



Max Marks: 70

Time: 2 Hrs.

Note:

1. Any 35 of 50 questions are to be attempted.
2. All questions have equal marks.
3. The question paper contains 5 pages and 50 questions.

Please read following table carefully and give answers for Question no. 1 to 3 with mentioning formula including numerator and denominator.

Hypothetical data burn injuries					
	Total burn injuries	Fatal burn injuries	Non-fatal burn injuries	Number in population	Total deaths from all causes
Men	83	3	80	3100	270
Women	52	2	50	2900	240
Total	135	5	130	6000	510

1. What is the crude mortality rate per 100,000 in this population?
2. What is the cause-specific mortality rate (per 100,000) for burn injuries?
3. What is the case fatality rate (per cent) for burn injuries? (Total)

Identify the type of study design that is described by each of the following statements:

4. The association between average unemployment levels and mortality from coronary heart disease was studied in counties in California.
5. A group of women who had been diagnosed with breast cancer were compared with a group of cancer-free women; participants were asked whether they used oral contraceptives in the past.
6. A group of recent college graduates (exercisers and non-exercisers) were followed over a period of 20 years in order to track the incidence of coronary heart disease.
7. A pharmaceutical company wanted to test a new medicine for control of blood sugar. Study participants were assigned randomly to either a new medication group or a group that used an older medication. The investigator and the participants were blinded as to enrollment in the study conditions.



Questions 8 through 12 are based on the following information.

A team of researchers from Penn University carried out a study to find out association between smoking and Coronary Heart Disease (CHD) in women. The study participants were asked about the past history of smoking; and data were tabulated. Data on smoking history and CHD are shown in the following table.

		Cases of CHD	Control for CHD (Healthy members)
Smoking	Present	110	40
	Absent	80	170

8. Identify this study design, and write down its two advantages.
9. Write down the formula and calculate for odds ratio for these data.
10. Write down interpretation of calculated odds ratio.
11. Assume that calculated odds ratio comes to be 1. How do you interpret this odds ratio?
12. What is your conclusion about findings of the study?

Questions 13 through 17 are based on the following information.

We conducted a prospective cohort study to understand the effect of tobacco chewing on oral cancer. In the study, 10,000 persons participated. This population was followed up for next 20 years. Of 10,000, 1000 were tobacco chewers. In 1000 tobacco chewers, 50 developed oral cancer in the follow up period. In total 10,000 population, total no. of oral cancer patients was 100.

13. Write down three advantages of prospective cohort study over case control studies.
14. Draw a 2x2 table from the information provided.
15. Write down formula and calculate the relative risk of oral cancer in tobacco chewers compared to non-chewers.
16. Differentiate the relative risk from odds ratio.
17. Write down an assumed burden of disease where odds ratio could be the best estimate of relative risk.

Questions 18 through 20 are based on the following information.

Researchers at Delhi University are interested in measuring the occurrence of insomnia (lacking sleep) among newly enrolled students during the first two weeks of courses. Each student is sent a survey with a few questions related to insomnia just after the first two weeks of courses has been completed. After compiling the answers into a database, researchers note that 103 students out of 560 have probable insomnia.

18. What is the prevalence of insomnia among newly enrolled students? What time period does this prevalence refer to?
19. One of the researchers is not familiar with epidemiology and interprets this data to mean that 103 new cases of insomnia occurred during the first two weeks of classes. Is this a correct assumption? Why or why not?
20. Write down the differences between the incidence and prevalence. Also write relationship between these two.

Questions 21 through 26 are based on the following information.

Aspirin versus Placebo in Pregnancies at High Risk for Preterm Preeclampsia

BACKGROUND: Preterm preeclampsia is an important cause of maternal and perinatal death and complications. It is uncertain whether the intake of low-dose aspirin during pregnancy reduces the risk of preterm preeclampsia. **METHODS:** In this multicenter, double-blind, placebo-controlled trial, we randomly assigned 1776 women with singleton pregnancies who were at high risk for preterm preeclampsia to receive aspirin, at a dose of 150 mg per day, or placebo from 11 to 14 weeks of gestation until 36 weeks of gestation. The primary outcome was delivery with preeclampsia before 37 weeks of gestation. The analysis was performed according to the intention-to-treat principle. **RESULTS:** A total of 152 women withdrew consent during the trial, and 4 were lost to follow up, which left 798 participants in the aspirin group and 822 in the placebo group. Preterm preeclampsia occurred in 13 participants (1.6%) in the aspirin group, as compared with 35 (4.3%) in the placebo group (odds ratio in the aspirin group, 0.38; 95% confidence interval, 0.20 to 0.74; $P = 0.004$). There were no significant between-group differences in the incidence of neonatal adverse outcomes or other adverse events. **CONCLUSIONS:** Treatment with low-dose aspirin in women at high risk for preterm preeclampsia resulted in a lower incidence of this diagnosis than placebo.

21. What type of study design has been used?
22. What was the objective of the study?
23. What biases the researchers wanted to avoid using randomization in this study?
24. Who were the subjects? Why have they chosen these subjects?
25. What was the follow up period? How the endpoints were measured?
26. What are the outcome measures in this study?
27. What are the main conclusions? Justify whether conclusions are appropriate.

Questions 28 through 30 are based on the following information.

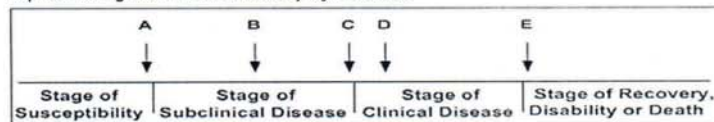
To evaluate the effectiveness of a diagnosis test, the test was applied to a sample of people with the following results:

	Sick	Healthy
Test Positive	2020	140
Test Negative	80	7760

28. Calculate the sensitivity and the specificity for above test
29. Calculate the positive predictive value for above mentioned test. Also explain that what does it mean?
30. What is the probability of a correct diagnosis by doing this test?

Questions 31 through 33 are based on the following information.

For each of the following question, identify the appropriate letter from the time line in Figure provided representing the natural history of disease.

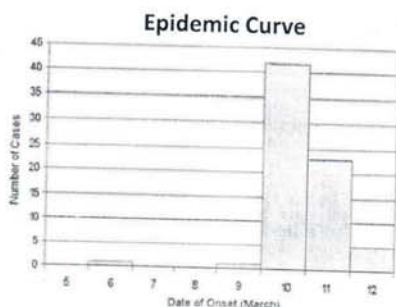


31. ____ Onset of symptoms
32. ____ Usual time of diagnosis
33. ____ Exposure



Questions 34 through 38 are based on the following information.

On the morning of March 11, the county health department (CHD) received a telephone call from a student at the local community college that he and his roommate were suffering from diarrhea. County Surveillance Unit (CSU) started the investigation. Around 10:30 AM, the physician from the Student Health Center reported that 20 students with vomiting and diarrhea had been seen at the clinic the previous day and more were waiting to be seen that morning. He believed only 1-2 students typically would have been seen for these symptoms in a week. CSU then visited College Hospital and reviewed medical records which revealed the profile of symptoms among the affected students as follows-vomiting (91%), diarrhea (85%), abdominal cramping (68%), headache (66%), muscle aches (49%), and bloody diarrhea (5%). All were students who lived on the college campus and ate from common cafeteria. No cases were identified among college faculty or staff, students living off-campus, or from the local community



Results from Case- Control study

S. No.	Food item	Risk ratio
1	Tomato salad	4
2.	Swiss cheese	1.8
3.	Ham	1.03
4.	Turkey	1.01
5	Pickles	1.05

Based on the above description, answer the following questions:

34. Would you call this situation an epidemic? Give reasons to justify your answer.
35. If you were to administer a questionnaire in this scenario, what information would you collect?
36. Based on the epidemic curve, what is the period of interest for possible exposures related to this outbreak. What are the uses of an epidemic curve?
37. Design a case definition to investigate this outbreak? What is the importance of case definition for outbreak investigation?
38. Which food item is source of infection in this outbreak? Justify your answer.
39. In the study of diabetics, 100 of the 189 diabetic men died during the 13-year follow-up period. Calculate the risk of death for these men.
40. In a community with a population of 25,000 people, 36 develop diabetes during 1-year period. What was the incidence rate of diabetes in the community?
41. Explain the concept of herd immunity with an example.
42. Write the numerator and denominator in 1. Annual Parasite Incidence (API); and 2. Annual Blood Examination rate (ABER) for malaria.
43. Write the components of DOTS strategy for tuberculosis.
44. What is meant by indicator of Health? Write four indicators of mortality.
45. Which is the level of prevention most applicable for prevention and control of Diabetes in the community. Explain your answer.
46. What is meant by window period in HIV infection?

Questions 47 through 50 are based on the following information.

Following is the data from a Surveillance component of Tuberculosis Control Program from a district.

Table 1. Total Number of TB cases year wise

Year	Number of TB cases
1990	232
1991	221
1992	201
1993	472
1994	500
1995	489

Based on the above data. Answer the following questions.

47. Comment on the time trend of Tuberculosis in the given district. Give two reasons for change in the time trend.
48. What does this data suggest about the effectiveness of Tuberculosis control program in district (assuming no major changes have happened in the program)? Suggest immediate step that should be taken to improve the program.

Table. 2 Characteristics of TB cases from the year 1993

Characteristic	Number of TB cases	Population possessing the characteristic
Male	282	596312
Female	190	503688
Urban resident	212	612346
Rural resident	260	487654
Farmers	52	223456
Manual Laborer	54	200296
Coal Mine worker	226	123789
Shopkeeper	28	77223
Office worker	22	75246
Unemployed	32	199999
Occupation not known	58	199991

Based on the above data. Answer the following questions.

49. Comment on the distribution of Tuberculosis by residence (place). Give two reasons to explain this pattern (based on your knowledge of tuberculosis).
50. Does this data suggest any risk factor for Tuberculosis? Explain your answer.

