

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No.: 22806 M

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**M.E. (Mech. Engg.: CBCS) II-Semester Make Up Examinations, September-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. Outline merits of strain gauge and piezoelectric transducers.
2. Describe circularity polarized light.
3. Define thermocouple and the governing laws of thermocouple.
4. List the flow visualization techniques.
5. How are the X-Rays produced?
6. Explain the importance of accuracy of dimension and form.
7. With an example explain the term Latin square.
8. What is the significance of conducting student 't' test?
9. Explain the concept of loss function.
10. How do Taguchi methods of experimental design differ from traditional statistical approach?

**Part-B (5 × 10 = 50 Marks)**

11. a) Discuss the concept of Interferometer. [5]  
b) Explain the Moire fringe technique for strain measurement. [5]
12. a) Explain the working principle of Vortex Shredding flow meter and list its merits and limitations. [5]  
b) Identify a transducer to measure 1100°C-1200°C in a heat treatment furnace. Explain its working principle. [5]
13. a) Discuss the application of Bragg's law to measure residual stresses of a given specimen. [6]  
b) What are the commonly used indices of surface roughness? Define each. [4]
14. a) Describe different experimental design methods. Give the features and applications of Orthogonal Squares. [5]  
b) Discuss the importance of replication and randomization in design of experiments. [5]
15. a) What do you understand by "main effect" and "Interaction effect"? How two factor interactions are considered by Taguchi method? [5]  
b) Describe the procedure associated with optimization through S/N ratio. [5]
16. a) Write the importance of strain gauge rosettes. [5]  
b) Explain the working principle of a hot wire anemometer. [5]
17. Answer any two of the following:
  - a) Describe 3 D CMM and mention its merits and limitations. [5]
  - b) Briefly discuss (i) ANOVA (ii) Autocorrelation. [5]
  - c) Briefly explain the Taguchi approaches for robust design. [5]

\*\*\*\*\*