ECON 3113 Microeconomics Theory I 2020
Midterm Test
Total time allowed: 1 hour and 20 minutes
Total points: 110

Part 1 (60 Points)

Throughout the test, unless otherwise specified, let the commodity space be $\mathbb{R}^2_+$. That is, there are two goods for consumptions and a typical consumption bundle takes the form (x_1, x_2), where x_1 is the quantity of consumption of good 1 and x_2 is the quantity of consumption of good 2. These quantities can be any positive real numbers.

1. For each statement below, determine whether it is *true (T)* or *false (F)* or *not enough information to tell (NEIT)*. For each statement, explain your answer in **one sentence**.

   (a) Harry's utility function is $U_H(x_1, x_2) = \sqrt{x_1 x_2}$ and Ron's utility function is $U_R(x_1, x_2) = (x_1 x_2)^2$. Therefore, Ron is always happier than Harry.

   (5 points)

   (b) Suppose Hermione always make **coherent choices**. If presented with a menu consisting only of a *Gryffindor* and a *Slytherin* handkerchief and asked to pick one and only one, she picks the *Gryffindor* one (and strictly not *Slytherin*). Now suppose we add a *Ravenclaw* handkerchief to the menu above. With the expanded menu of *Gryffindor*, *Slytherin* and *Ravenclaw* handkerchiefs (from which she picks one), Hermione may give up the *Gryffindor* handkerchief and pick something else.

   (5 points)

   (c) Hermione hates anything *Slytherin*. She would be strictly better off to have the *Slytherin* handkerchief removed from the menu.

   (5 points)

   (d) Fixing a consumer's income path, a reduction in the interest rate is always a good thing for her because the present value of the income path goes up.

   (5 points)

   (Total: 20 points)

2. Suppose the consumer has a utility function $U(x_1, x_2) = 3\sqrt{x_1} + \sqrt{x_2}$, and income I.

   (a) Derive the consumer's demand of good 1 as a function of prices p_1 and p_2 and income I. (Hint: you may assume without proof that the solution of utility maximization is interior.)

   (12 points)

(b) Suppose the price of good 1 is 20, the price of good 2 is 10, and the consumer's income is 220. What is the consumer's optimal consumption bundle? Show that the corresponding level of utility is 11.

(4 points)

(c) What is the compensated demand function of good 1 that passes through the optimal consumption bundle identified in part (a)?

(12 points)

(d) Suppose the price of good 1 increases to 30 (price of good 2 remains fixed at 10). Use your results in parts (a)-(c) to decompose the effect of the price increase on good 1's consumption into its substitution effect and its income effect.

(12 points)

(Total: 40 points)