Exam Date & Time: 17-Jan-2024 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
END SEMESTER MAKEUP EXAMINATION- JAN 2024
III SEMESTER B.TECH. (INDUSTRIAL ENGINEERING) - 2022 CURRICULUM

DATA ANALYTICS AND VISUALISATION [MIE 2127]

Marks: 50 **Duration: 180 mins.**

Descriptive

Answer all the questions.

1A) Choose a file format for a biomedical study's data sharing. Justify your choice considering structure, interoperability, and ease of analysis. (3)

1B) What is qualitative data analysis. List and explain different methods of qualitative data analysis. (4)

1C) Describe an ETL process to improve production line efficiency in industrial engineering, detailing necessary data transformations. (3)

2A) Discuss the benefits and challenges of implementing a distributed NoSQL database in aerospace engineering, considering data characteristics and project scale. (5)

2B) Illustrate the significance of the correlation coefficient graphically. (3)

2C) The yearly returns (in %) of investments X and Y are given for three years. Calculate the covariance are correlation between investment X & Y and give your interpretation. (2)

Year	Investment X (%)	Investment Y (%)
1	12	17
2	5	6
3	10	13

3A) Disitnguish between following with an example (4)

a. Box and Whisker plot.

b. Milestone chart

c. Water fall chart

3B) The distance in metres of randomly selected samples is given below. Compute the confidence interval and give the inference. (4)

Distance (in metres)	1100	1203	1198	1192	1191	1194	1102	1199	1196	1196	1197	1187	1104	1195

3C) Illustrate the significance of pivot table in data analytics and visualisation. (2)

4A) To study the performance of three detergents and three different water temperatures, the following whiteness readings were obtained with specially designed equipment. Perform anova test. (5)

	Detergents		
Water temperature	A	B	C
Cold water	47	45	50
Warm water	39	42	52
Hot water	44	36	48

4B) Explain the following in the context of data analytics and visualisation.
a) Population and Sample
b) Descriptive statistics
c) Inferential statistics. (3)

4C) Explain the working of a Parreto chart with a sketch. (2)

5A) A company manufactures car batteries with an average life span of 2 or more years. An engineer believes this value to be less. Using 10 samples. He measures the average life span to be 1.8 years with a std. deviation of 0.15. (5)

a. State the null and alternate hypothesis

b. At a 99% confidence level, is there enough evidence to discard null hypothesis?

5B) Distinguish between the bar chart and histogram. (3)

5C) Distinguish between Z-test and T-test. (2)

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