

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD - 402 103
End Semester Examination, May 2018**

Branch: M. Tech.

Semester: II

(MMD/MMDE/MHP/MME/MMF/MEXX/MCH/MTEE)

Subject with Subject Code: Research Methodology [MMD204A] Marks: 60
**[MMDE204A/MME11E3D/MHP12E5A/MMF204A/MEXX203C/MOE12E5A/
MCH206/MTEE205E]**

Date: 23 / 05 / 2018

Time: 3 Hrs.

Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram, etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Q.1. Solve any Two of the following:

(6×2=12)

- (a) Explain in brief the research process using a neat flow chart. Define the main issues which should receive the attention of the researcher in formulating the research problem.
- (b) What are the factors to be considered while preparing research design for a particular research problem? Explain in brief the qualities of a good research.
- (c) Describe the different types of research, clearly pointing out the difference between an experiment and survey.

Q.2. Solve any Two of the following:

(6×2=12)

- (a) What is the importance of literature review in research? Suggest any model how you will analyse it.
- (b) What are methods of sampling in response of complex random sampling designs? Elaborate each in brief.
- (c) What is hypothesis? What characteristics it must possess in order to be a good research hypothesis?

Q.3. Attempt the following:

(6×2=12)

- (a) A random sample of 200 measurements from an infinite population gave a mean value of 50 and a standard deviation of 9. Determine the 95% confidence interval for the mean value of the population.

(b) Enumerate the different methods of collecting data. Write a brief note on different types of analysis of data pointing out the significance of each.

Q.4. Attempt the following:

(12×1=12)

(a) Below are given the observed values of two responses A and B for three different tests each.

Response	1	2	3
A	30	32	22
B	20	18	16

Set up a table of ANOVA and calculate F ratio. State whether the difference between the output of the two responses is significant taking 7.71 as the table value of F at 5% level for $v_1=1$ and $v_2=4$.

Q.5. Solve any two of the following.

(6×2=12)

(a) How does an error differ from an Uncertainty? What is a fixed error and Random error? Explain.

(b) A certain resistor draws 110.2 V and 5.3 A. The uncertainties in the measurement are ± 0.2 V and ± 0.06 A, respectively. Calculate the power dissipated in the resistor and the uncertainty in the power.

(c) The torque and the engine speed of a truck is given as follows:

Engine drive: $T = -170 + 29.4\omega - 0.284\omega^2$ and Load: $T = 10.5\omega$

where T = torque, N.m and ω = rotation speed, r/s.

Determination of the operating condition of the truck is a simulation of a two components system. Perform this simulation adopting suitable flow diagram. Use an initial value for simulation of $\omega = 40$ r/s and show the result in the form in the table.

Q.6. Solve any two of the following:

(6×2=12)

(a) Describe in brief the layout of research report covering all relevant points.

(b) Explain the methods of Bibliography and its importance in context of research report.

(c) Write notes on the footnotes and documentation style to be used in research report. Write the correct meaning of the following abbreviations use in the research report. i) viz., ii) et. al., iii) art., iv) vid