

Total No. of Questions : 8]

SEAT No. :

**P4258**

**[4860]-1058**

[Total No. of Pages : 2

**M.E. Mechanical (Heat Power / Design / Mechatronics/CAD/CAM/  
Energy Engineering )**

**RESEARCH METHODOLOGY**

**(2013 Credit Pattern) (Semester - I) (502104)**

*Time :3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) Answer any five questions.*
- 2) Neat diagrams should be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) Use of pocket calculators & different gas charts applicable is allowed.*
- 5) Assume Suitable data if necessary.*

**Q1) a) State the different Criteria for Good research. [5]**

b) What are the different types of research based on application point of view. [5]

**Q2) a) What is the significance of Hypothesis in Research. [5]**

b) Explain the importance of literature survey during various stages of conducting research viz. [5]

- i) Defining the research problem,
- ii) Carrying out research work,
- iii) Concluding research problem,
- iv) Report writing.

**Q3) a) Explain the static and dynamic characteristics of Instruments with suitable examples. [5]**

b) What is the role of DSP in data collection in noisy environment. [5]

**Q4) What is the difference between error and uncertainty during measurements. What are the different sources of errors during measurement. State good measurement practices. What is the role of calibration of instrumentation in research process. [10]**

**P.T.O.**

- Q5)** a) Explain the significance of research design. [5]  
b) Explain with suitable examples Non-linear analysis. [5]
- Q6)** a) Write note on steady and unsteady state mathematical model for any research problem of your choice. [5]  
b) Why a strong mathematical model is necessary to carry out quality research? [5]
- Q7)** a) A sample of 400 students found to have a mean height of 67.47 inches. Can it be regarded as sample from large population with mean height 67.39 inches and standard deviation of 1.3 inches. Test at 5% level of significance. Z critical from Z - test table = 1.645. [5]  
b) Explain the structure for writing a research report. [5]
- Q8)** Explain format of a Research Proposal clearly stating the sections to be included while writing a good research proposal. What are the different Government and Non-Government funding agencies which support the engineering research. [10]

