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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, M. Tech. - Mechanical Engineering (MCIM)

Semester End Examination; Dec - 2017/Jan - 2018

Statistical Modeling and Experimental Design

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. With suitable examples, explain measures of central tendency. 10

b. Charan grew 50 baby carrots using special soil. He dig them up and measure their length to the nearest mm and group the results. Compute the measures of central tendency of the same. 10

Length in mm	Frequency
150 - 154	5
155 - 159	2
160 - 164	6
165 - 169	8
170 - 174	9
175 - 179	11
180 - 184	6
185 - 189	3

2. Explain the following :

a) Types of variables 20

b) Normal and Long-normal distribution.

UNIT - II

3. Discuss strategy of experimentation with appropriate example. 20

4. Explain basic principles of experimental design and its typical applications. 20

UNIT - III

5. With suitable illustrations, explain a factorial experiment with and without interaction. 20

6. Describe in detail 2^2 factorial design with suitable illustration. 20

UNIT - IV

7 a. Give a brief account of linear and multiple regression analysis. 10

b. Find the trend by least square method for the following data and estimate the demand for 2020: 10

Year	2010	2011	2012	2013	2014	2015	2016
Demand	85	75	80	72	65	60	55

Contd…2

8. A manager of a material production plant feels that the demand for a special purpose material may be related to number of construction permits issued in the county during the previous quarter. The data collected by the manager is given below. Estimate the demand for the special purpose material when the number of construction permits is 30. 20

Construction Permits	15	9	40	20	25	25	15	35
Demand for special purpose material	60	40	160	60	130	90	100	160

UNIT - V

9. Discuss evaluation of sensitivity to noise for static problems. 20

10. Discuss evaluation of sensitivity to noise for dynamics problems. 20

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