

**Test 2**  
**Economics 136 – Human Resources**  
**Spring 2001**  
**Prof. Julian Betts**

Name: \_\_\_\_\_

Student ID \_\_\_\_\_

There are 5 written problems in this exam, worth a total of 50 points. Please write neatly. If you place the answer to a question in an odd place, such as the back of the page, please indicate this clearly, for the sake of the marker.

*If you use pencil, the exam cannot be regraded. Also, if you wish to resubmit the test for regrading, you must do so within 5 days of the day the test is given back in class. The graders reserve the right to regrade the entire test if you submit the test for regrading.*

**SHOW ALL YOUR WORK, AND WRITE YOUR ANSWERS IN A WAY THAT THE GRADERS SHOULD BE ABLE TO UNDERSTAND! IN QUESTIONS WITH MATH YOU SHOULD ADD SOME WRITTEN EXPLANATION FOR WHAT YOU ARE DOING!**

**You have 80 minutes to complete this test. Good luck.**

For graders' use:

Question		Out of a Total of:
1		6
2		10
3		18
4		6
5		10
<b>TOTAL</b>		<b>/50</b>

*Show your work in all of your answers!*

1. (6 points) a) Explain in a sentence why a job applicant may have better knowledge of his likely productivity on the job than the prospective employer. (3 points)

b) Explain in a sentence why a prospective employer may have better knowledge of the job applicant's likely productivity in a specific job than the applicant himself. (3 pts)

2. (10 points) Suppose that you want to hire a tutor to help you study, and you place an ad in which you agree to pay the prevailing wage of \$15 per hour. Based on your past experience you believe that there are basically three types of tutors: bad, OK and great, but you can't tell this until you hire the tutor. Here is the value to you from hiring each type of tutor for one hour, and your best guess of the percentage of tutors of each type:

Type	Bad	OK	Great
Value of 1 hour of tutoring	\$0	\$20	\$30
Proportion of all tutors	0.5	0.3	0.2

*Assume that for the rest of this question you want to hire a tutor for a total of one hour.*

a) If you hire a tutor randomly, what is the expected net benefit to you? (Think of the benefit as the value of the tutoring minus the cost.) (4 points)

*Show your work in all of your answers!*

b) Suppose that for \$6 you can buy the official “UCSD Guide to Tutor Quality”, which will tell you whether a tutor is “Bad” or “O.K. or Great”, for every tutor on the market. Suppose that you buy the guide and then hire an “O.K. or Great” tutor for one hour. What is the expected net benefit of buying the screening guide and hiring a tutor in this case? Do you prefer to take your chances, as in part a), or to buy the guide? (6)

3. (18 points) You have been hired by Acme Yoyo Company to create a piece rate system for workers that will maximize profits. Workers’ utility is given by

$U = \text{earnings} - 3E^3$  where  $E$  is effort expended by the worker.

Workers will work for the company if utility is at least 0.

Revenue per worker is simply  $E$ . You are asked to design a piece rate system where  $\text{earnings} = \alpha + \beta E$ .

a) Solve the worker’s problem, make sure that you take the second-order condition to verify that you have maximized utility for the worker. Your final answer should be an equation for optimal effort  $E$  as a function of  $\alpha$  and/or  $\beta$ . (4 points)

*Show your work in all of your answers!*

b) Taking account of your answer to a) solve for the optimal  $\beta$  that the firm should set to maximize profits. Does your answer imply that the firm should pay a commission that is below 100% of net revenues, equal to 100%, or greater than 100%? (7)

c) Given that workers must receive net utility of at least zero, how should the firm set  $\alpha$ ? What will profit per worker be? (4)

*Show your work in all of your answers!*

d) Write down an alternative payment system that will generate the same output and profits, where workers are paid a straight salary subject to the worker meeting an output quota each period. (Assume that the costs of monitoring the number of yoyo's produced are zero.) (3)

4. (6 points) You have three workers at your firm and two divisions, sales and manufacturing (labeled as S & M below). By rotating workers through both divisions, you have determined that the addition to net revenues generated by each worker is as follows:

Worker	Net revenues in S	Net revenues in M
1	80	30
2	100	200
3	50	30

Your company needs two workers in manufacturing and one in sales. First, state the rule that your company should follow to maximize profits. Then, use this rule to determine the optimal allocation of workers between divisions.

*Show your work in all of your answers!*

5. (10 points) You are a financial consultant, and receive a request from somebody to help her decide whether to return to college. She expects to work two more years before retiring. If she does not return to college, she expects to earn \$40,000 each year. If she goes to college then she will earn nothing this year but \$100,000 in the following year before retirement. Tuition and books would cost \$5000. She discounts income and costs that occur next year with a discount rate of 25%.

a) Calculate the present discounted value of the two paths, college and no college. What do you advise her to do? (7)

*Show your work in all of your answers!*

b) Identify the two types of cost associated with going to college. Which is the larger type of cost for her? (3)