4E1231
B. Tech. IV-Sem. (Back) Exam., Oct.-Nov. - 2020
HSMC Mechanical Engineering
4ME2-01 Data analytics
AE, ME

Time: 2 Hours

Maximum Marks: 65
Min. Passing Marks: 23

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and one questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1   What is Box-Plot-Method?

Q.2   Define degree of freedom.

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Q.3   What is Perceptual-Map?

Q.4   Describe Hierarchical procedures.

Q.5   What is manifest variables?

PART – B

Q.1 Discuss why outlier might be classified as beneficial and as problematic.

Q.2 What is the difference between Q – type factor analysis and cluster – analysis.

Q.3 How does discriminant analysis handle the relationship of the dependent and independent variables?

Q.4 How does a researcher decide the number of clusters to have a solution?

Q.5 How are ideal points used in Multidimensional Scaling [MDS]?

Q.6 What are distinguishing characteristics of Structural Equation-Analysis?

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PART – C

Q.1 Explain why and how the various multivariate methods can be viewed as the family of techniques.

Q.2 The table shows the corresponding values of three variables X_1, X_2 and X_3. Find the least square regression equation on X_3 on X_1 and X_2.

X_1	3	5	6	8	12	14
X_2	16	10	7	4	3	2
X_3	90	72	54	42	30	12

Q.3 A manufacturing company has purchased three new machines of different makes and wishes to determine whether one of them is faster than the others in producing a certain output. Five hourly production figures are observed at random from each machine and results are given below.

Observations	A_1	A_2	A_3
1	25	31	24
2	30	39	30
3	36	38	28
4	38	42	25
5	31	35	28

Use analysis of variance and determine whether the machines are significantly different in their mean speed. (Given at 5% Level $F_{2.12} = 3.89$).