Qualifying Exam. Microeconomics. June 2002. Part I
Answer all three of the following questions.

1) The meaning of WARP in the choice-based approach. Recall the definition of WARP here:

> **Definition 1.C.1:** The choice structure $(\mathscr{B}, C(\cdot))$ satisfies the *weak axiom of revealed preference* if the following property holds:
>
> If for some $B \in \mathscr{B}$ with $x, y \in B$ we have $x \in C(B)$, then for any $B' \in \mathscr{B}$ with $x, y \in B'$ and $y \in C(B')$, we must also have $x \in C(B')$.

Let   (Script-B) = $\{B_1, B_2, B_3, B_4\}$ where $B_1 = \{a,b,c\}$ $B_2 = \{c,d\}$ $B_3 = \{a,b,d\}$ $B_4 = \{b,d\}$ and C $(B_1) = \{a,b\}$ $C(B_2) = \{c\}$ $C(B_3) = \{a\}$ $C(B_4) = \{b\}$
a) What is the smallest set that X could possibly be? (You should know what X stands for in this approach - it is the same as X in the other approach)
b) This example violates WARP. Identify which of the above sets plays the role of B and B' and which elements in the sets pay the role of x and y in the above definition such that one has that WARP does not hold.
c) The definition of SARP was given as

> **Definition 3.J.1:** The market demand function $x(p, w)$ satisfies the *strong axiom of revealed preference* (the SA) if for any list
>
> $$(p^1, w^1), \ldots, (p^N, w^N)$$
>
> with $x(p^{n+1}, w^{n+1}) \neq x(p^n, w^n)$ for all $n \leq N - 1$, we have $p^N \cdot x(p^1, w^1) > w^N$ whenever $p^n \cdot x(p^{n+1}, w^{n+1}) \leq w^n$ for all $n \leq N - 1$.

Now extend the economic meaning of SARP, which was given for demand functions and budget constraints, to this choice structure. Now let $C(B_4) = \{d\}$. Construct an example from this choice structure with this change that shows a violation of SARP, other than the violation WARP just described, and explain in words why it is a violation of SARP.

2) The following concepts were introduced in regards to the issue of aggregation.
a) What is a *positive representative consumer*?
b) What is a *normative representative consumer*?
c) Elaborate on the difference of the economic meanings the two. Include here in particular any extra economic things or concepts needed to define the one and not needed for the other.

3) For all the following, consider a production process with one input z and one output f(z).
a) Draw tow production sets, one that violates irreversibility and one that doesn't (and be SURE to label which is which!)
b) Draw (and label) three production sets: i) decreasing returns to scale, ii) constant returns to scale, and iii) increasing returns to scale
c) Let $(-z, f(z)) \in Y$. Assume one has constant returns to scale. Indicate what degree of homogeneity f(z) has.
d) Show (prove) f(z) in part c) has that degree of homogeneity.
e) Draw (and clearly contrast) the cost curves for a production process that has sunk fixed costs and constant returns to scale (be sure to label the axes, as always for graphs) and the same production process with fixed costs that are not sunk.
f) Describe in words the economic meaning of the two graphs in part e), and in particular make clear the economic meaning of the difference between the two graphs in part e).

Qualifying Exam. Microeconomics. June 2002. Part II
Answer all three of the following questions.

1)   Assume the following:
$Q = q_1 + q_2$
$P = 100 - Q$
$MC_1 = MC_2 = 10$
Find: a)   Competitive equilibrium(here assume lots of identical firms): P, Q, CS, DWL
       b)   Monopoly: P, Q, CS, DWL
       c)   Cournot: P, Q, CS, DWL
       d)   Stackelberg: P, Q, CS, DWL
       e)   Bertrand: P, Q, CS, DWL

2) a) Indicate what is the Nash Equilibrium for the game below. Player 1 is the row player and player 2 is the column player.

	L	R
L	(2,2)	(5,0)
R	(0,5)	(3,3)

b) Suppose one plays a game that consists of repeating this one-shot game 10 times (so the one-shot game becomes a stage game). Describe in words the single Nash Equilibrium of the full game.
c) Let $\delta = (1+r)^{-1}$, the ususal discount factor for payments in the future if the interest rate is r.
Consider playing this game as an infinitely repeated stage game. Consider both players playing the Grim Strategy (R on first move, R if both players have played R on all previous moves, L otherwise). ECONOMICALLY explain IN WORDS why a high δ (a low r) is more likely to lead to players playing (R,R) every time than (L,L), and conversely why a low δ (high r) is more likely to lead to them playing (L,L) at each stage.
d) Find ALL δ's such that the Grim Strategy by each player will be a Nash Equilibrium in which the play at each stage is (R,R).
e) For all those δ's you found in d), describe a different Nash Equilibrium strategy pair and the play at each stage that would result from it.

3) Consider an economy that has one consumer and produces one good. Good q is produced from input m and the consumer consumes amount x of the produced good. The price of the input is 1 and the relative price of the produced good in p. The cost function for production is $\ln(1+q)$. The government pays a flat subsidy of 1 to the producer to produce. The consumer receives any profits from production (he owns the firm). The consumer's utility is
     $u(m,x) = m + x^{1/2}$.
a) The equilibrium solution is determined by two "programs" (max or min problems) and an equation. Give mathematically each program and the equation.
b) Say in words what each program and the equation represent economically.
c) Solve for the unknowns: λ (the sensitivity of maximum utility to relaxing the constraint), x, m, q, and p, and profits for the firm π. The math is straightforward and only a little messy, but if you get lost in the math be sure to write in words what one should do to solve the problem.

Long Question:

1. Evaluate Kaldor's trade cycle theory and discuss Chang & Smyth's formulization of it. Explain in what way it is more consistent with the structure of the argument in Keynes' *Treatise* rather than that in the *General Theory*.

Short Question: Answer one of the following two questions.

1. In the *General Theory*, Keynes' critique of what he called the "Classical" theory focuses on the orthodox analysis of labor and capital markets. Critically evaluate each of these arguments.

2. Discuss the Harrod-Domar growth model and explain the "knife-edge" instability problem.