Economics

Paper 3

Further macroeconomics

Imperial Secondary Examinations Authority
January 1920 examinations

Answer questions in the space provided. *If maths are required, show your working.* If you require more space, attach with Treasury tag a piece of paper to this examination, clearly number where you left off, and provide cross-reference to the page where further work is located.

Do not write on the back of examination materials.

You will receive no marks if you interfere with the scoring box at the bottom of this page.

Institution: _____

Examinations code: _____

1. (14 marks) Show that for a household optimising as follows—

$$\max_{c_t,\, a_{t+1}} \sum_{t=0}^{T} \beta^t \, \mathrm{u}(c_t)$$

$$\text{s.t. } c_t + a_{t+1} = w_t + a_t(1 + r_t) \text{ for all } t$$

$$c_t \geq 0 \text{ for all } t$$

a steady state solution implies that the interest rate is equal to the time discount factor. Recall that $\beta = 1/(1 - \rho)$.

2. (a) (12 marks) Show that for a household optimising as follows—

$$\max_{c_t,\, a_{t+1}} \sum_{t=0}^{T} \beta^t \, \mathrm{u}(c_t)$$

$$\text{s.t. } c_t + a_{t+1} = w_t + a_t(1 + r_t) \text{ for all } t$$

$$c_t \geq 0 \text{ for all } t$$

household consumption is proportional to lifetime income.

(b) (2 marks) Give two compelling reasons why a real world actor would be unable to effect such an outcome.

. . . .

. . . .

. . . .

. . . .

. . . .

3. (6 marks) Assume that the intertemporal elasticity of substitution parameter σ is 2. Using a utility function with the form—

$$u(c_t) = \frac{c_t^{1-\sigma} - 1}{1 - \sigma}$$

show that an equal-disutility taxation policy must be progressive.

4. (16 marks) Show that in an economy directed by a social planner optimising as follows—

$$\max_{c_t,\, k_{t+1}} \sum_{t=0}^{T} \beta^t \, \mathrm{u}(c_t)$$

$$\text{s.t. } c_t + k_{t+1} = k_t^\alpha (A_t l_t)^{1-\alpha} + (1-\delta)k^t \text{ for all } t$$

$$c_t \geq 0; k_t \geq 0 \text{ for all } t$$

labour-augmenting technological growth produces a stable output capital-labour ratio.