Jeans East is a manufacturer of designer jeans. The operations manager has requested your advice to help him determine the size of the new factory that the company is proposing to build. The company wishes to investigate 3 different levels of demand (pairs of jeans per annum) from the factory: 20 000, 50 000, and 100,000. The following payoff table has been constructed:

Demand	Small	Medium	Large
20,000	$-75000	$-125000	$-175000
50,000	$100000	$175000	$100000
100,000	$100000	$225000	$300000

The operations manager assess the probability of the different levels of demand as follows:

Demand	P(x)
20,000	0.3
50,000	0.5
100,000	0.2

a) Calculate the expected monetary value (EMV) for each possible factory size..
Which size factory would you select to maximise the expected monetary value?

Question 1 continued

b) Calculate the Expected Value of Perfect Information (EVPI) for this decision-making scenario.

c) The operations management has discovered that the jeans can be manufactured overseas removing the need of a factory but will incur other operating costs. The profit for each level of demand are as follows:

Demand	Overseas
20,000	$30000
50,000	$100000
100,000	$200000

Calculate the EMV for the overseas option. Should they move their operations overseas?

Question 2 (3 + 2 + 3 = 8 marks)

The time required to assemble an electronic component is normally distributed, with a mean and standard deviation of 17.6 minutes (μ) and 4.9 minutes (σ) respectively.

a) Find the probability that a particular assembly takes between 10 and 20 minutes.

b) The fastest 10% of workers to assemble their component, receive a prize.

What is the time to beat, for a worker to receive a prize?

c) The person assembling the components works for 10 hours each day. Find the probability that they will be able to assemble 36 electric compnents in a normal day. That is, find the probability that the total time to assemble 36 components is less than 10 hours.

Hint: Find the average number of minutes per component.

Question 3 (4 + 3 = 7 marks)

a) The average pizza delivery times are normally distributed with a known population standard deviation of 6 minutes. A random sample of 28 pizza deliveries is taken and has a sample mean delivery time of 26 minutes. Find a 90% confidence interval estimate for the population mean delivery time.

b) A certain pay television company wishes to estimate the proportion of its customers who would purchase a pay television program guide. To do this, the company manager decides to select a random sample of customers and note the number who would purchase a program guide. Suppose that experience in other areas suggests that about 41% of customers will purchase a program guide.

How many customers should the company manager include in his sample if he wishes to estimate the true proportion who will purchase the program guide correct to within 1% (0.01) with a confidence level of 99%?

Question 4 (7 marks)

A courier service advertises that its average delivery time is less than 8 hours for local deliveries. A random sample of times for 10 deliveries to an address across town was recorded. These data are shown here (in hours).

9, 9, 10, 6, 6, 7, 7, 7, 4, 4

Assume that the times are normally distributed. Is this sufficient evidence to support the courier's advertisement, at the 5% level of significance?