THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

This exam paper must not be removed from the venue

Venue   _____

Seat Number   _____

Student Number |__|__|__|__|__|__|__|__|__|

Family Name   _____

First Name   _____

School of Economics
In-Semester 2 Sample Examinations, 2025
ECON2040 Macroeconomic Policy

This paper is for St Lucia Campus students.

Examination Duration: **60 minutes**
Reading Time: **10 minutes**

Exam Conditions:

This is a School Examination

This is a Closed Book Examination - no materials permitted

During reading time - write only on the rough paper provided

This examination paper will NOT be released to the Library

Materials Permitted In The Exam Venue:
(No electronic aids are permitted e.g. laptops, phones)

An unmarked Bilingual dictionary is permitted

Calculators - Casio FX82 series or UQ approved (labelled)

Materials To Be Supplied To Students:

1 x Gradescope Answer Booklet (provided by schools)

Instructions To Students:

Additional exam materials (eg. answer booklets, rough paper) will be provided upon request.

Total Questions: **4 in Part A and 1 in Part B**

Total Marks: **60**

For Examiner Use Only

Question	Mark

Total   _____

PART A - SHORT ANSWER

ANSWER ALL QUESTIONS. MARKS ARE AS INDICATED (TOTAL 40 MARKS)

Question A.1 [10 marks]. Consider the following data on Real GDP across time:

	Year 1	Year 2
Real GDP (year 1 prices)	$480	$520
Real GDP (year 2 prices)	$300	$330

Compute Real GDP in year 2 by applying the Chain-Weighting approach. Use year 1 as the reference year.

Answer. The growth rate in Real GDP (year 1 prices) is $g_1 = 520/480 = 1.083$. The growth rate in Real GDP (year 2 prices) is $g_2 = 330/300 = 1.1$. Then Real GDP in year 2 using year 1 as the base year via Chain-Weighting approach is

$$\text{Real GDP in year 2} = 480 \times \sqrt{1.083 \times 1.1} = 523.904.$$

Question A.2 [10 marks]. The Hodrick-Prescott filter computes the non-linear trend $\{g_t\}_{t=1}^{T}$ of an economic time series $\{y_t\}_{t=1}^{T}$ by solving:

$$\min_{\{g_t\}_{t=1}^{T}} \left\{ \sum_{t=1}^{T}(y_t - g_t)^2 + \lambda \sum_{t=2}^{T-1} \left[(g_{t+1} - g_t) - (g_t - g_{t-1}) \right]^2 \right\}.$$

How does an *increase* in λ affect the behaviour of the *cyclical component* of y_t? Explain.

Answer. When λ increases, the HP trend g_t becomes smoother. Hence, the cyclical component $\varepsilon_t = y_t - g_t$ becomes more volatile.

Question A.3 [10 marks]. Consider the One-Period Model of the Household studied in class. What is the impact of a increase in wage rate (w) on the consumption-leisure choice of the household? Provide a detailed explanation and use a diagram in your answer. [All assumptions made in the model in lecture 3 hold.]
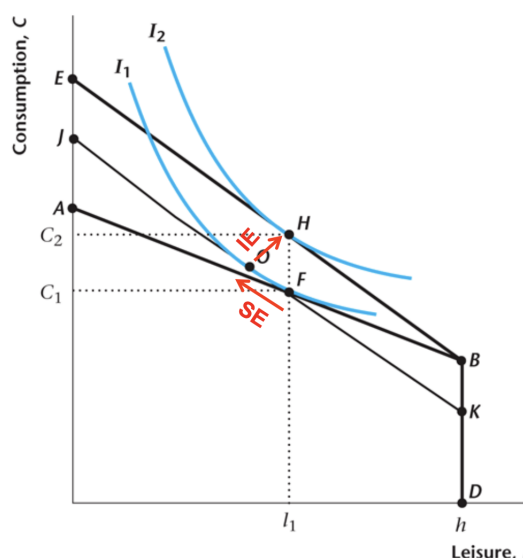
Answer.

- **Income Effect:** A higher wage increases the household's income for any given amount of labour supplied. Since both consumption C and leisure l are normal goods, the household demands more of both. This implies $\uparrow C$ and $\uparrow l$.

- **Substitution Effect:** A higher wage increases the opportunity cost of leisure (i.e., the forgone consumption from not working). This makes leisure relatively more expensive, leading the household to substitute away from leisure and towards consumption. This implies $\uparrow C$ and $\downarrow l$

EXAMINATION CONTINUES ON NEXT PAGE

The total effect of a wage increase is therefore:

$\uparrow C, \quad l$ ambiguous (could increase or decrease depending on which effect dominates).

Thus, while consumption unambiguously rises with a higher wage, the effect on leisure (and equivalently on labour supply) depends on the relative strength of the income and substitution effects.

Question A.4 [10 marks]. According to the Two-Period Model of the Household (lecture 4), how does a temporary increase in current income affect consumption compared to a permanent increase?

Answer. With a temporary increase in current-period income, current consumption c increases, but by less than the rise in income. Formally,

$$\frac{\partial c}{\partial y} < 1,$$

which means that the marginal propensity to consume out of temporary income is less than one. The household saves part of the additional income to increase future consumption c'. This behaviour reflects *consumption smoothing*, since both c and c' are normal goods.

In contrast, when income rises permanently (i.e., both current and future income increase by the same amount), there is a larger increase in current consumption than in the case of a temporary shock. The marginal propensity to consume out of permanent income therefore lies between zero and one, and is larger than in the temporary case:

$$1 > \frac{\partial c}{\partial y^{perm}} > \frac{\partial c}{\partial y}.$$

This outcome illustrates the *Permanent Income Hypothesis* (Friedman, 1950s): consumption depends on lifetime wealth, so permanent changes in income have a stronger effect on consumption than temporary ones.

EXAMINATION CONTINUES ON NEXT PAGE

PART B - PROBLEM SOLVING

ANSWER ALL QUESTIONS. MARKS ARE AS INDICATED (TOTAL 20 MARKS)

Problem B.1 [20 marks]: Two-Period Endowment Model of Household

Consider the Two-Period Endowment Model of household behaviour. The household derives utility from consumption today c and consumption tomorrow c'. Her preferences are represented by the utility function

$$U(c, c') = u(c) + \beta u(c'),$$

where $\beta \in (0, 1)$, and u is strictly increasing and strictly concave.

The household receives exogenous income y today and y' tomorrow. For simplicity, assume that there are no lump-sum taxes (i.e. $t = t' = 0$, using the notation in class). The real interest rate is given by r.

1. **[7 marks]** Suppose that the government introduces a *subsidy on debt interest* $s \in (0, 1)$. That is, borrowers face the real interest rate $r(1 - s)$, while lenders receive an interest rate r on their savings. Using a diagram, show the effect of this policy on the consumer's lifetime budget constraint.

   Answer. The borrowers face a lower interest rate than the lenders due to the subsidy. As a consequence, the interest rate subsidy introduces a kink in the lifetime budget constraint, which becomes flatter to the right of the endowment point.
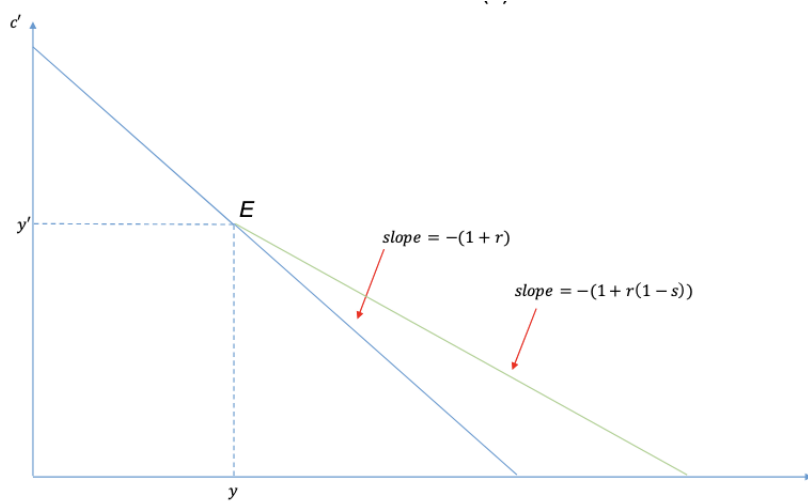
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2. **[6 marks]** Suppose that the consumer is initially a borrower. How does the introduction of the tax s affect her level of borrowing? Explain using a diagram. Make reference to income and substitution effects where appropriate.

Answer. See Figure below. When the interest earnings subsidy is introduced, the borrower moves from point A to point B. Along this movement, there is an substitution and an income effect. The former makes the borrower give up c' for c (i.e. $\uparrow c$, $\downarrow c'$). The income effect, on the other hand, leads to an increase in both c and c', since these are both normal goods. The final effect on c is thus positive, so the subsidy makes the borrower borrow more (i.e. save less).
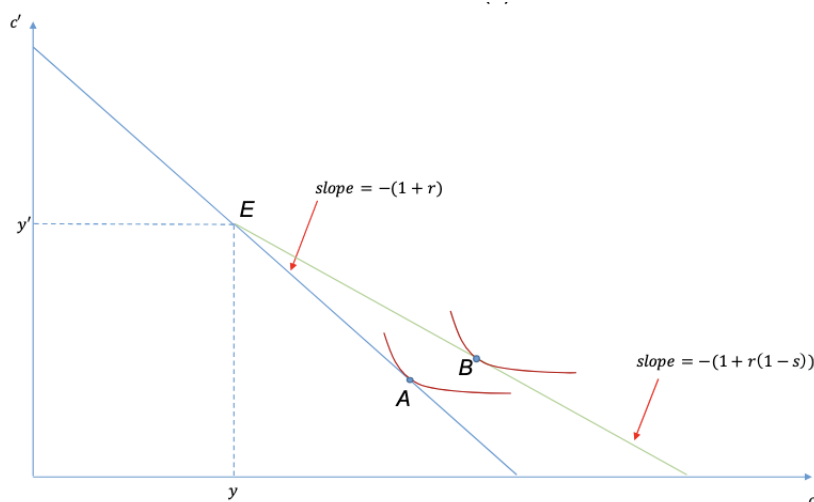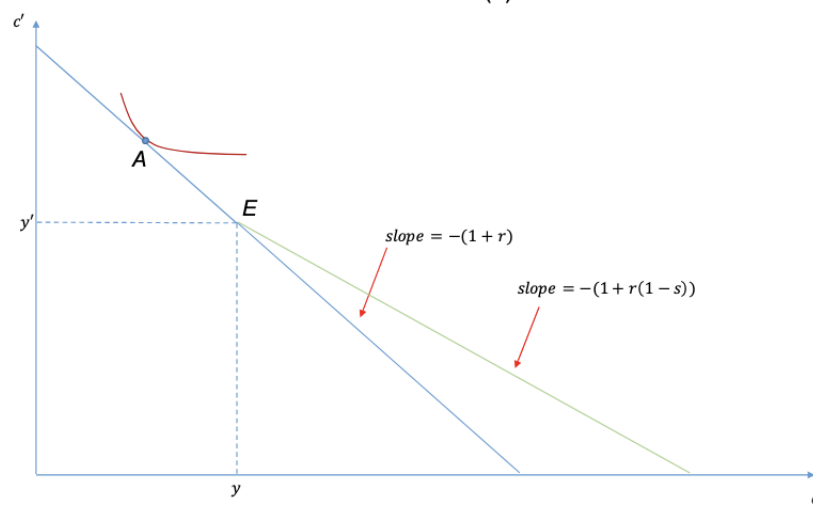

3. **[7 marks]** Now suppose that the consumer is initially a lender. How does the introduction of the subsidy s affect her level of savings? Explain using a diagram. Make reference to income and substitution effects where appropriate.

Answer.

- For a sufficiently low subsidy, the initial lender is still a lender. This is the case depicted in the Figure below. In this case, the interest earnings tax does not affect the lender in any way: She consumes at A both before and after the tax is introduced.

- For a particular value of subsidy, the initial lender is indifferent between being a lender and a borrower. This case is pathological, but it can still occur because the constraint set becomes convex.

- For sufficiently high subsidy, the initial lender becomes a borrower.

EXAMINATION CONTINUES ON NEXT PAGE

END OF EXAMINATION