

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Sixth Semester**Biomedical Engineering***BM3651 - Fundamentals of Healthcare Analytics***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks****PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)***

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Outline biostatistics and its significance in biomedical research.	L2	1	2
2.	How software tools like R or Python can be used to determine the statistical distribution of a data set?	L2	1	2
3.	Define a p-value in the context of hypothesis testing. What does a low p-value indicate?	L1	2	2
4.	List any two assumptions met to perform a chi-square test for homogeneity.	L2	2	2
5.	What metrics are commonly used to evaluate the effectiveness of a regression equation?	L2	3	2
6.	Give any two key assumptions underlying regression models.	L1	3	2
7.	Identify two types of data commonly used in meta-analysis and write their significance.	L1	4	2
8.	Justify the choice of a factorial experiment for studying interactions between multiple factors.	L2	4	2
9.	Specify the primary goal of epidemiological studies in public health.	L2	5	2
10.	Show the role of CT imaging in trauma assessment.	L1	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Critically compare and contrast the concepts of probability, likelihood, and odds in health studies, illustrating their applications in real-world scenarios like clinical trials and epidemiological studies.	L4	1	16
	Or			
	b Examine different distribution types in statistical analysis, highlighting three common distributions (normal, binomial, Poisson) and their applications in health research.	L4	1	16
12.	a Compute the chi-square statistic for a contingency table and interpret the results. Discuss how the chi-square test can be used to assess the relationship between two categorical variables.	L3	2	16
	Or			
	b Apply logistic regression in Python to model the relationship between a binary outcome and several predictor variables. Interpret the coefficients and discuss their relevance in a health-related context.	L3	2	16

13.	a	Explain the purpose of a regression model and how it can be used to predict outcomes in health research. Provide an example scenario.	L2	3	16
		Or			
	b	Describe how to visualize regression results using scatter plots and fitted lines in R. What insights can this visualization provide in a health context?	L2	3	16
14.	a	Evaluate the process of reading and interpreting a meta-analysis by identifying key elements to scrutinize and discussing how they impact the validity of the conclusions.	L4	4	16
		Or			
	b	Demonstrate how to conduct a variance test using R or Python. Analyze the output and interpret what the results indicate about the data.	L4	4	16
15.	a	Describe the key components of an epidemiological study. How do these components contribute to understanding disease patterns in a population?	L2	5	16
		Or			
	b	Summarize a case study that focuses on ECG data for diagnosing heart conditions. What conclusions can be drawn from the analysis?	L2	5	16