**Part A. Answer FIVE questions.** Explain your reasoning carefully. Use graphical or mathematical arguments where appropriate, but keep your answers brief. Calculators are permitted but not any other aids or devices. Hand in this paper with your answers. **You have 110 minutes.**

1. (a) State the Second Theorem of Welfare Economics.

   (b) Some low-income families in Canada receive housing subsidies from the government. Based on the Second Welfare Theorem, can this policy be justified? Explain your answer.

2. (a) Define the *excess burden* of a tax system. Using graphs or mathematical formulas (or both), show how the excess burden of a tax on a single commodity is related to its *elasticity of demand*.

   (b) At present, subscriptions to Netflix are not taxed, but subscriptions to cable TV are at a tax rate of 10%, which generates $500 million in annual tax revenue. Suppose that the introduction of a one per cent tax on Netflix caused the number of cable subscriptions to rise by 0.5%. Which of the following numbers is closest to the excess burden of the new tax:

      (a) -$25 million   (b) -$2.5 million   (c) 0   (d) +$2.5 million   (e) +$25 million

   Show your work, and justify your answer.

3. A consumer's utility function is

$$U(X,Y) = 8X - \frac{1}{4}X^2 + Y$$

   her income is $30, and the pre-tax price of both goods is $1. Compute the excess burden of a specific tax of $1 imposed on good $X$. (You may use an exact formula or an approximation based on the Harberger triangle.)

4. (a) Define the *elasticity of taxable income (ETI)*. Explain its role in forecasting government revenue from a tax increase. Under what conditions on the ETI could an increase in tax rates cause government revenue to fall? (*Hint:* Write down government revenue as a function of the tax rate, and differentiate.)

   (b) Explain how researchers can use *difference-in-difference estimation* to estimate the elasticity of taxable income from tax reforms. Discuss the work of Feldstein (1995) in your answer: Describe the tax reform studied and the conclusions drawn by Feldstein. What other factors, not considered by Feldstein, might have caused him to overestimate the ETI?

5. (a) For an income tax system that assigns a tax liability $T(Z)$ to a taxpayer with income $Z$, define the following terms:

   - marginal tax rate
   - average tax rate
   - progressive income tax

   (b) Suppose that government required employers to give to new mothers one year of paid leave from their jobs (but not to new fathers). Discuss the *economic incidence* of this policy on female workers, and male workers. State clearly your assumptions about the relevant elasticities and draw graphs if possible to support your argument.

6. (a) Briefly discuss the trends in top tail income inequality (e.g. the richest one per cent, and higher) in Canada from the mid-20th century until today. Based on the discussion in Saez and Veall (2005), what factors might explain these trends?

   (b) If top tail inequality is increasing, how should government policy respond? Justify your answer by reference to the work of Diamond and Saez (2011), as discussed in class.