Answer all questions in the space provided on the exam. 
Total of 57 points (and worth 44.5% of final grade). 
Read each question carefully, so that you answer the question.

Multiple Choice (1 points each question)

CIRCLE ONE

1. a b c d e
2. a b c d e
3. a b c d e
4. a b c d e
5. a b c d e
6. a b c d e
7. a b c d e
8. a b c d e
9. a b c d e
10. a b c d e
11. a b c d e
12. a b c d e
13. a b c d e
14. a b c d e
15. a b c d e
16. a b c d e
17. a b c d e
18. a b c d e
Short Answer (6 points each question)

1. (a) On an appropriate diagram show the impact on individual consumer well-being of a health shock that leads to increased ability to produce health capital.

(b) Consider the following data from the Manning et al. paper. “Health Insurance and …”

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Free</td>
<td>4.55</td>
<td>340</td>
<td>.128</td>
<td>409</td>
<td>86.8</td>
<td>10.3</td>
<td>749</td>
</tr>
<tr>
<td></td>
<td>(.168)</td>
<td>(10.9)</td>
<td>(.0070)</td>
<td>(32.0)</td>
<td>(.817)</td>
<td>(.45)</td>
<td>(39)</td>
</tr>
<tr>
<td>25 Percent</td>
<td>3.33</td>
<td>260</td>
<td>.105</td>
<td>373</td>
<td>78.8</td>
<td>8.4</td>
<td>634</td>
</tr>
<tr>
<td></td>
<td>(.190)</td>
<td>(14.70)</td>
<td>(.0090)</td>
<td>(43.1)</td>
<td>(1.38)</td>
<td>(0.61)</td>
<td>(53)</td>
</tr>
<tr>
<td>50 Percent</td>
<td>3.03</td>
<td>224</td>
<td>.092</td>
<td>450</td>
<td>77.2</td>
<td>7.2</td>
<td>674</td>
</tr>
<tr>
<td></td>
<td>(.221)</td>
<td>(16.8)</td>
<td>(.0116)</td>
<td>(139)</td>
<td>(2.26)</td>
<td>(0.77)</td>
<td>(144)</td>
</tr>
<tr>
<td>95 Percent</td>
<td>2.73</td>
<td>203</td>
<td>.099</td>
<td>315</td>
<td>67.7</td>
<td>7.9</td>
<td>518</td>
</tr>
<tr>
<td></td>
<td>(.177)</td>
<td>(12.0)</td>
<td>(.0078)</td>
<td>(36.7)</td>
<td>(1.76)</td>
<td>(0.55)</td>
<td>(44.8)</td>
</tr>
</tbody>
</table>

(i) What do we essentially learn from this table?

(ii) Calculate the arc price elasticity of demand for outpatient expenses based on movement from the 50 percent plan to the free plan.

(c)(i) What is the economic advantage of paying healthcare providers using a prospective payment system?

(ii) Explain physician-induced demand and its likely consequences.
2.(a)(i) Susan believes she faces health costs in the current year of either $5,000 with probability 0.8 or $20,000 with probability 0.2. She can purchase complete insurance for $8,000. Is this premium actuarially fair? Explain your answer.

(ii) Suppose an insurance company sells insurance to 100 people who face the same distribution of health costs as does Susan. What interval will the average claim per individual insured person lie in with probability 0.95?

(b)(i) Define adverse selection.

(ii) Explain the major consequence for health policy of the presence of adverse selection.

(c) For the diagram below: Compare no health insurance to a health insurance policy with 50% coinsurance.

(i) The change in total medical expenditures due to insurance is given by which combinations of areas A, B, C, D, E, F and G?

Answer:

(ii) The welfare loss due to moral hazard is given by which combinations of areas A, B, C, D, E, F and G?

Answer:
3.(a) Data from a drug trial found that a drug led to improvement in a fraction 0.44 of those who received a drug with a standard error of 0.08, while the placebo led to an improvement in a fraction 0.30 of those who received the placebo with a standard error of 0.06. Is the difference statistically significant at significance level 5 percent? Explain your answer. [Note: \( T = \frac{m_1 - m_2}{s} \) where \( m_1 \) and \( m_2 \) are sample means and \( s \) equals the square root of \( (s_1^2 + s_2^2) \). The critical value for a two-sided test is 1.96.]

(b) Suppose that a person with terminal cancer has the following options:

- Do nothing: spend nothing and live two more years with each year worth 0.4 of a year in perfect health.
- Passive treatment: spend $40,000, live four more years with each year worth 0.5 of a year in perfect health.
- Aggressive treatment: spend $200,000, live ten more years with each year worth 0.6 of a year in perfect health.

With adjustment for quality of life, which treatment – passive or aggressive – is most preferred to no treatment on cost-effectiveness grounds? Explain your answer. For simplicity there is no need to discount.

(c) Consider the following screening test for cancer applied to 100,000 people, 100 of whom have cancer. Each test costs $20, picks up 80% of cancer cases, and additionally 10% of the time falsely diagnoses cancer. Detection of cancer (rightly or wrongly) leads to a further exact diagnostic test that costs $200. Correct early detection of cancer by the test is valued at $20,000. Is the first test worthwhile? Explain your answer.
4. Circle True or False to each of the following statements [One point each.]
   (a) True   False  The coinsurance rate under the Bronze Plan is 60 percent.
   (b) True   False  Under Obamacare it is expected that more people will get health insurance through Medicaid.
   (c) True   False  Under both FFS and HMO insurance there is a gatekeeper.

5.(a) For each of the following forms of national health insurance market state one substantial economic problem (other than access/equity).
   (i) completely private

   (ii) universal government.

(b) Provide two ways that a national health insurance system may try to ration health care (other than through price).
   (i) first way

   (ii) Second way.

(c)(i) State the essential features of the Beveridge system.

(ii) State the essential features of the Bismarck system.
6.(a)(i) Consider testing of chemicals for potential carcinogens. To properly test each chemical costs $20 million. If Q chemicals are tested a typical household places value $(1 - 0.02 \times Q)$ on each chemical tested. There are 100 million households in the U.S. What is the socially optimal number of chemical tests that should be sponsored by the National Institutes for Health.

(ii) Provide two major examples of public goods in the health sector.

(b) Consider vaccination against a contagious disease. If a person is vaccinated there is a direct benefit to the person (they are less likely to get the disease), as well as an indirect benefit to others (someone vaccinated is less likely to pass the disease to others. Vaccination costs $40. Show on an appropriate diagram that a competitive market will lead to too few people having vaccinations. On the same diagram show the welfare loss to society.

(c)(i) State the main negative aspect for health care of government laws providing patent protection.

(ii) State the main positive aspect for health care of government laws providing patent protection.
7. (a)(i) In a world with no health insurance is the problem of obesity just a standard example of an externality? Explain.

(ii) Summarize the trend in obesity over the past forty years.

(b) Consider the paper by Chou et al. “An Economic Analysis of Adult Obesity”.

(i) Chou et al.’s model for BMI (with mean 26) includes a quadratic in alcohol price (with mean 1.0, and estimates BMI = ... + 1.1 alcoholprice - .7 alcoholprice^2 . Provide an estimate of the elasticity of BMI with respect to alcohol price.

(ii) What is the major criticism of the study by Chou et al.?

(c)(i) How does life expectancy in the U.S. compare to that in other major developed countries?

(ii) Provide a plot of life expectancy at birth against country per capita income for the full range of countries (from very poor to very rich).
Multiple Choice (1 points each)  
Note: You should spend 30% of time on these!

1. Government in 2014 pays for roughly  
   a. one-quarter of U.S. health expenditures  
   b. one-half of U.S. health expenditures  
   c. three-quarters of U.S. health expenditures  
   d. all of U.S. health expenditures

2. The marginal efficiency of capital curve is used to demonstrate  
   a. individual choice of the level of health capital  
   b. individual choice of whether to invest in training as a doctor  
   c. health care is a superior good  
   d. none of the above.

3. Doctor’s pay in the U.S. is high due to  
   a. high return on training  
   b. high training costs  
   c. neither a. nor b.  
   d. both a. and b.

4. If utility is 80 when X=10, 140 when X=20, 180 when X=30 and 200 when X=40 then expected utility when X=10 with probability 0.25 and X=40 with probability 0.75 is  
   a. 80  
   b. 140  
   c. 180  
   d. none of the above

5. The article by Neuhauser and Lewicki, “What Do We Gain from the Sixth Stool Guaiac?” found that  
   a. the marginal benefit of the second test was negative  
   b. the marginal benefit of the third test was negative  
   c. the marginal benefit of the fourth test was negative  
   d. none of the above.

6. For a pharmaceutical company selling a patented drug in different countries we expect  
   a. a higher price in countries with more price elastic demand  
   b. a higher price in countries with less price elastic demand  
   c. similar price across countries (assuming similar MC across countries)  
   d. any of the above is likely.
7. In the study by Cutler and McClellan on Technology
   a. A specific value was placed on a year of life
   b. A specific value was placed on the discount rate
   c. neither a nor b
   d. both a and b

8. Phase III drug trials to show a drug is safe and effective are required for
   a. the original developer of the drug
   b. manufacturers of a generic version of the drug after it comes off patent
   c. both a. and b.
   d. neither a. nor b.

9. The economic rationale for patent protection for prescription drugs is
   a. internalization of a positive externality
   b. privatization of a public good to make it excludable
   c. redistribution of income to wealthy corporations
   d. creation of a monopoly that will maximize consumer surplus

10. Medicare Part B (physician and outpatient) is provided
   a. free to those eligible
   b. at heavily subsidized insurance rates to those eligible
   c. at actuarially fair insurance rates to those eligible

11. In deciding on the optimal provision of a nonexcludable public good the major challenge for government policy-makers is
   a. determining social marginal cost
   b. determining social marginal benefit
   c. neither of these is relevant

12. For Medicare Part D for Yolo County
   a. there are few plans to choose from and one of them is clearly the best
   b. there are few plans to choose from and it is nonetheless unclear as to which is best
   c. there are many plans to choose from and one of them is clearly the best
   d. there are many plans to choose from and it is very unclear as to which is best
13. A Pigouvian tax is a tax that
   a. leads to socially optimal production of a pure public good
   b. leads to socially optimal production of a good produced with a negative externality
   c. both a. and b.
   d. neither a. nor b.

14. The Coase Theorem suggests that
   a. assignment of property rights may solve the externality problem
   b. assignment of property rights may solve the free-rider problem
   c. both a. and b.
   d. neither a. nor b.

15. Total economic cost of disease is composed of
   a. epidemiological cost
   b. excess burden of costs taken to avoid disease
   c. both a. and b.
   d. neither a. nor b.

16. The SIR model is
   a. a model of vaccination rate
   b. a model for once-only infectious diseases over time
   c. a model for annually recurrent infectious diseases over time
   d. a model of a voice recognition system that was ultimately included in an iPhone.

17. In the U.S. obesity has become a major health policy issue over the past twenty years because
   a. even though obesity rates have changed little in the past twenty years, there is much greater knowledge of the adverse health consequences
   b. obesity rates have increased greatly in the past twenty years
   c. most other health problems have been solved, so attention has turned to obesity.

18. A person is deemed obese if
   a. BMI > 15
   b. BMI > 20
   c. BMI > 25
   d. BMI > 30