

**Government College of Engineering, Aurangabad**

(An Autonomous Institute of Government of Maharashtra)

**M.E. Examination (Institute Elective)**

End Semester Examination November 2016

**GE 611: RESEARCH METHODOLOGY**

**Time: Three Hours**

15 NOV 2016

**Max. Marks: 60**

*“Verify the course code and check whether you have got the correct question paper”*

*N.B:-*

1. *Attempt any FIVE questions*
2. *All questions carry equal marks*
3. *Assume suitable data if necessary and state it clearly*
4. *Use of non-programmable calculator is allowed*
5. *Attempt all questions in sequence*

**Q1. Attempt any TWO**

- a) Explain objectives and criteria of good research
- b) How a research problem can be defined? What are the techniques involved in defining a research problem? Explain
- c) What is research design? Explain the significance of a research design

**Q2. Attempt any TWO**

- a) Write a short note of the following: (i) Regression Model (ii) Correlation .
- b) Explain students' distribution t for sample size less than 30. Write formula for t value computation for significance of the difference between two means.
- c) Explain various techniques of data collection

**Q3. Attempt any TWO**

- a) Explain sensitivity analysis in linear programming method.
- b) Explain the steps in artificial variable technique of linear programming problem
- c) Solve following linear programming problem.

$$\text{Maximize } Z = 3X_1 + 6X_2$$

Subject to

$$X_1 + 4X_2 \leq 20$$

$$X_1 + 2X_2 \leq 18$$

$$X_1, X_2 \geq 0$$

**Q4. Attempt any TWO**

- a) What are the steps to ensure ideal experiment from the view of uncertainty control?
- b) What is the significance or uncertainty analysis in experimentation/research work?  
Elaborate
- c) If power is measured by dynamometer,  $w = (2\pi RFL)/(t)$  sec. For a specific run, if the data for 95% uncertainties for each item are  
R=1200±1 rev                      F=50±0.18 N  
L=0.40±0.00127 m                t=60±0.5 s  
Compute the power with uncertainty band.

Q5. Attempt any TWO

- a) Discuss supervised and unsupervised learning in ANN
- b) In research, what are the situations where the fuzzy logic is best suited? Discuss your answer with suitable examples. Also list different fuzzy logic based commercial products.
- c) What are the applications of genetic algorithms? Explain with example.

Q6. Attempt any TWO

- a) Write a note on “types of reports”.
- b) Prepare a content page of a thesis for any research topic of your interest.
- c) What is plagiarism? What are its implications? Explain with example.

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