**HOWARD UNIVERSITY**

**DEPARTMENT OF ECONOMICS**

**CODE NUMBER------------- TOTAL NUMBER OF PAGES----------**

**September 8, 2016**

**COMPREHENSIVE EXAMINATION:**

**MACROECONOMIC THEORY/ Ph.D.**

**EXAMINERS:**

1. **Dr. Mika Kato, Chairperson**
2. **Dr. Kofi Kissi Dompere**
3. **Dr. Gerald Daniels**
4. **The examination is scheduled between the hours: 9:30 a.m-1.00 pm**

**ALL STUDENTS ARE TO BE SEATED BY 9:15 a.m.**

1. **YOU ARE REQUIRED TO ANSWER ONLY FIVE (5) QUESTIONS.**

**Any additional questions answered over the required number from each category will NOT receive credit.**

1. **Correct answers to questions NOT asked will receive NO credit.**
2. **Be sure to write the Code Number assigned to you in the TOP LEFT HAND CORNER OF THIS SHEET AND ON EACH ANSWER SHEET. DO NOT WRITE YOUR NAME ON ANY SHEET OF THE EXAMINATION.**
3. **Begin each question on a new page. Number each page used in sequence. Write only on one side of the paper.**
4. **Write clearly and illustrate your answers with graphs whenever and wherever possible.**
5. **USE ONLY BLACK INK PENS.**
6. **At the end of the examination, please indicate the total number of pages being submitted in the space provided in the TOP RIGHT HAND CORNER of this sheet.**

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1. **Bring your pens, pencils, calculators and rulers.**
2. **No briefcases, book bags or sacks, no handbags larger than 10 x 6 of any form are to be brought into the examination room.**
3. **No books, notes or other study material are to be brought into the examination room.**
4. **During the Examination there is to be no communication between or amongst students for any purpose. All questions must be directed to and channeled through the faculty member conducting the examination.**
5. **Only the scrap paper provided by the proctor is to be used for the examination. Scrap paper should bear the code number assigned to each student, and be handed over to the proctor along with the examination.**
6. **Students are not expected to leave the examination room before completing their examination and turning it in to the proctor.**
7. **NO FOOD OR SMOKING is permitted in the examination room.**
8. **It is the student’s responsibility to remove any coffee or water containers taken into the examination room.**
9. **NO CELL PHONES ARE ALLOWED.**
10. **EXAMINATION RESULTS WILL ONLY BE GIVEN TO STUDENTS WHO ARE REGISTERED.**

**Revised 09/07/2004**

**CODE NUMBER\_\_\_\_\_\_\_\_\_\_\_**

**STUDENTS: PLEASE CIRCLE ONLY THE QUESTIONS ANSWERED AND PROVIDE THE PAGE NUMBERS.**

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| **QUESTIONS** | **PAGE NUMBERS** |
| **1.** |  |
| **2.** |  |
| **3.** |  |
| **4.** |  |
| **5.** |  |
| **6.** |  |
| **7.** |  |
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**PH.D. MACROECONOMIC THEORY**

**COMPREHENSIVE EXAMINATION FALL 2016**

**ANSWER ANY FIVE (5) QUESTIONS.**

1. **Write short definitions for (a)-(e).**
2. Neutrality of money
3. Efficiency-wage hypothesis
4. Non-Ponzi-game condition (in an intertemporal budget constraint)
5. Ricardian equivalence theorem
6. Expectation-augmented Phillips curve
7. **The production function is used in the construct of the neoclassical theory of income distribution between factors or among factors. It is also used in the theories of investment and economic growth.** **Answer questions (a)-(c).**
   1. How are the uses of the production function in these theories related?
   2. Can the results of these theories be accomplished without the use of the production function?
   3. What are the differences and similarities between the micro-production function and the macro-production function in the analysis of economic theory?
   4. Can the macro-production function be derived from a set of micro-production functions and can the set of the micro-production functions be derived from the macro-production function and why?
8. **To the best of your understanding of macroeconomic theory, comment on the following:**

**“Most of macroeconomic theories focuses on two main questions”: The macroeconomic theory is basically of two components of income determination theory and growth theory.** **Answer questions (a)-(d).**

1. What are the basic differences between the income determination theory and economic growth theory in terms of their approaches in the construction of economic theory?
2. What are the essential questions that each of the theories is attempting to answer?
3. How is the growth theory an extension of the income determination theory and how does income determination theory initializes the growth theory?
4. What role does economic information play in the construct of the theories?
5. **Answer questions (a) - (c).**
6. What does it mean by factor-augmenting technical progress and non-factor-augmenting technical progress in the analysis of neoclassical economic growth theory?
7. Show that with constant returns to scale and other usual (regular) neoclassical restrictions on the production function, technical progress is Harrod-neutral if, and only if, the production may be re-expressed in purely labor-augmenting form, that is the production function,

where .

1. What role does production function play in the neoclassical economic growth theory in obtaining the growth paths of the key aggregate variables?
2. **Consider a Central Bank (CB) whose objective is to minimize the social-welfare loss. Assume a quadratic social welfare loss function,**

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**and an expectation-augmented Phillips curve,**

,

**where is the real output, is the natural output, is the target output (, is the inflation, is the target inflation, is the relative importance between inflation and output, and is the expected inflation.**

**Answer questions (a)-(d).**

1. Assume that the CB makes a binding commitment about inflation, i.e., the expected inflation always coincides with realized inflation,

Derive the welfare-loss-minimizing inflation and the economy’s real output in equilibrium.

1. Now assume that the CB can set a policy by discretion. Given the public’s expectation of inflation, derive the CB’s policy reaction that minimizes the social welfare loss.
2. Sooner the public learn about the CB’s policy derived in (b). Then in equilibrium, the public’s expected inflation and the actual inflation should be equal,

Derive the equilibrium inflation and output of the economy.

1. By comparing the equilibrium inflation and output derived in (a) in the case of binding commitment and those derived in (c) in the case of discretionary monetary policy, discuss a dynamic inconsistency problem.
2. **Suppose that the economy’s production function is**



**where *K* is capital, *L* is labor, and *A* is the state of technology.**

**Suppose that the saving rate (*s*) is equal to 6%, the rate of depreciation of capital (*δ*) is equal to 11%, the number of workers grow at 1% per year and the rate of technological progress is 3%. Answer questions (a) and (b).**

(a) Find the steady state values of:

1. capital stock per effective worker
2. output per effective worker
3. growth rate of output per effective worker
4. growth rate of output per worker
5. growth rate of output
6. Suppose that the saving rate increases. Study its short-run and the long-run effect on the *growth rate* of per-capita output.
7. **Suppose that the production function is the Cobb-Douglass form,**

**where the labor productivity improves as technology progresses. Prove each of the following statements (a) – (d) about the steady state of the Solow model with population growth and technological progress .**

1. The capital–output ratio is constant.
2. Capital and labor each earn a constant share of an economy’s income.
3. Total capital income and total labor income both grow at the rate of population growth plus the rate of technological progress, .
4. The real rental price of capital is constant, and the real wage grows at the rate of technological progress g.
5. **Consider a simple investment problem. *A* representative firm maximizes the present value of these profits:**



**where *r* is the interest rate, π is the firm's profit function, *K* is the capital stock, *I* is the investment, and φ is the adjustment cost of investment. Answer questions (a) and (b).**

1. Set up the appropriate current-value Hamiltonian for this problem. (Let q denote the costate awwvariable.)
2. Find the optimal investment rule. Show that the derived rule is actually compatible with the Tobin's q (Tobin, 1969) theory of investment.

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