Hall Ticket Number:

Code No. : 22806

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.E. (Mech. Engg. : CBCS) II-Semester Main Examinations, July-2017

(Advanced Design & Manufacturing)

Experimental Techniques and Data Analysis

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. What is the difference in the Moire fringe techniques for plain and shear strain measurement?
2. Explain the principle of force dynamometer.
3. Define Doppler effect.
4. "Thermistor is not preferred for temperature measurement"-Discuss.
5. What is the difference between hardness and micro-hardness?
6. Explain the principle of electron spectroscopy.
7. Differentiate "deterministic" and "random" data.
8. List the statistical methods that are used in design of experiments.
9. Write the importance of Additive cause-effect model.
10. Explain tolerance design according to Taguchi.

Part-B (5 × 10 = 50 Marks)

11. a) Distinguish between plain and circular Polariscopes. [5]
    b) How the strain gauge bridge circuits are calibrated? [5]
12. a) Explain the working principle of bi-metallic temperature transducer along with applications. [5]
    b) Differentiate between ultrasonic flow meter and hot wire anemometer. [5]
13. a) Discuss the relative features of optical and electron microscopes. [4]
    b) What is the significance of surface roughness and describe any one of the roughness measuring instruments? [6]
14. a) A temperature measurement instrument in a furnace indicated the following reading 630, 612, 607, 625, 630, 620, 618, 627 ^{0}C. Perform an uncertainty analysis. [5]
    b) Explain the structures of Latin and Orthogonal design of experiments. [5]
15. a) How do you identify the design and noise factors? Explain. [4]
    b) Explain the concept of loss function in Taguchi. State its applications. [6]
16. a) Describe the principle of strain gauge dynamometer for measuring cutting forces. [5]
    b) Briefly describe the flow visualization techniques. [5]
17. Answer any *two* of the following:
    a) How Bragg's law is applied for studying crystal structure? [5]
    b) Differentiate between student 't' test and 'F' test. [5]
    c) What are the steps to achieve quality according to Taguchi? [5]