

Test 2
Economics 136 – Human Resources
Spring 2000
Prof. Julian Betts

Name: _____

Student ID _____

There are 3 written problems in this exam, worth a total of 75 points. This includes 10 bonus points from a bonus question, so in theory you could get a grade of 85/75. 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.

**SHOW ALL YOUR WORK, AND WRITE YOUR ANSWERS IN A WAY
THAT THE GRADERS SHOULD BE ABLE TO UNDERSTAND!**

You have until 10:55. Good luck.

1. (25 points) You have six workers at your firm (Maytag washers) and two divisions, sales and repair (S & R). 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 R
1	20	10
2	3	10
3	50	49
4	10	5
5	5	10
6	19	10

a) (6 points) Assuming that you can vary the size of both divisions in any way you want costlessly, who should work in R and in S? What are net revenues for the entire company? Explain your reasoning.

b) Suppose instead that because so few Maytag washers ever need repair, you find that you need only one worker in Repair, with the other 5 in Sales.

i) (4 points) State the general rule for worker assignment under which you will maximize net revenues for your firm.

ii) (4 points) Apply this rule to the above problem, identifying the one worker who should work in repair. What are net revenues now?

iii) (6 points) After you have made your allocation decision, you get an angry phone call from the manager of the Repair division. He complains that you did not assign worker 3 to his division, even though she was almost five times as productive in repair as any of the other workers. In a calm voice, explain your reasoning to your manager.

c) (5 bonus points) Circle the answers below that most closely resemble the general lessons we learned about when it is more worthwhile to screen applicants for jobs,

It is MORE worthwhile to screen job applicants when

- i) the % of workers who are highly unproductive is (LARGE/SMALL)
- ii) the costs of screening each worker are (LARGE/SMALL)
- iii) the variations in worker productivity are (LARGE/SMALL)
- iv) the costs of firing unproductive workers are (LARGE/SMALL)
- v) if workers know their own productivity (EXACTLY/NOT AT ALL)

2. (30 points)

a) (2 points) In a sentence or two, list the two main advantages of paying workers using piece rates (i.e. variable pay).

b) (3 points) In a sentence or two, list the three main advantages of instead paying workers a fixed salary.

c) (20 points) A firm is trying to establish a wage $=a+bE$ where E is worker effort and a and b are to be chosen by the firm. The worker maximizes utility which is given by $\text{wage} - 5E^2$ or $U = (a+bE) - 5E^2$, where the latter term reflects the cost of effort to the worker. Each unit of effort E produces 6 units of output, which can be sold for \$2 per unit. But additional worker effort of 1 unit also leads to additional material costs for your firm of \$1, and additional energy costs of \$1. Assume that the worker's utility must be at least zero for him or her to accept the job. Calculate the profit maximizing values of a and b , and the optimal effort E and profit π that results.

d) (5 bonus points) In c) above we assumed that the worker had to receive utility of at least 0 in order to accept the job. This might apply during a recession in which few jobs were available. Suppose instead that each worker will accept the job only if utility equals 5 units, i.e. $U=5$. How will the optimal values of a , b , E and π change as a result? (Hint: You can save a lot of time by “eyeballing” the logic in your answer to c) and then writing down what does and does not change, and why.)

3. (30 points) Assume that a worker works for two periods, and chooses the job that maximizes the sum of her earnings. She can earn \$20 per period at any other job in the economy on average. At your firm you supply workers with training, which lowers their contribution to net revenues to \$15 in the first period, but which increases their contribution to net revenues to \$25 in the second period. The training is equally valuable at your firm and other firms in the economy.

a) (20 points) Prove that all of the costs of training, and the benefits in period 2, must be paid by or given to the worker respectively. That is, derive the wages that must be paid in each period. Show your work and your reasoning.

b) (10 points) Explain why if the training instead imparts general skills, it is best for the wage in both periods to be part way between what you derived in part a) and the industry-wide average of \$20. For full points, explain why the answer in a) will fail to work, and why at the other extreme paying \$20 per period cannot work either.