'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 6th Semester [Special] Examination, 2023

DSE-P3-COMPUTER SCIENCE (63)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
All symbols are of usual significance.

The question paper contains DSE63-E1, DSE63-E2 and DSE63-E3.
The candidates are required to answer any *one* from *three* courses.
Candidates should mention it clearly on the Answer Book.

DSE63-E1-DIGITAL IMAGE PROCESSING

GROUP-A

Answer any *five* questions 1×5 = 5

1. What is hue of saturation?
2. Define brightness.
3. Define Fourier transformation pair.
4. What is quantization?
5. List the applications of colour models.
6. What is image compression?
7. Define channel encoder.
8. Mention the applications of Image processing.

GROUP-B

Answer any *three* questions 5×3 = 15

9. What are the components of digital image processing system? Explain.
10. Distinguish spatial correlation and convolution. Explain with identical examples.
11. Write a short note on image restoration and image degradation.
12. Write a short note on Huffman coding.
13. Differentiate lossy and lossless image compression.

GROUP-C

Answer any *two* questions 10×2 = 20

14. Explain the segmentation techniques that are based on finding the regions directly.

15. What are the two approaches for blind image restoration? Explain in detail.

16. Explain the histogram equalization method of image enhancement.

17. What is morphological image processing? What are the two most widely used morphological operations? Explain in detail.

DSE63-E2-INTRODUCTION TO DATA SCIENCES

GROUP-A

Answer any *five* of the following 1×5 = 5

1. What is a training set?

2. Explain Logistic Regression.

3. What does *n*-fold cross validation mean?

4. What is the utility of a heat map?

5. Define outliers.

6. What do you mean by pre-processing?

7. State the difference between data science and big data.

8. What is github?

GROUP-B

Answer any *three* of the following 5×3 = 15

9. Explain the different stages in data science project.

10. Discuss various exploratory techniques for summarizing data.

11. Explain the process of obtaining data from web with an example.

12. What are objects in R? Explain with examples.

13. Discuss about graphical analysis in data sciences.

GROUP-C

Answer any *two* of the following 10×2 = 20

14. Write a program in R to implement matrix subtraction and multiplication as per user choice.
15. Discuss different loop structures in R with examples.
16. Explain the benefits of Data Visualization.
17. Obtain probability distribution, where X is the number of spots shown when a six-sided symmetric die (i.e. all six faces of the die are equally likely) is rolled. Simulate random samples of sizes 40, 70 and 100 respectively and verify the frequency interpretation of probability.

DSE63-E3-DATA MINING

GROUP-A

Answer any *five* questions 1×5 = 5

1. What is Data mining?
2. Mention two major issues of Data mining.
3. What is a neural network?
4. Mention the relation between Data mining tools and Query tools.
5. Define Temporal Data mining.
6. Define Data cleaning.
7. Write the steps of knowledge discovery from data.
8. What is metadata?

GROUP-B

Answer any *three* questions 5×3 = 15

9. Explain the hierarchical methods used for performing data clustering.
10. Compare Data, Information and Knowledge with suitable examples.
11. Discuss the missing value with suitable example.
12. Compare Descriptive Data mining and Predictive Data mining.
13. Discuss in brief any two data pre-processing approaches.

GROUP-C

Answer any *two* questions 10×2 = 20

14. Explain in detail the ‘Decision tree’ with suitable example.
15. Write down the K-means algorithm for partitioning data into clusters.
16. Discuss the steps of the Data mining process.
17. Explain the strategies for data reduction.

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