Version A

1. (a) Total costs of treatment: 7,000,000 + 14,000,000 = 21,000,000
Total benefit is 2,400 life years or 0.75 x 2,400 = 1,800 QALYs.
Cost benefit analysis. MB = 30,000 x 1,800 = 54,000,000 Euros.
This is worthwhile since it exceeds MC = 21,000,000 Euros.

(b) Cost-utility: Marginal cost of one QALY = 21,000,000 / 1,800 = 11,667 Euros.
This is worthwhile since it is less than 30,000 Euros.

(c) This table is from the Sixth Stool Guaiac Example for early detection of colon cancer.
The marginal cost per cancer case detected is $3,804 for the first test, $26,335 for the second test, $213,056 for the third test and $1,734,722 for the fourth test. Clearly any more than three tests is not worthwhile (and given the much lower value of a dollar in 1975 even the third test is questionable).

2. (a)

(b) High deductible and coinsurance/payment for most services (other than essentials such as vaccinations and a couple of doctor visits per year)
with a cap so that serious medical incidents are fully covered on the margin.

(c) The upper curve shows that as percentage covered goes up the premium per unit of coverage goes up due to moral hazard (and this moral hazard problem is increasing in the coverage level). The lower curves show utility trade-off with lower curves preferred - more cover at cheaper price. (The slope is decreasing in level of cover due to diminishing marginal utility). The tangency is at an interior point showing that person chooses less than full insurance.

3. (a)
3. (b) Phase I: A few people to determine tolerable dose
Phase II: 30-300 patients studied for 2 years on average to determine safety and efficacy
Phase III: 1,000’s of patients for 3 years on average in double-blind trials (if possible) to better
measures efficacy (and further ensure safety).

4. (a) False It provides a constructive estimate.
(b) False A higher discount rate reduces the present discounted value of life years saved.
(c) True The rates vary considerably across regions.
(d) True Often close to $10 million.
(e) False It is due to greater use of medical technology.
(f) False By law Medicare is prevented from doing this.

5. (a)(i) That improvements in treatment of heart attack were worthwhile, with net benefit (and
MB seven times MC).
(ii) Several answers possible here. The year of life saved is in the future, so discounts from
$100,000 to $70,000. And because live longer have more medical costs later on (of $25,000).

(b)(i) A QALY is a quality-adjusted life year.
(ii) QALY’s provide a standardized measure of health output. One can then compare different
treatments on the basis of costs per QALY. This can avoid, or at least reduce, the need to place a
value on a year of life.

(c)(i) If it is approved for use by the FDA (and in some cases if there is no better drug that is
cheaper).
(ii) A QALY league table lists the cost per QALY of treatment versus no treatment for a range of
medical conditions.

Multiple choice
Question 1 2 3 4 5 6
Answer a a c b a c

Q4.: $0.9 \times (1+1/1.25) = 0.9 \times 1.8 = 1.62.
Q5.: 2,000 \times (1,000 / 2) = 1,000,000.

Scores out of 36 Curve (Indication only: Course Grade is based on Total Score!)
(Ave GPA 2.72 on this curve)

75th percentile 26 (72 %) A+ 31 and above C+ 21 and above
Median 24 (67 %) A 28 and above C 19 and above
25th percentile 20 (55 %) A- 26 and above C- 18 and above
B+ 25 and above D+ 17 and above
B 23 and above D 15 and above
B- 22 and above D- 14 and above