

Question Paper

Exam Date & Time: 28-Jan-2021 (02:30 PM - 04:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER MASTER OF PUBLIC HEALTH DEGREE EXAMINATION - JANUARY/FEBRUARY 2021
SUBJECT: INTRODUCTORY BIostatISTICS FOR PUBLIC HEALTH (MPH 653)
(REGULAR)

Marks: 50

Duration: 120 mins.

Answer all the questions.

- 1A) What are the two types of variables? Explain with examples (3)
- 1B) Children in elementary school are evaluated and classified as non-readers (0), beginning readers (1), grade level readers (2), or advanced readers (3). The classification is done in order to place them in reading groups. Choose the appropriate scale of measurement. (1)
- i) Interval
ii) Ratio
iii) Ordinal
iv) Nominal
- 1C) Subjects are asked to sit at a computer screen. In 30-second intervals, a picture of a wrench is flashed on the screen. The picture may appear anywhere on the screen. Sometimes the wrench has an open end (curved) and sometimes the wrench is a closed hexagon. Subjects are asked to press the "Y" key on a computer keyboard if the wrench is open and the "N" key if it is closed. The total score is the number of correct responses. Choose the appropriate scale of measurement for the total number of correct responses. (1)
- i) Interval
ii) Ratio
iii) Ordinal
iv) Nominal
- 2) Find the mean of the following frequency table (5)

Number of adverse reactions	Frequency
1	2
2	13
3	18
4	0
5	10
6	2

- 3) Explain skewness with help of a diagram. Mention relationship between mean, median and mode for positively skewed data (5)
- 4) List out the difference between coefficient of variation and variance (5)

5. Write short notes on

- 5A) Pie Chart (1)
- 5B) Frequency polygon and Frequency curve (3)
- 5C) Bar graph (1)

- 6) Define Mutually exclusive events, Independent events and Conditional probability (1½+1½+2 = 5 marks) (5)

7. A medical research team wishes to assess the usefulness of a certain symptom (call it S) in the diagnosis of a particular disease. In a random sample of 775 patients with the disease, 744 reported having the symptom. In an independent random sample of 1380 subjects without the disease, 21 reported that they had the symptom.

- 7A) Compute a false positive and a false negative. (2)
- 7B) Compute the sensitivity and specificity of the symptom. (2)
- 7C) Suppose it is known that the rate of the disease in the general population is .001. What is the predictive value positive and predictive value negative of the symptom? (3)
- 8) Define frequentist and axiomatic definition of probability. (3)
- 9A) Explain Poisson distribution with examples and properties? (3)
- 9B) In a study of drug-induced anaphylaxis among patients taking rocuronium bromide as part of their anaesthesia, it was found that the incidence of anaphylaxis is 0.3. Find the probability that 5 receiving rocuronium
 i) exactly three will experience anaphylaxis
 ii) none will experience anaphylaxis (3)

10. The IQs of individuals admitted to a state school for the mentally retarded are approximately normally distributed with a mean of 60 and a standard deviation of 10.

- 10A) Find the proportion of individuals with IQs greater than 80. (2)
- 10B) What is the probability that an individual picked at random will have an IQ between 50 and 70? (2)

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