

Total No. of Questions : 8]

SEAT No. :

P3979

[Total No. of Pages : 2

[5462] - 706

M.E. (Production - Manufacturing & Automation)

RESEARCH METHODOLOGY

(2017 Course) (Semester - I)

Time : 3 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Answer any five questions.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume suitable data if necessary.*

Q1) a) Differentiate between descriptive and experimental research. **[5]**

b) Explain the significance of the hypothesis in research. **[5]**

Q2) How do you evolve research design for exploratory research? Briefly analyze. Briefly explain Independent dependent and extraneous variables in a research design. **[10]**

Q3) a) Differentiate between 'Census survey' and 'Sample Survey'. Analyze multi-stage and sequential sampling. **[5]**

b) The design matrix showing the effect of temperature and pressure on strength of a glue bond is shown in Table below. Plot the Pareto chart and investigate the interaction effect. **[5]**

Experiment No.	Temperature (°C)	Pressure (MPa)	Strength of glue bond (N)
1	100	0.35	95
2	100	0.70	190
3	200	0.35	230
4	200	0.70	255

P.T.O.

Q4) Write short notes on: **[10]**

- a) Methods of collecting primary data
- b) Criteria of good research.

Q5) a) List down various measures of central tendency and explain difference between them? **[4]**

b) Use multiple linear regression to fit. **[6]**

x_1	12	14	22	31	16
x_2	0	5	10	14	7
Y	117	235	302	224	297

Where, x_1 and x_2 are input variables and Y is output variable.

Q6) a) Determine the sample size to ensure the percent defective within 3% of the true value with 92% confidence level. (Assume standard variate for 92% confidence level as 1.75 and sample proportion 0.02). **[4]**

b) For a minimization problem, using simulated annealing, the function value of 120 is updated to new value of 142 at temperature 200°C. What is the probability of accepting the new solution? **[6]**

Q7) a) How the research proposal is presented, reviewed and evaluated? **[4]**

b) What are various funding agencies to whom the research proposal can be submitted? What are criteria required to be fulfilled while submitting research proposal to these agencies? **[6]**

Q8) Write short note on: **[10]**

- a) Mechanics of writing research report.
- b) Multi-objective optimization methods.

