

MASTER OF SCIENCE (AUDIOLOGY)
M.Sc. (AUDIOLOGY) Sem-I : WINTER :- 2021
SUBJECT: RESEARCH METHODS, STATISTICS & EPIDEMIOLOGY

Day : Monday
Date 28-Mar-2022

W-19533-2021

Time : 10:00 AM-01:00 PM
Max. Marks: 80

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answer to both the sections should be written in **SAME** answer book.
- 4) Draw diagrams **WHEREVER** necessary.

SECTION – I (Research Methods & Epidemiology) (50 Marks)

Q.1 Attempt any **TWO** out of **THREE**: **(30)**

- a) Explain in brief cohort study design.
- b) A population of 100 healthy men was followed for the development of prostate cancer. After being followed for 5 years, 20 men developed prostate cancer exactly at year 5. Ten other men were followed for 1 year and then were lost exactly at year 1. The remaining men who never developed the disease were followed for 10 years. Calculate the number of person- years of observation accrued by this population. Calculate the PTI.
- c) Two groups of rats were placed on diets with high and low protein contents and the gain in weight were recorded after 2 months. The results of gain in weight are as follows:

High protein diet: 140, 117, 160, 123, 145, 127, 107, 146, 107, 102, 114, 121, 132, 153

Low protein diet: 97, 63, 110, 120, 96, 74, 86, 120, 115, 120, 150

Use appropriate test to claim that the mean change in high protein diet is same as mean change in low protein diet group. Use 5% level of significance. It is given data follow normal distribution.

Q.2 Attempt any **FOUR** out of **FIVE**: **(20)**

- a) Calculate odds ratio for given data and interpret the result.

	Cancer		Total
	Yes	No	
Male	40	90	130
Female	10	60	70
Total	50	150	200

- b) Define type I and type II error.
- c) Write down suitable statistical test in the following situations.
 - i) Comparison between sex and income (income is categorical).
 - ii) Comparison of hemoglobin level (normal) in control and intervention group.
 - iii) Comparison of age in years (non- normal) and height in cm (non-normal).
 - iv) Comparison of diastolic blood pressure in patients with presence of cancer and absence of cancer (diastolic blood pressure is non normal).
 - v) Comparison of BMI (numeric & normal) and income (numeric & normal).
- d) Write down steps for solving two sample proportion test.
- e) Explain research in Audiology.

P. T. O.

SECTION – II (STATISTICS) (30 Marks)

Q.3 Attempt any **TWO** out of **THREE**: **(20)**

- a) A bag has 4 green marbles and 6 red marbles. Rich picks 7 marbles from this bag. What is the probability that exactly 4 of his 7 marbles are green and the other three are red?
- b) An airline carries out a study to examine if there is any association between the types of flight used (domestic, International) and the Types of Ticket purchases (First class, Business Class, Economy Class). the data obtained are shown in the following contingency table:

	Domestic	International
First Class	20	22
Business Class	95	121
Economy Class	518	135

At 5% level of significance will you conclude that Types of Flight used and Types of Ticket purchased are independent? It is given that the tabled value of the chi-square distribution with right-tail area equal to 5% for 1, 2 and 3 degrees of freedom are 3.84, 5.99 and 7.81 respectively.

- c) Explain non probability sampling techniques.

Q.4 Attempt any **TWO** out of **THREE**: **(10)**

- a) Explain the difference between minimum and optimum sample size.
- b) Weight (kg) loss of 10 individuals after 1 month of yoga was 1.0, 0.5, 0.4, 0.25, 1.2, 0.6, 0.75, 0.34, 0.52 and 0.42. Calculate standard deviation and coefficient of variation.
- c) Convert each entry of the following list to standard units (that is find 'Z' score).
13, 9, 11, 7, 10.

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