

**Birla Institute of Technology & Science, Pilani**  
**Pilani Campus – Rajasthan**  
**Economics of Growth & Development (ECON F244)**  
**Mid-Semester Examination**

**Date:** 13/Mar/2023

**Time Duration:** 90 Minutes

**Maximum Marks:** 60

**Instructions:**

- All questions are compulsory.
  - Please note that marks would be deducted in case of No Valid Interpretation and necessary steps, wherever required.
  - A calculator is allowed.
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**Q1:** For Country Z, the following information is given using the standard notations:

The aggregate production function:  $Y_t = A_t K_t^{\frac{1}{2}} N_t^{\frac{1}{2}}$ ; Saving rate = 20 % ; Population is constant i.e.  $N = 100$  ; and Capital depreciation rate = 5 % per year:

- a) Assume that  $A_t = 1$ , find out the steady state values for per-capita income, labor & capital income shares, and wage rate & interest rate. Graphically represent the calculated equilibrium and discuss its stability.
- b) Assuming the same values of all parameters, including  $A_t = 1$ , what will be the impact of the fall in the savings rate to 2.5 % on per-capita income and the interest rate? Discuss the role of change in savings to explain cross-country differences.
- c) Assuming the same values of all parameters, including savings rate at 20 %, what will be the impact of a fall in the value of A to  $A_t = 0.5$  on per capita income and the interest rate? Discuss the role of change in A to explain cross-country differences. **[10+5+5]**

**Q2:** The convergence hypothesis in the growth economics literature sheds light on many important aspects of cross-country differences. Given its importance, specify the mathematical form of various types of convergence discussed in the class with proper explanation. If all specifications are based on one common convergence hypothesis, what is the need for separate specifications? Discuss. **[10]**

**Q3:** Answer the following:

- a) Write down the ‘*Inada conditions*’ for an aggregate production function with an explanation. (use the per-worker form of production function)
- b) Write down the mathematical expression of the necessary condition for steady growth with full employment in a Harrod-type economy with the presence of labor augmenting technical progress and explain. Also, provide the meaning of each notation used with its purpose.
- c) As per the class discussion, *the assumption of continuous expansion of technology helps the Solow model to comply more with Kaldor’s stylized facts*. What facts were not captured by the basic Solow model, and how does it start capturing those with technical progress? [The student can directly use the steady state values of required parameters to answer this question]. What is the relevance of these stylized facts in growth economics? Discuss. **[6+4+5]**

**Q4:** Derive the steady state level of per-capita income under the assumptions of the Solow model with the continuous expansion of technical progress by allowing the role of human capital in production. **[15]**

\*\*\*\*\*All the Best\*\*\*\*\*