8 marks]
- (c) Discuss the major policy implications of the Romer growth model. [9 marks]

QUESTION 5

- (a) Critically discuss the growth dynamics in the Ramsey growth model. [12 marks]
- (b) Explain, using a diagram, the effect of rise in population growth rate in the Ramsey growth model framework. [4 marks]
- (c) Discuss the major policy implications of the Ramsey growth model. [9 marks]

[Total 25 marks]

END OF EXAMINATION