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

Part A

1. Select Correct Answer

a) Criteria of Good Research
   i) Purpose is clearly defined
   ii) Purpose is spelt out but to define before final result
   iii) Validity of the data may not be clearly checked

b) Primary data can be collected
   i) Either through experiment or through survey
   ii) From journals and periodicals
   iii) Government data sources

c) Important scaling techniques (give priority of two most important)
   i) Arbitrary Scale
   ii) Rating Scale
   iii) Differential Scale
   iv) Likert-type Scale

d) Geometric Mean of 4, 6, 9 is
   i) 5    ii) 4, 5    iii) 6

e) Difference between Survey and experiment is
   i) Recording Method
   ii) Sample Analysis
   iii) One is behavioural science and other is physical science
f) Standard deviation is commonly denoted by
   i) Alpha    ii) Beta     iii) Sigma

g) Curve showing no skewness in which case we have :
   i) $\overline{X} > M$    ii) $\overline{X} < Z$    iii) $\overline{X} = M = Z$

h) The metric appreciation test consists of a set of :-
   i) Algorithms   ii) Pictures   iii) Random Data

2. Fill up the blanks :-
   a) Harmonic Mean of no. 4, 5, 10 __________
   b) Measure of dispersion is __________
   c) Standard deviation $\sigma$ is __________ (express in term of $X_i$, $X$, $n$)
   d) Basic concepts in the context of testing of hypothesis are ______ ______
   e) One of the term of Research Validity is __________
   f) The itemized rating Scale is known as ______________
   g) Reliability of Data depends on ____________
   h) Research hypothesis must contain ________ and _______

3. Match the following :-

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Sampling Error</td>
<td>a) Standard Error (SE)</td>
</tr>
<tr>
<td>b) Charle’s Spearman’s co-efficient of co-relation</td>
<td>b) Collected afresh</td>
</tr>
<tr>
<td>c) Karl Pearson has suggested a measure known as</td>
<td>c) is used to find out difference between ranks of two variables</td>
</tr>
<tr>
<td>d) Time series model</td>
<td>d) Done at Consumer’s level</td>
</tr>
<tr>
<td>e) Standard Deviation is also known as</td>
<td>e) Indirect interview methods</td>
</tr>
<tr>
<td>f) Primary Data</td>
<td>f) Addition of frame, chance and</td>
</tr>
</tbody>
</table>
4. Find True or False of the following :-
   
a) Partial Co-relation measure only relationship between two variables
b) Structured interview involves predetermined questions
c) Clinical interview concerns about individual’s life experience
d) Measures of dispersion is Mode
e) Secondary data have not passed through statistical process
f) In order to judge association between two attributes, we use chi-sq. test
g) Y=a+bx is simple Regression
h) Null hypothesis is accepted when $x^2$ value is not equal to table value

**Part B**

*(Answer any three questions)*

5 a) Explain the meaning of following co-relation co-efficient :
   i) $r_{yx}$  
   ii) $r_{y1x2}$

b) How would you workout following statistical measures :-
   i) co-efficient of skewness
   ii) Regression equation of $X$ on $Y$

6 Write short notes on (any two)
   a) ANOVA
   b) Cross tabulation
   c) Chi-Square Distribution ($x^2$)
   d) Significance level

7 Explain and illustrate the following research designs :-
   a) Latin Square Design
   b) Simple factorial Design
Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots. Find out total ‘SS’ value.

<table>
<thead>
<tr>
<th>Plot of land</th>
<th>Per Acre Production Data</th>
<th>Variety of Wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

Distinguish between any two (8 + 8)

a) t-test and z-test
b) Hypothesis and null-hypothesis
c) Likert-type and Arbitrary Scale
d) Poisson and normal distribution

Part C
(Case Study)

Raja Restaurant near the railway station ‘Hooghly’ having average sales of 500 tea cups per day. Because of development of bus stand nearby it expects to increase its sales. During first twelve days of starting of bus stand the daily sales as under:

550, 570, 490, 615, 505, 580, 570, 460, 600, 580, 530, 526.

With these information can you conclude sales have increased. (use 5% level of confidence)

(t distribution value of 11 degrees of freedom 5% level = 1.796)