B.Sc. 5th Semester (Honours) Examination, 2020(CBCS)
Subject: Statistics
Paper: DSE-1

Time :2 Hours **Full Marks : 40**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
Notations have their usual meaning.

Statistical Quality Control

Answer *any* ***eight*** of the following questions. **8×5=40**

1. What is the average outgoing quality limit? Illustrate your answer with a suitable example.
2. What are 'rational sub-groups' in Shewhart's control charts? Mention two possible bases of forming such sub-groups.
3. Point out the differences between control limits and specification limits. Suggest a control chart where specification limits are also used to check the state of control.
4. Explain the control chart for fraction defectives. Why is it better than the *np* chart when the sample size varies?
5. Evaluate the 3σ-control limits for number of defects when standard is not given and state their use in Statistical Process Control (SPC).
6. Define Operating Characteristic (OC) curve. Discuss its role in identifying a suitable sampling inspection plan.
7. Distinguish between 'producer's risk' and 'consumer's risk'. Identify them with Type-I and Type-II errors.
8. What is product control? How does it differ from process control?
9. The lifetime of an electronic component follows a normal distribution with standard deviation 10 hours. Given a lower specification of 200 hours, discuss how will you set up a sampling inspection plan for mean?
10. Write a short note on the double sampling plan by an attribute. Using suitable approximations, also obtain the average outgoing quality (AOQ).

OR

Econometrics

Answer *any* ***eight*** of the following questions: **8×5=40**

1. Define multicollinearity. How do you detect the presence of multicollinearity in data?

2. Write a short note on autocorrelation. Give a real life instance where auto-correlation may appear.

3.Explain the generalized least square method. How do you estimate parameters in this set up?

3. Write a short note on heteroscedastic models.

4. Define simple regression models along with assumptions. What are the drawbacks of these assumptions? Explain.

5. Define heteroscedasticity and describe its impact in OLS method.

6. Describe Goldfield Quandt test for detection of heteroscedasticity.

7. What do you mean by dummy variable? Explain its importance in econometrics.

8. Derive the efficiency of Aitken estimator with OLS estimator under heteroscedasticity.

9. How will you estimate the regression coefficients when the errors are autocorrelated in a regression model?

10. How do you examine the fitting of a multiple regression line?