School of Public Health
Department of Epidemiology

Epid. 160   Final Examination   January, 1966

Name of Student _____
                        (Please Print)

Instructions:

1. This examination consists of 21 questions.

2. The first 14 questions are multiple choice for which there is only one best
    answer.

3. For these 14 questions circle the letter next to the one answer you consider
    correct.

4. The remaining 7 questions are either multiple choice for which there is more
    than one correct answer, or you are required to construct a table, or fill
    in numbers. Please follow instructions for each question.

5. Some questions count more points than do others. The points for each
    question are shown in the right hand column of each page.

6. When you are finished sign this pledge:

        I have neither given nor received help during this examination.

        (Signed) _____

1. If you knew that during the period of one year in a city of
   2 million people there were 1000 cases of a particular disease:

   a. This would be important information as it would indicate
      that the disease was serious.
   b. This would be important information as it would indicate
      that the diseases was not serious.

   c. By itself this would have little meaning without some
      form of comparison

   d. By itself this would have little meaning without knowing
      the prevalence rate of that disease.

2. The admissions form to be used for a general hospital had
   the following categories:

Liver diseases	Gastro intestinal diseases
Lung diseases	Heart Diseases
Infectious diseases	Accidents

   The components in this classification are:

   a. Mutually exclusive and exhaustive

   b. Not mutually exclusive but exhaustive

   c. Mutually exclusive but not exhaustive

   d. Neither mutually exclusive nor exhaustive

3. If you knew that in the U.S. the incidence rates of
   coronary heart disease were two times higher in
   middle aged men than they were in women of the same age,
   you could conclude from these data that:

   a. Men are under greater stress than women

   b. Coronary heart disease is not related to age alone

   c. The female sex hormone exerted a protective influence

   d. The male sex hormone exerted a deleterious influence

4. In a city of 100,000 people the only knowledge available for
   a particular year about a given disease is its incidence and
   prevalence rate. This knowledge could most appropriately be
   used in:

   a. Determining the type of health services needed

   b. Isolating the etiological factors responsible for the disease

   c. Predicting the death rate

   d. determining the effectiveness of the control program

5. The incidence and prevalence rates of a particular disease
   in a defined community were as follows:

Year	Incidence per 100,000 Population	Prevalence per 100,000 population
1940	310	500
1944	290	498
1948	270	510
1952	250	495
1956	230	500
1960	190	490

Which of the following statements is correct?

a. Recovery from this disease is becoming more rapid

b. The disease is becoming more short-term with
   increasing mortality

c. The disease is becoming more long-term (chronic)
   with decreasing mortality

d. There is an error in data gathering

6. The following are the results of a study of the factors
    associated with response to a mass X-Ray program:

Table 1. Response to Mass X-Ray by Place of Residence

Residence	Percent Population Responding
Urban	75%
Rural	46%
All Residences	53%

Table 2. Response to Mass X-Ray by Educational Level

Education Level	Percent Population Responding
College Grads.	82%
High School Only	68%
Elementary School Only	43%
All Educational Levels	53%

Table 3. Percentage of Persons in Each Sub-Group
(Residence by Educational Level) Participating
in Mass X-Ray Program

Residence	Educational Level			
	College Grads.	High School Only	Elementary School Only	All Educational Levels
Urban	83%	67%	43%	75%
Rural	81%	69%	43%	46%
All Residences	82%	68%	43%	53%

From these data it would be correct to infer that:

a. The better educated people have a higher response rate
   because more of them are urban residents

b. Urban residents have a higher response rate than do
   rural because more of the urban residents have higher
   education levels

c. No inferences can be drawn from these tables as none of
   the percentages add to 100%

7. For a particular county all mothers giving birth to a first child during a particular year were classified by place of residence (urban or rural) and by social class. The <u>mean birthweights</u> of the babies were tabulated as follows:

Mean Birthweights in Grams by Maternal Place of Residence and Social Class

Place of Residence	Social Class		
	Low	High	All Classes
Rural	3300	3682	3384
Urban	3319	3669	3592
All Places	3303	3671	3475

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If these data were available and a new investigation was being planned to search for the causes of low birth weight, would it be more logical to start this search:

a. By attempting to identify the relevant factors in rural way of living as contrasted to urban.

b. By attempting to identify the relevant factors in the way of life of low social class people as compared to high social class.

c. By attempting to identify the relevant factors in rural way of living and low social class as compared to urban and high social class.

d. To ignore both place of residence and social class status as neither of these are associated with birthweight.

8. It has been discovered that tuberculosis is most prevalent in the lower socioeconomic groups in the U.S., and that disordered social relationships often precede the development of frank tuberculosis symptomatology. Does this most likely indicate that:

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a. The tubercule bacillus is unimportant in the etiology of the disease.

b. That the cause of tuberculosis is poverty.

c. That the cause of tuberculosis is social and psychological stress.

d. None of the above.

9. A new environmental agent suspected of being able to produce cancer was identified. To determine whether exposure to this agent did increase the risk of developing cancer a longitudinal study was started. A random sample from the population was selected and examined to make sure they were free from cancer, 9920 individuals were thus identified as being eligible for study (i.e. as being free of cancer). Of these, 1000 had been exposed to the new environmental agent and the remainder had not. The entire sample was followed for 5 years with the following results:

Exposure to Environmental Agent	Number of Cases Cancer Over 5 Years	Number Without Cancer	Total
Number Exposed	10	990	1000
Number Not Exposed	10	8910	8920
Total	20	9900	9920

From these data which one of the following conclusions can be drawn?

a. Exposure to this agent does not increase the risk of developing cancer as 10/1000 (1%) of those exposed developed cancer but 990/1000 (99%) of those similarly exposed did not develop cancer

b. Exposure to this agent does increase the risk of developing cancer and the magnitude of this risk is shown by the fact that 10/20 (50%) of the cases of cancer were exposed whereas 990/9900 (10%) of those without cancer were also exposed

c. Exposure to this agent does not increase the risk of developing cancer as the proportion of cases who were exposed (10/20) is the same as the proportion who were not (10/20).

d. Exposure to this agent does increase the risk of developing cancer and the magnitude of this risk is shown by the fact that 10/1000 (1%) of the exposed developed cancer whereas 10/8920 (0.1%) of the non-exposed developed cancer.

10. The staff of a health department was concerned over the
lack of utilization of some of their programs by certain
segments of the community. There was a general impression
that people who were socially isolated used the services
of the health department less than did those who had many
social contacts, and it was suggested that a study be
undertaken to confirm or deny this impression.

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The study indicated that:

1. The utilization rates were lower for urban people
than for rural people for the same age, sex and race.

2. Urban people had fewer social contacts (i.e. were
more socially isolated) than rural people of the
same age, sex and race.

Which is the best conclusion that can be drawn
from these results?

a. The results are consistent with the original im-
pression but do not confirm it.

b. The results confirm the original impression, but only
for the sample studied.

c. The results neither confirm nor refute the original
impression because no allowance was made for the cohort effect.

d. No conclusion should be drawn from these results because
in the county under study more people live in the rural
areas than in the urban and the results are thus spurious.

11. The following table shows the <u>prematurity rates</u> per 1000 live births for high social class mothers according to whether they were gainfully employed or not. The rates for low social class mothers have not been filled in.

Social Class	Employment Status of Mother During Pregnancy		
	Not Gainfully Employed	Gainfully Employed for Less than 28 Weeks	Gainfully Employed for 28 Weeks or More
High	23	36	59
Low			

Which of the following rates would you put in the row for the low social class if employment status was the only factor associated with prematurity rates:

	Not Gainfully Employed	Gainfully Employed for less than 28 Weeks	Gainfully Employed for 28 Weeks or More
a.	78	104	137
b.	78	56	42
c.	23	36	59
d.	34	34	34

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12. Using the same data presented in Question 11, which of the following rates for <u>low</u> social class women would indicate that <u>both</u> being employed and low social class are associated with higher prematurity rates:

	Not Gainfully Employed	Gainfully Employed for less than 28 Weeks	Gainfully Employed for 28 Weeks or More
a.	78	89	99
b.	78	50	35
c.	23	36	59
d.	36	36	36

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13. Using the same data presented in Question 11, which of the following rates for low social class women would indicate that gainful employment has opposite effects for the two social classes:

	Not Gainfully Employed	Gainfully Employed for less than 28 Weeks	Gainfully Employed for 28 Weeks or More
a.	78	89	99
b.	78	56	42
c.	23	36	59
d.	36	28	60

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14.   In a recent study the investigators were concerned with determining whether a relationship existed between a certain characteristic "X" and coronary heart disease. For this purpose a retrospective study was undertaken in which all male cases of coronary heart disease in a hospital (numbering 90) were compared to a group of controls (110) of the same age, sex and race who were patients in the same hospital. Each subject (coronary heart disease case and control) was then interviewed to see if he had the characteristic (in which case he was labelled "X") or did not have the characteristic (in which case he was labelled "Y"). All interviewing was done "blind" i.e. the investigator did not know at the time whether he was interviewing a coronary case or control.

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One of the tables presented was as follows:

GROUP	X	Y	TOTAL
Age 35 - 44			
Coronary	33	17	50
Non-Coronary (Controls)	7	43	50
Total	40	60	100
Age 45 - 54			
Coronary	13	27	40
Non-Coronary (Controls)	15	45	60
Total	28	72	100

On the basis of this table the investigators drew the following conclusions. (These conclusions were restricted to the sample under investigation. The investigators were aware of the biases involved in using hospital populations and did not try to generalize to the community at large).

"In the young age group (35-44) there is an association between characteristic "X" and coronary disease because the majority of the coronary group have this characteristic. In the age group 45-54 years however a reverse association is evident because the majority of the coronary group have the characteristic "Y".

Check the one totally correct answer.

a. Agree with both conclusions drawn by the authors because they have made the appropriate comparisons.

b. Agree with both conclusions drawn by the authors despite the fact they did not make the appropriate comparisons.

c. Disagree with one or both of the conclusions drawn by the authors because they did not make the appropriate comparisons.

15. Give the numerators and denominators for the rates (or proportions you used to arrive at your answer for question 14. (Please indicate your answer on this page).

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In a study concerned with a search for the causes of a particular disease, the association between occupation and mortality rates from that disease was obtained.

The population studied was divided into 5 occupational classes as follows:

Class I   Leading professions and business

Class II   Lesser professions and business

Class III   Skilled workers

Class IV   Semi skilled workers

Class V   Unskilled workers

Wives were "classed" by their husband's occupation.

Tables A, B, C, and D presented below represent four different results that might have been obtained from such a study.

In each case the data represented age standardized mortality rates for males and females.

TABLE A

Occup. Class	M	F
I	95	54
II	87	56
III	79	49
IV	71	58
V	59	52

TABLE B

Occup. Class	M	F
I	88	68
II	81	61
III	73	55
IV	65	48
V	61	42

TABLE C

Occup. Class	M	F
I	47	42
II	53	43
III	61	38
IV	69	41
V	82	39

TABLE D

Occup. Class	M	F
I	81	40
II	83	37
III	79	41
IV	81	40
V	78	39

Which sets of results (Mark as many as may be correct) suggest most strongly that future search for the causative factors should focus on:

16. Job-related hazards   A   B   C   D   2

17. Some aspect of the behavior or environment that varied by occupational-social groups but was not likely to be a job-related hazard.   A   B   C   D   2

18. Neither job-related hazards

19. In a small state, all cases of "Disease X" must be reported, and data gathering is extremely accurate. (This disease confers life-long immunity. One person __cannot__ contract it twice.) In the year 1962, the following figures were reported:

Persons contracting Disease X in __1961__ or before, and still sick as of January 1962	17
Additional persons contracting "Disease X" in 1962, but recovering before December 1962	80
Persons (additional to all those above) contracting "Disease X" in 1962 and remaining ill into 1963	12
Persons dying from "Disease X" during 1962	23

During the year the population of the state remained constant at 100,000.

Please answer the following questions: Where fractions or rates are called for you may express them as fractions (e.g. 45/62) .. you need not perform long division.

For this state in 1962,

1. What was the __incidence__ rate of "Disease X" per

    100,000? _____   2

2. What was the annual prevalence rate per 100,000 of

    "Disease X" for the year 1962? _____   2

3. What was the mortality rate for "Disease X" during

    the year 1962? _____   1

20. A study was undertaken to determine the effects of atmospheric pollution on the prevalence of respiratory diseases. Two cities A and B were studied. These cities were of similar size, and geographical location but the atmospheric pollution was far greater in city A than in B, and city A had a greater proportion of men aged 60-69 than did city B.

The study was confined to men in three age groups 40-49, 50-59, and 60-69. The findings were reported as follows:

The prevalence of respiratory infections was higher in City A than in B. In both cities the prevalence was highest in the oldest age group, lowest in the youngest and intermediate in the middle group.

Construct one table (using imaginary figures) to document these two results and to show that the higher rates in City A were not a result of differences in the age structures of the two cities. (Please use this page for your answer).

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21.   A study of the epidemiology of an infectious disease was conducted in a county. In analyzing their results the investigators grouped the population of the county into three age groups (young, middle aged, and old) and two social class groups (High and Low). The results were reported as follows:

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1. For the population as a whole, the incidence rates were lowest in the young and highest in the old.

2. For the population as a whole, the incidence rates were lowest in the high social class and highest in the low social class.

In examining the relationship of this disease to age and social class simultaneously they made the following interpretations:

    In this county low social class people are exposed to the disease at an early age. Their rates at this age are thus high but with increasing age they have developed immunity and therefore have low rates. High social class people, on the other hand, are not exposed to this disease when they are young and are thus still susceptible at older ages.

Show in one table (Using Imaginary Figures) the relationship between the disease and age and social class that the investigators must have found in order to be able to make the above interpretations: (Please use this page for your answer).