Enrolment No.: ……

IIHMR UNIVERSITY

Institute of Health Management Research
MBA Hospital and Health Management
Batch-28th (2023-2025)
First Year, Term 1 End Term Examinations, November 2023

CC – 604 Biostatistics

Time - 3 Hour **Maximum Marks: 50 (Minimum Marks: 20)**

Instructions to students:

- **This question paper contains 2 printed pages.**
- **Don't write anything on the Question Paper except writing your Enrolment No.**

Part A

(Maximum Marks: 5)

Q1. Choose the most appropriate option for each of the following: (each question carries 1 mark)**.**

(a) Which of the following is a nominal variable?

(i) Blood sugar level
(ii) Blood type (A, B, AB, and O)
(iii) Severity of pain (mild, moderate and severe)
(iv) Haemoglobin level

(b) Which of the following properties is characteristic of a variable following normal distribution?

(i) Symmetry about the mean
(ii) High skewness
(iii) Small variance
(iv) Large mean

(c) Confidence intervals are preferred to p-values because

(i) They are more precise
(ii) p-values are not easily interpretable
(iii) Along with the significance, the variability and the limits of the estimate is known in the confidence intervals
(iv) Confidence intervals can be computed more readily, whereas p-values involve complex calculation
(v) They are more accurate in large studies

(d) In a study carried out to identify the markers of type 2 diabetes, the mean and standard deviation for total cholesterol in mmol/L were 5.0 ± 1.2 and 4.7 ± 1.0 for the new diabetic cases (n = 117) and controls (n = 117), respectively. What is the appropriate method to test whether there exists a significant difference in the total cholesterol between the two groups?

(i) Paired 't'-test
(ii) One sample 't'-test
(iii) Two sample 't'-test (independent)
(iv) Test for difference in proportions
(v) One sample proportions test

(e) The association between two categorical (qualitative) variables is best shown in a

(i) One way frequency distribution
(ii) Cross-tabulation of two factors
(iii) Scatter plot
(iv) Bar chart
(v) Dot plot

Part B

(Maximum Marks: 15)

Answer the following questions. Q2 is compulsory. There is a choice between Q3 & Q4 and Q5 & Q6.

Q2. Why concepts of biostatistics are important in answering questions which concern us in the field of health? Support your response with a relevant example. (5)

Q3. Write a short note on measurement of scale and give examples. (5)

OR

Q4. Give a brief description of any three graphical methods of data presentation. (5)

Q5. Define standard error and elucidate its significance in establishing a connection between random samples and populations. (5)

OR

Q6. What is confidence interval? What information is obtained through a 95% confidence interval? (5)

Part C

(Maximum Marks: 30)

Answer the following questions. Q7 is compulsory. There is a choice between Q8 & Q9 and Q10 & Q11.

Q7. Outline the various steps involved in statistically testing the comparison of a sample mean with a population mean. Illustrate your explanation with a relevant example. (10)

Q8. It is known from a random sample of 100 individuals obtained from a community that the sample mean and standard deviation of height are 165 cm and 10 cm, respectively. Construct 95% and 99% confidence intervals for the height of individuals in the community. Additionally, provide the interpretation of these confidence intervals. (10)

OR

Q9. From a sample survey conducted to estimate the prevalence of underweight in a particular state in India, it is known that 20% of the sample subjects are underweight from a total sample of 625 subjects. Construct 95% and 99% confidence intervals for the population prevalence. Additionally, provide the interpretation of these confidence intervals. (10)

Q10. The average birthweight of children born in 1979 from a particular community survey was 2458 grams. From a sample of 100 births in the same community in 2009, the mean ($\bar{x}$) and standard deviation (s) was calculated as 2784 grams and 368 grams, respectively. Test whether the population mean in 2009 is different from 2458 grams as calculated in 1979 at significance level 0.05. (10)

OR

Q11. In a random sample of 500 mothers who had singleton births from 2011 to 2015 in a large tertiary hospital, one of our aims is to examine whether maternal hypertension is a risk factor for preterm delivery. The summary of the data is presented as follows:

Maternal Hypertension	**Gestational Age**		**Total**
	Preterm	**Term**	
Yes	7	20	27
No	41	432	473
Total	48	452	500

Test whether there is an increased risk of preterm birth among pregnant mothers with hypertension at significance level 0.01. (10)