

Name _____

**ECO361: LABOR ECONOMICS
FIRST MIDTERM EXAMINATION
OCTOBER 11, 2007**

Prof. Bill Even

DIRECTIONS.

The exam contains a mix of short answer and essay questions. Your answers to the 28 short answers of the exam (3 points each unless indicated otherwise) should be listed on the answer sheet attached to the end of the exam. Your answers to the essays (30 points total) should be provided in the space beneath each question

Consider the data below for September 2007 to answer the 4 questions that follow.

	(in 1000s)
Employed	146,257
Unemployed	7,207
Adult Civilian Noninstitutionalized population	232,461

Based on the data provided, provide numerical estimates of each of the following (round your answer to the nearest 0.1 percent, e.g. 7.3%).

- the unemployment rate
 - the labor force participation rate
 - the labor force
4. Given the above information, suppose that 5 million college students who were not in the labor force graduate from college and 4.5 million of these students find jobs whereas 0.5 million continue their search for a job. The effect of this change would be that the unemployment rate would (*rise, fall, not change*) and the labor force participation rate would (*rise, fall, not change*).
5. Given the above information (and ignoring what happened in question 4), suppose that 1 million elderly workers are laid off from their jobs and that .9 million of these workers retire and choose not to search for another job. This would cause the unemployment rate to (*rise, fall, not change*) and the labor force participation rate to (*rise, fall, not change*).

To answer the next 2 questions, consider the following information on the consumer price index (CPI). The base year for the CPI is 1983.

Year	CPI (1983=100)	Nominal Weekly Wage
1996	156.9	\$557
2004	188.9	\$757

- What is the real weekly wage in 2004 (stated in 1983 dollars)?
- Based on the information provided, a nominal weekly wage of \$557 in 1996 would have the same purchasing power as a nominal weekly wage of \$_____ in 2004.

Suppose that the daily output of a company that replaces car windshields is given by the table below:

Labor	Marginal Product
1	7
2	6
3	5
4	4
5	3
6	2

Assume that the firm receives \$100 for each windshield installation and a worker earns \$250 per day.

8. if the firm increases the number of workers from 1 to 2, it's profits would (*increase, decrease*) by \$_____.

9. what is the marginal revenue product of the second worker?

10. what is the profit maximizing number of workers?

11. Suppose that a firm is currently producing 100 units of output using a mix of labor and capital where the MP of labor and capital are 30 and 60, respectively, and the cost of a unit of labor is \$10 and the cost of a unit of capital is \$25. Which of the following conclusions would be correct?

- a. the firm is minimizing its cost of producing 100 units of output.
- b. the firm could lower its cost of producing 100 units of output by using more labor and less capital.
- c. the firm could lower its cost of producing 100 units of output by using more capital and less labor.

12. If carpenters and plumbers are gross complements, then an increase in the wage of carpenters will (*increase, decrease*) the demand for plumbers because the scale effect on the demand for plumbers is (*larger, smaller*) than the substitution effect.

- a. increase; larger.
- b. increase; smaller.
- c. decrease; larger.
- d. decrease; smaller.

13. Suppose that the government decides to finance national health care for every citizen by forcing employers to pay a tax of \$3 per employee hour. This payroll tax would result in a payroll tax of \$3 per hour on all employers that is proportional to the wages they pay their workers. Given the likely differences in the elasticity of demand for labor, this payroll tax will decrease equilibrium employment more in (*labor, capital*) and decrease equilibrium wages received by employees most in (*labor, capital*) intensive industries.

- a. labor; labor
- b. labor; capital
- c. capital; labor.
- d. capital; capital

14. Unions are generally thought to have more bargaining power when labor demand is more (elastic, inelastic) because any wage increases they negotiate would lead to (fewer, more) layoffs.

- a. elastic; fewer.
- b. elastic; more.
- c. inelastic; fewer.
- d. inelastic; more.

15. If the quantity of steel workers demanded falls from 5,000 to 4,500 when the equilibrium wage increases from \$15.00 per hour to \$16.00 per hour, the own-wage elasticity of demand for these workers is _____. (Round answer to nearest tenth).

16. If the labor demand curve for steel workers is given by $LD=6000-50W$, what is the elasticity of labor demand if the wage rate is currently 20? (round answer to the nearest one-tenth.)

17. According to the Hicks-Marshall laws of derived demand, labor demand becomes more elastic when product demand is more (elastic, inelastic) since the (scale, substitution) effect of a wage increase on labor demand would be greater.

- a. elastic; scale.
- b. elastic; substitution.
- c. inelastic; scale.
- d. inelastic; substitution.

18. According to the Hicks-Marshall laws of derived demand, labor demand becomes more elastic when labor is (larger, smaller) share of total cost because the (scale, substitution) effect of a wage increase on labor demand would be greater.

- a. larger; scale. b. larger; substitution. c. smaller; scale. d. smaller; substitution.

19. According to labor supply theory, if a worker's wage rate rises, she will work more hours only if

- a. the substitution effect dominates the scale effect.
b. the scale effect dominates the substitution effect.
c. the substitution effect dominates the income effect.
d. the income effect dominates the substitution effect.

ch. 6

To answer the next 3 questions, suppose that a defined benefit plan provides an annuity at retirement equal to 2 percent * years of service * final salary. Jerry started with the firm at age 35 and would have 30 years of service if he retires at 65, he would receive an annual benefit equal to 60% of his final salary. Assume that Jerry will live until age 80 and would therefore expect to collect 15 years of benefits if he retired at age 65; that there is a zero interest rate; and that his final salary will be \$100,000 regardless of when he retires.

20. For the pension to be actuarially fair, the pension would have to provide an annual benefit of _____ if Jerry postponed retirement from age 65 to 66.

ch. 6

21. The size of the actuarially fair increment in the pension decreases as interest rates (*rise, fall*) or as life expectancy (*rises; falls*).

- a. rise; rises. b. rise; falls. c. fall; rises. d. fall; falls.

ch. 6

22. Suppose that the generosity rate in the above pension was decreased from 2.0 to 1.8 percent per year of employment. If Jerry had originally planned to retire at age 65, this change in the benefit formula would

- a. lead to later retirement.
b. lead to later retirement only if the wealth effect dominated the substitution effect.
c. lead to earlier retirement only if the wealth effect dominated the substitution effect.
d. lead to earlier retirement.

ch. 6

23. A quasi-fixed labor cost is a cost that

- a. increases with hours per worker but not the number of workers.
b. increases with the number of workers but not the number of hours per worker.
c. is independent of the number of workers and the number of hours per worker.
d. increases with both hours per worker and number of workers.

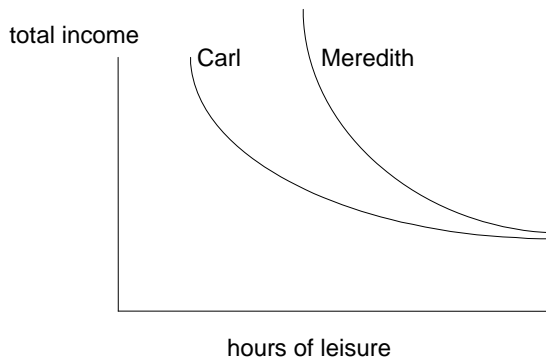
24. If a firm minimizes its cost of producing a given level of output, which of the following would cause the firm to hire fewer workers and have each worker work more hours per day.

- a. an increase in quasi-fixed costs.
b. a decrease in quasi-fixed costs.
c. an increase in the hourly wage rate.
d. both a and c.
e. both b and c.

25. Recall our class discussion of the black lung trust fund for coal miners. Compared to the miners in the surface coal industry, those in the underground coal industry:

- a. were more opposed to using a payroll tax to finance the trust fund because the substitution effect would be much larger in the underground coal industry.
- b. were more opposed to using a payroll tax to finance the trust fund because the scale effect would be much larger in the underground coal industry.
- c. were less opposed to using a payroll tax to finance the trust fund because the substitution effect would be much smaller in the underground coal industry.
- d. were less opposed to using a payroll tax to finance the trust fund because the scale effect would be much smaller in the underground coal industry.

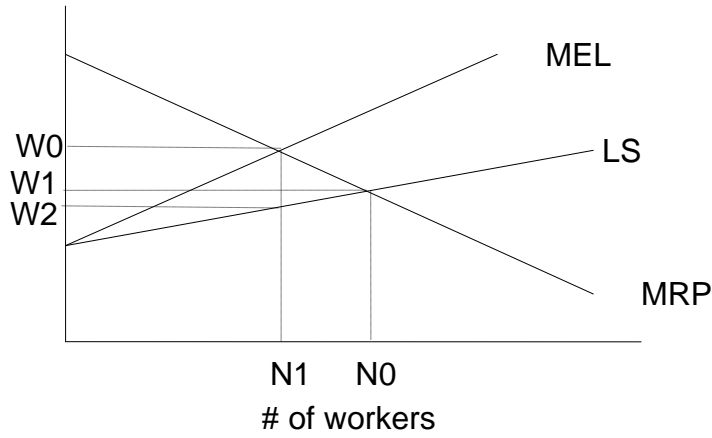
Consider the two indifference curves drawn below representing Carl and Meredith's preferences.



26. Given the indifference curves, it would be correct to conclude that:

- a. For any given number of leisure hours, Meredith is willing to give up an hour of leisure for less additional money than Carl.
- b. Meredith has a lower wage rate than Carl
- c. Carl has a lower reservation wage rate than Meredith
- d. all of the above.

Consider the diagram drawn below for a monopsonist to answer the two questions that follow.



27. The profit maximizing wage and number of workers for the above monopsonist is:
- a. W_0 and N_0
 - b. W_1 and N_1
 - c. W_2 and N_0 .
 - d. none of the above.
28. A minimum wage would cause the profit maximizing level of employment to
- a. rise if the minimum wage is anywhere between W_1 and W_2 .
 - b. rise if the minimum wage is between W_0 and W_1 .
 - c. fall if the minimum wage is above W_0 .
 - d. all of the above.

Short answer questions.

(Answer 3 of the next 4 questions.)

1. (5 points) Other things being the same, if there is an economic downturn that reduces a firm's product demand, the firm is less likely to layoff workers if there is specific training involved. Explain why this is true. (Feel free to draw a diagram if it assists with your explanation.)

When a firm invests in specific human capital, it must pay a worker a wage (W) that is less than her marginal revenue product (MRP) after the training is complete in order to recoup the costs of the training. When there is an economic downturn, MRP drops and the value of the worker to the firm declines. However, because of the initial wedge between W and MRP , it is possible for MRP to drop and yet remain above the worker's wage so that it is still profitable for the firm to retain the worker. Another reason that the firm may retain the worker is that if MRP drops below W , but the firm believes the downturn is temporary, it may be wise for the firm to retain the worker so as to avoid the cost of training new workers when product demand and MRP rises again.

2. (5 points) As discussed in class, some have argued that firms use deferred pay contracts to prevent unions from making unreasonable wage demands. Define deferred, provide an example of a form of deferred pay, and explain how such a contract could help prevent unions from making wage demands that could bankrupt the firm.

A deferred pay contract is one where a worker is paid a wage (W) below marginal revenue product (MRP) early in the career, but a $W > MRP$ later. The present value (PV) of the underpayments early in the career are offset by the PV of the overpayments later. An example of deferred pay is a pension plan or a promise of retiree health insurance where workers receive benefits only if they stay with the firm for a sufficiently long period of time.

When a union is part of a deferred pay contract, firm bankruptcy would mean that the union workers would lose all of the deferred pay – and thus have more to lose if the firm goes bankrupt than if there was no deferred pay.

3. (5 points) Explain why a firm would be willing to pay for a worker's specific training, but unwilling to pay for a worker's general training.

Define MRP as the worker's marginal revenue product at the firm that provides training, and MRP^ as the MRP at the worker's next best alternative. With specific training, a worker's $MRP > MRP^*$ because the training improves the worker's productivity only at the firm that provides the training. Consequently, after the training is complete, a firm that provides specific training can pay a wage (W) that is above what the worker can earn elsewhere (MRP^*) and yet below their MRP for the firm. The ability to pay $W < MRP$ and also retain the worker makes it possible for the firm to recoup its expenditures on the specific training.*

With general training, $MRP = MRP^$ because the training improves the worker's productivity at many firms. Consequently, the firm cannot pay $W < MRP$ after the training, or the worker would leave to another firm and receive their full MRP. Since the firm cannot pay $W < MRP$, it is impossible for the firm to recoup the cost of general training and the firm will be unwilling to pay for it.*

ch. 6

4. (5 points) Describe two changes to the Social Security system that are being "phased in" to encourage later retirement.

1. The normal retirement age is gradually be pushed back from age 65 to 67. The wealth effect of this change would encourage later retirement.

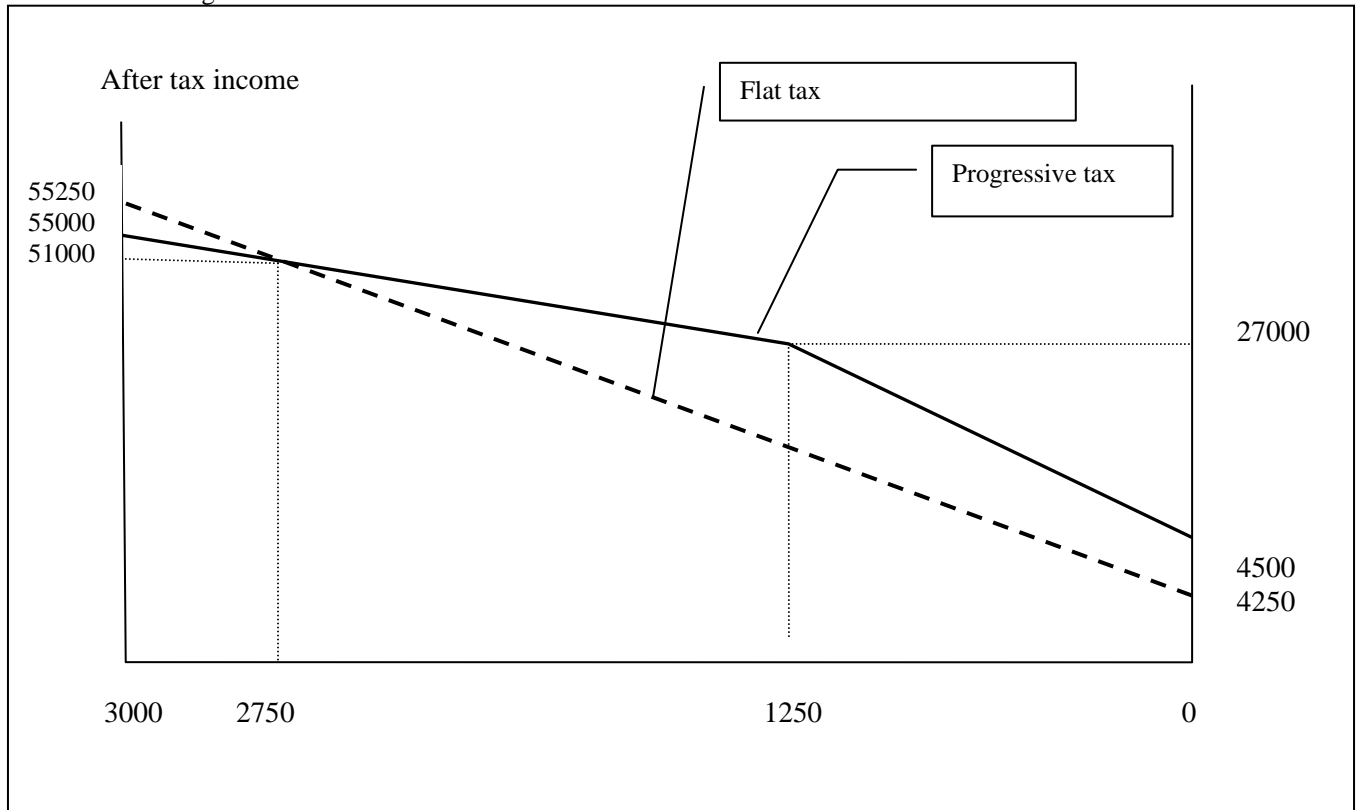
2. The delayed retirement credit (i.e. the increase in the monthly benefit) for postponing retirement beyond age 65 has increased over time. For someone that previously retired at age 65, the substitution effect of this change would encourage later retirement.

EVERYONE MUST ANSWER THIS QUESTION.

ch. 6

5. (15 points) This question is designed to make you think about how a switch from a progressive income tax to a flat tax would affect labor supply incentives. Suppose that a person can vary ANNUAL work hours between 0 and 3000 hours. John is offered an hourly wage of \$20 per hour and has nonlabor income of \$5000 per year. The U.S. income tax system is currently a progressive system. We'll simplify by assuming that the marginal tax rate is 10% on the first \$30,000 of income, and 20% on any income above \$30,000. Consequently, if John works 2000 hours, his total income would be \$45,000 (\$40k of labor earnings plus \$5k of nonlabor income) and his tax bill would be \$6,000 (10% * \$30,000 + 20% * \$15,000), resulting in after tax income of \$39,000.

a. Draw the budget line for John in the space below, but be sure to **measure after-tax income** on the vertical axis. Be sure to label important numeric information indicating vertical intercepts at both axes and the location of any "kinks" in the budget line.



b. Suppose that the government switches to a "flat tax" and levies a tax of 15% on all income. Draw the new budget line for John providing the same kind of numeric information as in (a) regarding vertical intercepts, kinks, etc. Be sure to make it clear in your drawing how this budget line differs from that for part a.

c. Describe the effect of this change in the tax system on John's labor supply. That is, discuss whether the income/substitution effects of this tax code change would encourage John to work more or less hours. If the answer depends on how much John was originally working, be sure to point this out.

The income and substitution effects depend on hours worked prior to the change from the progressive to the flat tax. The results are summarized below:

Prior hours	0-1249	1251-2749	2751-3000
Substitution effect	Less hours	More hours	More hours
Income effect	More hours	More hours	Less hours
Net effect	Ambiguous	More	Ambiguous

Consider now the differential effects for a high and low wage worker who both worked full time (say 2000 hours annually). For the **high wage worker** earning more than \$30,000 annually, the switch to the flat tax reduces the marginal tax rate (from 20 to 15%). For the **low wage worker** earning less than \$30,000, the marginal tax rate rises from 10% to 15%.

Just circle the correct answers for d & e.

d. **For the high wage worker**, the switch to the flat tax will lead to an income effect encouraging (*more, less*) work and a substitution effect leading to (*more, less*) work. [The income effect could go either way – it depends upon whether the person's total earnings were above or below \$60,000 since that would determine whether the switch to the flat tax increases or decreases after tax income, holding work hours constant.]

e. **For the low wage worker**, the switch to the flat tax will lead to an income effect encouraging (*more, less*) work and a substitution effect leading to (*more, less*) work.

NAME (Please print) _____ KEY _____

Answer Sheet

1	4.7%
2	66.0%
3	153,464,000
4	RISE; RISE
5	RISE; FALL
6	\$400.74
7	\$670.60
8	INCREASE \$350
9	\$600
10	5
11	B
12	C
13	A
14	C
15	1.6
16	-0.2
17	A
18	A
19	C
20	\$64,286
21	C
22	B
23	B
24	A
25	B
26	C
27	D
28	D