MASTER OF ARTS EXAMINATION, 2025

DEPARTMENT OF ECONOMICS

1st Year, 2nd Semester

Subject Code : ECO/A/C 8.2

MACROECONOMICS AII

Time : Two Hours **Full Marks : 30**

Answer any two questions from Group A and any one from Group B.

Group – A **10×2=20**

1. Show that in Ramsey model, competitive equilibrium is the optimal outcome obtained in command economy. Why is it so? 8+2

2. Specify AK model of growth. Find out the Euler equation. What is the transversality condition ? Was this class of model successful in endogenizing the long-run growth rate ? Analyse the transitional dynamics. Describe the limitations of this model. 1+1+1+2+3+2

3. Consider an economy where individuals live for two periods, Individuals born at time t live for dates t and t+1. Assume a general utility function.

$$U(t) = u(c_1(t)) + \beta u\ (c_2(t+1))$$

Where utility function and production function satisfy the standard assumptions. Individuals work only in 1st period of life supplying inelastically one unit of labour and earning a real wage w_t. They consume a part of their income in first period of life and save the rest to finance their second period retirement consumption. The aggregate saving of the young in period t generates the capital stock that is used to produce output in period t+1 along with the labour supplied in period t+1. The number of individuals in an economy is assumed to be constant at N_0.

$Y_t = F(K_t, N_t)$ satisfies constant returns to scale. The production function is assumed to satisfy Inada conditions. Product market and factor markets are assumed to be competitive.

(a) Write down the budget constraint of the individual.

(b) Find out the dynamic equation of the capital labour ratio (for general production function and utility function).

(c) Now, suppose government imposes tax τ on young working generation, invests the tax revenue and transfers the tax revenue along with the intertest to the same individuals when they are old. How does the model and the dynamic equation of capital labour ratio, aggregate savings of the economy change because of introduction of this tax transfer scheme ?

Group – B 10×1=10

4. Suppose a household lives for 2 periods 1 and 2. Assume for simplicity the household has only one number. The household incomes in two periods are give by $y_1 = w_1 (1 - l_1)$ and $y_2 = w_2 (1 - l_2)$ where w_1 and w_2 are real wages in period 1 and period 2 while l_1 and l_2 are leisure time enjoyed in periods 1 and 2. The household can borrow or save at **constant rate of intertest *r***. The household's utility function is given by

$$U = \text{In}\,(C_1) + \beta\frac{l_1^{1-\gamma}}{1-\gamma} + \delta[\text{In}\,(C_2) + \beta\frac{l_2^{1-\gamma}}{1-\gamma}]$$

Where $\beta > 0$, $\gamma > 0, C_1$, C_2 are consumption of the goods in period 1 and period 2, $0 < \delta < 1$ is the discount factor.

(a) Write down the household's budget constraint.

(b) Set up the household's utility maximization problem.

(c) How does relative labour supply $\frac{l_1}{l_2}$ respond to change in relative wage $\frac{w_1}{w_2}$? Explain mathematically and intuitively.

(d) How does relative labour supply $\frac{l_1}{l_2}$ respond to change in rate of interest ? Explain mathematically and intuitively.

(e) Now suppose, in period 2, there is a positive technology shock and wage of period 2, w_2 becomes $\frac{w_2}{A}$ and rate of interest r becomes Ar where $A > 1$. What will be the impact of technology shock on employment or period 2 ? 2+2+2+2+2

5. Consider an economy (on demand side) with the production function $Y_t = AK_t + BL_t$ where K is physical capital, L is labour, A and B being constants. Suppose labour grows at constant rate n.

(a) Assume first that a fraction of the output (s_t) is saved for capital accumulation.

(i) Does this producrtion function satisfy Inada conditions?

(ii) What is the growth rate of per capita physical capital ?

(iii) Is the growth rate stable ? Explain. 1+2+2

(b) Now, instead of assuming a constant fraction of saving, suppose we include the demand side in this model. The representative individual wants to maximize the present discounted value of utility $U(c) \int_0^\infty \text{In}\, c\, e^{-pt}\, dt$ over the infinite time horizon, where ρ is the discount rate.

(i) What is the steady state growth rate of per capita output ?

(ii) Is the growth rate exogenous or endogenous ? Justify your answer.

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