Test 1
Economics 136 – Human Resources
Spring 2007
Prof. Julian Betts

April 18, 2007

Name: _____

Student ID _____

There are 3 written problems in this test, worth a total of 25 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 graders.

      If you use pencil, the exam cannot be regraded. If you do submit your test for
regrading, you must do within the time and other guidelines listed in the syllabus.

      SHOW ALL YOUR WORK!

      You have 50 minutes. Good luck.

For the graders:

1.   _____/10
2.   _____/3
3.   _____/12
SUM   _____/25

1. (12 points) You are the sole owner of a surfboard manufacturing firm. Currently, you sell 32 surfboards a day and because of liquidity constraints you cannot currently expand your operation. Also, because you directly supervise your workers, as you hire more workers you get spread a bit too thin and output rises at a declining rate.

You use two different types of workers to help sell your surfboards. College educated workers with lots of Internet experience work with a commercial database to identify likely buyers of your surfboards throughout California. They give this information to high school educated salespeople/surfer bums, who go door to door and beach to beach selling your surfboards. Based on experimentation, you estimate that sales depend on both types of workers. Letting C = number of college educated workers and H = number of high school educated workers, you have found that the production function is given by $Q=C^{0.25}H^{0.5}$ where Q is sales per day.

a) Given this production function, at the firm in question do workers work independently of each other or in an interdependent fashion? Explain in a sentence. (2 points)

b) Suppose that there is no capital cost in this business, so that the total cost of hiring one worker with college or high school education is given by the corresponding wage rates $80 and $10 (per period) . Write down the Lagrangean and take the first-order conditions. Then use the first order conditions to calculate the cost-minimizing number of workers of each type, C and H.   (7 points)

c) Draw a graph that shows the shape of the isoquant and isocost line, and illustrate the optimal combination of C and H for the given production level in problem b). You do not need to derive the general equation for the isoquant. Instead just show the general shape. For the isocost, do state the formula for the slope AND intercept. (3)

2) (3 points) The Scottish Baseball League is a (very small) professional league, that requires each team to spend no more than $100 million on salaries per year. The Glasgow Haggis team is in serious trouble, because it has 3 players on long-term contracts, each of whom makes an astounding $30 million per year. This leaves almost nothing for the rest of the players.

Adding to the Haggis' problems, although each of these 3 players was truly a superstar when he signed his long term contract, at present only one player is playing better than when he signed the contract, one is playing slightly worse, and one is playing terribly. The following table shows you what the team would pay each of its superstars if it could re-negotiate their contracts today:

Player	Quality of Current Play	How Much the Haggis Would Re-sign these Players for Today if it Had to Re-negotiate
McRodriguez	Outstanding	$40 million per year
McMaddux	OK	$20 million per year
O'Jeter	Terrible	$3 million per year

The team needs to get rid of some of these players, but cannot do so unless both the team and the player in question agree to end the contract.

Team management has a brilliant idea: why not offer a one-time payment of $5 million to any of these three top-paid players who agrees to leave the team? The reasoning is that this would free up $30 million in salary this year and in future years as well.

Which of these 3 players is most likely to take the offer and leave the team, and which is the least likely? Why? Of what human resources problem is this an example (hint—I'm looking for a two-word economic term)? (3 points)

3) (10 points) Suppose that the labor force in your region consists of four types of workers whose productivity ranges between $5 and $20 an hour as shown below. The column on the right shows the proportion of the population that is in each category. At present there is only one type of firm, which pays a piece rate. Because it is costly to monitor output, these "piece rate" firms deduct $5 per hour for the costs of monitoring.

Worker Type	Productivity per hour	Proportion of the population
A	$5	0.1
B	$10	0.4
C	$15	0.4
D	$20	0.1

Note that these firms earn zero profits per worker, although they will presumably earn the average return on their capital.

a) Suppose that some firms decide to start paying a fixed salary per hour, and that their goal is to hire the greatest proportion of the population that they can. What hourly wage will they pay, and which types of workers above will choose to work for these fixed-salary firms? Assume that through competition, these fixed-salary firms earn zero profits per worker. (4 points)

b) Draw a graph of earnings per hour plotted against productivity per hour, and clearly indicate which types of workers choose the fixed salary and which choose the piece rate firms. (2 points)

c) Now, suppose that the piece-rate firms adopt new computer technologies that make it cheaper to monitor the output of their workers. Now, instead of deducting $5 per hour per worker, they need to deduct only $3 per hour. How, if at all, will the fixed hourly salary alter in the fixed-salary firms, and how, if at all, does the types of workers change after this technological change?

How about the piece-rate firms? Who works for them now, and what do they earn?

Be sure to explain your answers in a sentence or two. (4 points)