



**2023/TDC(CBCS)/EVEN/SEM/
STSSEC-401T(A/B)/274**

TDC (CBCS) Even Semester Exam., 2023

STATISTICS

(4th Semester)

Course No. : STSSEC-401T

Full Marks : 50

Pass Marks : 20

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Candidates have to answer *either* Option—A
or Option—B

OPTION—A

Course No. : STSSEC-401T (A)

(Statistical Techniques for Research Method)

SECTION—A

Answer any *fifteen* questions : $1 \times 15 = 15$

1. Define research.
2. Mention one motivation behind doing research.



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3. Define analytical research.
4. What are the two approaches of research?
5. Write one objective of research.
6. Schedule is filled by what?
7. What is meant by review of literature?
8. What is research gap?
9. What is schedule?
10. Write one advantage of doing pilot survey.
11. What is primary data?
12. Write one source of collecting secondary data.
13. What is coverage error?
14. Define sampling frame.
15. What is non-response due to no-contact?
16. Define sampling error.
17. Define mean and variance.
18. What is p -value?

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19. Name any two statistical tools used for data processing.
20. Write one importance of data processing.

SECTION—B

Answer any *five* questions :

2×5=10

21. Write a note on the different research approaches.
22. Define research problem.
23. Why is defining a research problem important?
24. Write how to find a research gap.
25. Write a note on research objective.
26. Explain sample survey.
27. Write two advantages of interview method.
28. Define target population.
29. What is non-response in surveys?
30. Explain any two methods of data analysis.

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SECTION—C

Answer any *five* questions :

5×5=25

31. Explain the steps of doing research.
32. Write a note on the significance of research.
33. Write how to formulate sampling procedure.
34. Distinguish between schedule and questionnaire.
35. What are the guidelines that one should follow while formulating a research objective?
36. Define questionnaire. Write down the points that one should follow while preparing a questionnaire.
37. Explain different methods of collecting primary data.
38. Distinguish between sampling error and non-sampling error.
39. What are the precautions that need to be adopted when we do data interpretation?
40. Develop a questionnaire on the topic—
“A comparative study of Gender Discrimination in public and private sectors”.

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OPTION—B

Course No. : STSSEC-401T (B)

(Data Analysis using R)

SECTION—A

Answer any *fifteen* questions :

1×15=15

1. A frequency distribution can be represented graphically by what?
2. Which graphs can display the inter-quartile range of a dataset?
3. Which R command can be used to compute the arithmetic mean of a dataset?
4. What is a data frame in R?
5. Write the equation of an exponential curve between two variables.
6. What is the difference between `pnorm()` and `rnorm()` commands in R?
7. What is the range of regression coefficient?
8. Write the command of two-sample *t*-test in R.

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9. Which command can be used to generate random numbers in R?
10. What is ANOVA?
11. How can you load a .CSV file in R?
12. In R, how can you import data?
13. How can you save your data in R?
14. Explain how you can create a table in R without external file.
15. What is R?
16. How do you assign a variable in R?
17. What is the basic syntax for creating scatterplot in R?
18. What is the main difference between an array and a matrix?
19. How do you get the standard deviation for a vector x ?
20. Give the command to create a histogram.

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SECTION—B

Answer any five questions : 2×5=10

21. Explain the steps in R for reading data written in a CSV file.
22. With the help of an example, explain how pie-chart can be drawn in R.
23. Write the commands to compute the standard deviation and variance of a dataset X in R.
24. Write how to compute β_1 and β_2 for a dataset X in R, where β_1 and β_2 are skewness and kurtosis respectively.
25. Suppose X is a random variable following binomial distribution with parameters $(6, \frac{1}{4})$. Plot the corresponding probability mass function in R.
26. Write the R commands which can fit an exponential curve given the values of (X, Y) .
27. Write the R commands that can test the significance of correlation coefficient between two variables X and Y .

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28. Explain how F -test can be performed in R.
29. Generate 50 random numbers from a Poisson distribution with parameter 1.2 in R.
30. Write the assumptions of two-way ANOVA.

SECTION—C

Answer any five questions :

5×5=25

31. Represent the following numbers using appropriate graphical tool :
21, 27, 93, 31, 37, 43, 46, 54, 52,
59, 60, 47, 73, 72, 79, 83, 86, 27
Write the corresponding command in R.
32. Write the commands for drawing a box-plot in R with all necessary accessories :
 $X : 13 \quad 17 \quad 19 \quad 24 \quad 27 \quad 43$
 $Y : 6 \quad 7 \quad 14 \quad 12 \quad 23 \quad 29 \quad 32$
33. A dataset is as follows :
 $X : 12, 17, 43.2, 46.4, 32.6, 42$
Write the R commands following which one can compute the coefficient of variation of X .

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34. For the dataset provided in question number 33, write the commands in R to compute the coefficient of range.
35. Explain the process of plotting any probability mass function in R.
36. The values of X and Y are as follows :
 $X : 2 \quad 7 \quad 9 \quad 18 \quad 24 \quad 29$
 $Y : 7 \quad 16 \quad 42 \quad 108 \quad 210 \quad 279$
Write the R commands to fit a—
(a) linear regression;
(b) quadratic regression;
between X and Y with X as the independent variable.
37. Take a hypothetical dataset comprising of two variables X and Y and write the R commands to perform two independent samples t -test and F -test.
38. For the values of X and Y provided in the appendix, write the R commands to compute the regression coefficients b_{XY} and b_{YX} and hence compute the value of the correlation coefficient.

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39. Write the R commands to draw two random samples of size 100 each from two normal distributions viz., $N(5, 1.7)$ and $N(7.6, 2.8)$. Hence calculate the estimated mean and variance from the corresponding samples.
40. Write the R commands for performing two-way ANOVA and the corresponding commands for pairwise comparison in case any null hypothesis is rejected.
