Total No. of Questions : 8]

SEAT No. :

P4125

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[4760]- 1058

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

RESEARCH METHODOLOGY

(2013 Credit Pattern) (Semester- I)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

Q1) a) What are the important Characteristics of any study to qualify as a research problem. **[5]**

b) What care should be taken by the researcher while defining the scope and objective of a research problem. **[5]**

Q2) a) What do you mean by Citation and Impact Factor? Write the names of any two International Journals of your domain and its Impact Factor. **[5]**

b) How noisy environment effects data collection? Explain the role of DSP in noisy environment. **[5]**

Q3) a) Write a note on Types of Errors involved in the Measurement. **[5]**

b) Write a note on "ANOVA". **[5]**

Q4) a) What are the different types of mathematical models commonly used with examples. Also state the important steps in mathematical modeling. **[5]**

b) Explain regression analysis with examples. **[5]**

P.T.O.

Q5) a) Explain research design and how it reduces time required to carry out the research process. **[5]**

b) What are the different types of mathematical models used in Engineering research? **[5]**

Q6) a) Discuss Uncertainty Analysis with a suitable example. **[5]**

b) Write a note on Types of Errors involved in the Measurement and significance of periodic calibration of instruments. **[5]**

Q7) a) Write a short note on principal component analysis. **[5]**

b) Explain the structure for writing a research report. **[5]**

Q8) A company wanted to constant manufacture 10,000 ball bearings. The mean diameter of the bearing was 8 mm and the variance of the same was 4 mm.The measurement of diameter follows the normal distribution. Design the acceptance test taking only samples of 100 sheets with mean diameter of 9 mm. Z from normal table=2.57. Use the two tailed test and plot the results on a Two-tailed probability curve marking clearly the acceptance and rejection zone. **[10]**

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