

M.TECH/RE/1ST SEM/ REEN 5103/2019
RESEARCH METHODOLOGY AND IPR
(REEN 5103)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Type I error is synonymous with :
 - (a) Consumer's Risk
 - (b) Producer's Risk
 - (b) Quality Control Professional's Risk
 - (d) Benefit of everyone.
 - (ii) A Research Thesis should not contain
 - (a) Literature Review
 - (b) Aims and Objectives
 - (c) Advertisement of Outcome
 - (d) Results and Discussion.
 - (iii) The number of Class Intervals for making distribution using 400 numbers of discrete data points are about
 - (a) 5
 - (b) 20
 - (c) 100
 - (d) none of (a), (b), (c).
 - (iv) Descriptive Statistics is:
 - (a) Description of scenic beauty
 - (b) application of probability measure
 - (c) mode of analysis of data
 - (d) a simulation technique.
 - (v) Pareto Analysis is
 - (a) a basic TQM tool
 - (b) A stochastic analysis
 - (c) synonymous with Ishikawa diagram
 - (d) SWOT analysis.
 - (vi) The names of Four Software are given below whereby three would serve same purpose, identify the odd one
 - (a) MS- Excel
 - (b) Origin Lab
 - (c) SPSS
 - (d) Apple Page.

- (vii) Interpretation of ANOVA needs
 - (a) t- distribution chart (b) Chi-square distribution Chart
 - (c) Gantt Chart (d) F distribution chart.
- (viii) Identify the plan not related with acceptance sampling
 - (a) Dodge- Romig (b) MIL- STD-105 (c) Chsp (d) PPP.
- (ix) The Journal Impact factor is published by
 - (a) Thompson Reuters (b) PTI
 - (c) Chicago University Press (d) Audit Bureau of Circulations India.
- (x) Personnel working in the market research group is responsible for the job of
 - (a) equipment selection
 - (b) product evaluation
 - (c) equipment design
 - (d) cost estimation

Group – B

- 2. (a) IPR is helpful in protecting the interest of stakeholder -- Discuss Critically.
- (b) Enumerate the steps for filing a patent in India.

6 + 6 = 12

- 3. What are the main components of any research work? You are applying for PhD programme in abroad -- Enumerate how you proceed for writing your SOP.

6 + 6 = 12

Group – C

- 4. What is the role of a leader in a Quality Circle? A Q.C. was formed in a manufacturing unit of a Renewable Energy Industry. In the first meeting an effective brainstorming was conducted and the circle identified a problem pertaining to the same work area. In a next meeting the members identified 20 causes of the selected problem under four sub-heads. Considering you to be the leader of the circle present this case study and draw an Ishikawa diagram.

3 + 9 = 12

- 5. Samples of two types of electric light bulbs were tested for length of life and following

	Type I	Type II
Sample no.	n ₁ =8	n ₂ =8
Sample Means	$\bar{x}_1 = 1,234$ hrs.	$\bar{x}_2 = 1,036$ hrs.
Sample Standard Deviations	s ₁ = 36 hrs.	S ₂ = 40 hrs.

Is the difference in the means sufficient to warrant that Type I is superior to Type II regarding length of life?

[Data for comparison: The tabulated value of the parameter at requisite degrees of freedom is 1.77]

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Group – D

- 6. A textile company weaves a fabric on a large number of looms. They would like the looms to be homogeneous so that they can obtain a fabric of uniform strength. The process engineering suspect that, in addition to the usual variation in strength within samples of fabric from the same loom, there may also be significant variations in the strength between looms. to investigate this she selects four looms at random and makes four strength determinations on the fabric manufactured on each loom. This experiment is run in random order, and data obtained are shown in the following table

Looms	Observation				y _i
	1	2	3	4	
1	98	97	99	96	390
2	91	90	93	92	366
3	96	95	97	95	383
4	95	96	99	98	388
Total					1527

Compute analysis of variance (ANOVA) and draw your conclusion.

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- 7. (a) Formulate a two-factor Design of Experiment model without interactions.
- (b) Enumerate the basic steps of conducting experimental designs using RSM.

6 + 6 = 12

Group – E

- 8. What is Google's Scholar Citation? Discuss the steps to find an author's h- index. What is i10 index?
- 9. You are to prepare a Poster of 3' × 5' from a power point presentation. Mention the name of a convenient software and enumerate the steps of working with it.

3+ 6 + 3 = 12

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