Instructions:

1. PART A : Contains 4 main questions (8 sub questions) . Total 32 marks
2. PART B: Answer any three questions out of 5. Each carries 16 marks. Total 48 marks
3. PART C is Case Study (Compulsory.) Total 20 marks.

1. Select Correct Answer

a) Conceptual research is that related to

   i) Concept ideas
   ii) Abstract ideas
   iii) Empirical analysis

b) Research can either be

   i) Fundamental or basic
   ii) Information oriented
   iii) Knowledge driven

c) Basic approach of Research is

   i) Qualitative
   ii) Diagnostic
   iii) Field Oriented

d) Simulation approach is basically

   i) Model approach
   ii) Creating artificial environment within which data can be generated
   iii) Experimental

e) Deliberate Sampling is known as

   i) Cluster Sampling
   ii) Quota Sampling
   iii) Non-Probability Sampling
f) Good Research is
   i) Non logical
   ii) Empirical
   iii) Non-Replicable

g) Continuous variables are
   i) Integer in nature
   ii) Discrete
   iii) Quantitatively different values

h) Standard deviation is commonly denoted by
   i) Alpha
   ii) Beta
   iii) Sigma

2. Fill up the blanks

   a) Mean deviation from mode = ____________ \( Xi = i^{th} \) values of variable \( X; \ n = \text{no.}; \ Z = \text{mode}. \)

   b) Dividing standard deviation by arithmetic average is known as ________

   c) Geometric mean of \( n \) number 4, 6, 9 = __________

   d) Harmonic mean of number 4, 5, and 10 = ________

   e) Range is the simplest possible measure of __________

   f) Inferential statistics are also known as ____________

   g) Most popular statistical averages are Mean, ________, __________

   h) ANOVA is _____________________
3. Match the following :-

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Mode is commonly</td>
<td>a) Average of reciprocal</td>
</tr>
<tr>
<td>b) Sample does not constitute homogenous group</td>
<td>b) Null hypothesis is accepted</td>
</tr>
<tr>
<td>c) Tests consists of service of pictures</td>
<td>c) Spearman’s co-efficient</td>
</tr>
<tr>
<td>d) Statistical relationship between two or more variables</td>
<td>d) T.A.T.</td>
</tr>
<tr>
<td>e) Harmonic Mean</td>
<td>e) Comparing variance</td>
</tr>
<tr>
<td>f) Chi-square as a test for</td>
<td>f) Occurring value in a series</td>
</tr>
<tr>
<td>g) ( X^2 ) value is equal to table value</td>
<td>g) Stratified sampling</td>
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<tr>
<td>h) Rank co-relation is named as</td>
<td>h) Regression</td>
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</tbody>
</table>

4. Find True or False of the following

a) Co-efficient of standard deviation is the ratio of standard deviation and arithmetic average
b) Rating scale is known as numbering scale
c) Louis Guttman’s Scalogram analysis is a cumulative scale
d) Pilot survey is not a replica of main survey
e) Range is the difference between highest & lowest value of a series
f) Analysis of co-variance is termed
g) Irregular as ANOVA fluctuations is also known as Random fluctuation
h) Focused interview is to focus attention to given experience
Part – B
(Answer any three)

5. a) What are the measure of central tendency? Discuss
b) Illustrate different graphical methods of data presentation

6. Given the forecasting figures of four years; find out forecast value of the 5th year, with the help of regression analysis. (Y = a + bx)

<table>
<thead>
<tr>
<th>Year (X)</th>
<th>F/C Values (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>110</td>
</tr>
<tr>
<td>3</td>
<td>110</td>
</tr>
<tr>
<td>4</td>
<td>105</td>
</tr>
</tbody>
</table>

7. Write short notes (any four) (4X4 = 16)
   a) Chi-Square test
   b) ANOVA
   c) Louis Guttman’s Scalogram Analysis
   d) Two-factor Evaluation Approach
   e) Preparation of normal distribution
   f) Procedures for testing of hypothesis

8. Distinguish between any two 8 + 8
   a) Ordinal Scale & Nominal Scale
   b) Poisson Distribute & normal Distribution
   c) ‘t’ – test and ‘z’ test
   d) ANOVA & ANOCOVA

9. a) What is simple random sampling?
   b) What are the major component of research reports?
   c) What do you mean by ‘Decision Tree Analysis’
Cummins Engine, a heavy Capital Intensive Company, frequently made decisions on outsourcing based on the level of difficulty to produce a part/component. The firm must evaluate the entire hierarchy of components essential to its competitive position, considering future product generation. Cummins needs to invest heavily to upgrade capabilities in the ‘Backhoe’ design. Debate occurred over whether to in-source or outsource ‘Piston’. The designer found Cummins’ internal capabilities inferior to the leading piston manufacturer.

A company like Cummins can achieve ‘architectural knowledge’ to facilitate this process and when a large number of parts were previously made in-house, the organization must upgrade its supply base management practices. RON Temple, VP of Electronic Technology, called a meeting for the Designers, Engineers, Operation Engineers & Marketing Executives to discuss and debate about outsourcing of the main part (Piston Assembly) of the engine and asked for the opinion of the development of the architectural knowledge to upgrade supply base management.

Q: You are to give your analysis supporting RON’s advice.