



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 6th Semester Examination, 2022

DSE-P3-COMPUTER SCIENCE (63)

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

**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. Define a digital image.
2. Give an example of each image that can be created by the following electromagnetic rays:
 - (i) Gamma rays
 - (ii) Infrared
3. Define weber ratio.
4. What is aliasing?
5. What is image compression?
6. Expand DCT.
7. Give two example of edge kernel operator.
8. Define contrast stretching.

GROUP-B

Answer any *three* questions

5×3 = 15

9. Discuss the piecewise Linear transformation.
10. Write a short note on Co-ordinate convention.
11. Write a short note on sampling and quantization.

12. Discuss the concept of Contrast Stretching.
13. Write a short note on Huffman coding.

GROUP-C

Answer any *two* questions

10×2 = 20

- 14.(a) Consider the following 3 bit image.

7+3

I =

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 5 | 5 | 5 | 4 | 4 | 5 | 3 |
| 2 | 2 | 2 | 5 | 4 | 5 | 3 | 3 | 3 | 2 |
| 2 | 3 | 3 | 5 | 2 | 1 | 5 | 5 | 5 | 2 |
| 3 | 2 | 2 | 5 | 3 | 4 | 4 | 4 | 2 | 1 |
| 2 | 2 | 3 | 2 | 1 | 1 | 5 | 4 | 2 | 0 |
| 2 | 2 | 3 | 2 | 2 | 1 | 5 | 5 | 5 | 3 |
| 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| 2 | 2 | 2 | 4 | 4 | 4 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 5 | 4 | 2 | 2 | 2 | 2 | 1 |

find the histogram equalized image of I.

- (b) Discuss LZW coding.
- 15.(a) Discuss Fourier Transformation and its properties. 6+4
- (b) Discuss spatial correlation and convolution operation in digital image processing.
16. Discuss image morphing in detail. 10
17. What is image compression? Differentiate Lossy and Lossless image compression. 2+8

DSE63-E2-INTRODUCTION TO DATA SCIENCES

GROUP-A

Answer any *five* from following

1×5 = 5

1. Define Data Science. 1
2. What do you mean by Data Pre-processing? 1
3. What are the techniques available to clean data in an excel sheet? 1
4. Define cross validation. 1
5. What is the syntax for defining a matrix in R? 1

- | | | |
|----|---|---|
| 6. | How Data Science differs from Big Data? | 1 |
| 7. | Why data cleansing is important? | 1 |
| 8. | What is GitHub used for? | 1 |

GROUP-B

Answer any *three* from following 5×3 = 15

- | | | |
|-----|--|---|
| 9. | What is Data Science and its benefits? | 5 |
| 10. | What are the goals of Data Science? | 5 |
| 11. | What are the problems face when handling large data? | 5 |
| 12. | Explain R objects. | 5 |
| 13. | Discuss how to collect data from a website. | 5 |
| 14. | Explain different stages of data science. | 5 |

GROUP-C

Answer any *two* from following 10×2 = 20

- | | | |
|--------|--|-------|
| 15. | Explain the application of Data Science in various fields. | 10 |
| 16. | Write about the various methods of Data Collection involved in Data Science. | 10 |
| 17. | Explain data security issues with suitable examples. | 10 |
| 18.(a) | What are vectorized operations in R? Give example. | 3+3+4 |
| | (b) Briefly explain “for loop” and “while loop” in R. | |
| | (c) Briefly explain how the objects and classes defined in R. | |

DSE63-E3-DATA MINING

GROUP-A

- | | | |
|----|---|---------|
| 1. | Answer any <i>five</i> questions: | 1×5 = 5 |
| | (a) What is Data mining? | |
| | (b) Write the name of four data mining tools. | |
| | (c) What is metadata? | |

- (d) Define Spatial Data mining.
- (e) Mention the need of Data mining.
- (f) Define Data cleaning.
- (g) Mention the relation between Data mining tools and Query tools.
- (h) Write the name of appropriate Data mining technologies.

GROUP-B

2. Answer any *three* questions: 5×3 = 15
- (a) Compare Data, Information and Knowledge with suitable example.
 - (b) Briefly mention the major issues of Data mining.
 - (c) Discuss the noisy data with suitable example.
 - (d) Mention few real time applications of Data mining.
 - (e) Compare Descriptive Data mining and Predictive Data mining.

GROUP-C

3. Answer any *two* questions: 10×2 = 20
- (a) With appropriate examples explain the classification of Data mining.
 - (b) Explain in detail the “Decision tree” with suitable example. Also justify why prune is needed in such tree.
 - (c) Discuss in brief any four data pre-processing approaches.
 - (d) Discuss the steps of the Data mining process.

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