**BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2022 COURSE)**

**B.C.A. Sem-III : WINTER : 2023**

**SUBJECT : OPERATING SYSTEMS**

Day : Tuesday | Time : 02:00 PM-05:00 PM

Date : 21-11-2023 | **W-26286-2023** | Max. Marks : 100

**N.B.**

1) Attempt any **FIVE** questions from Section –**I** and any **TWO** questions from Section – **II .**
2) Figures to the right indicate **FULL** marks.
3) Answers to both sections should be written **SAME** answer book.

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**SECTION - I**

**Q.1** **a)** What is an operating system? List and explain its functions. **(06)**

**b)** Explain Architecture of an Operating System. **(06)**

**Q.2** **a)** What is process? Give difference between process and program. **(06)**

**b)** Differentiate between Batch processing system and Real Time Processing System. **(06)**

**Q.3** Define Process Scheduling. Differentiate between Short – Term, Medium – Term and Long – Term scheduler. **(12)**

**Q.4** **a)** Explain contiguous and non – contiguous memory Allocation Techniques in Operating System. **(06)**

**b)** Explain optimal Page replacement algorithm. **(06)**

**Q.5** **a)** What is Deadlock? Explain Banker's Algorithm. **(06)**

**b)** Explain following terms **(06)**

i) Critical Region
ii) Semaphore

**Q.6** **a)** What is file system? Explain various types of files with attributes. **(06)**

**b)** What are different file allocation methods? Explain Indexed File allocation. **(06)**

**Q.7** Write short notes on following **(Any TWO)** **(12)**

**a)** Virtual Memory
**b)** File operations
**c)** System call
**d)** Fragmentation



**P.T.O.**

## SECTION - II

**Q.8** **a)** Explain various process scheduling algorithm in detail. **(10)**

**b)** Consider following processes arrived in ready queue at same time with following sequence. Calculate average waiting time and average turned around time using FCFS and SJF scheduling algorithm. **(10)**

| Process | Burst time (in ms) |
|---|---|
| $P_4$ | 3 |
| $P_2$ | 60 |
| $P_3$ | 1 |
| $P_5$ | 50 |
| $P_1$ | 12 |

**Q.9** **a)** Explain various page replacement algorithms. **(10)**

**b)** Consider following page reference string. **(10)**
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1 with 3 frames calculate total page faults using following algorithms
i) FIFO
ii) Optimal page replacement

**Q.10** **a)** Explain the following disk scheduling algorithm **(10)**
i) SSTF
ii) SCAN
iii) LOOK

**b)** Consider a disk with 200 tracks and the queue has random requests from different processes in the following order **(10)**
55, 58, 39, 18, 90, 160, 150, 38, 184
Initial position of arm is at 100. Find total head movements using
i) FCFS
ii) SSTF



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**BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2022 COURSE)**
**B.C.A. Sem-III : WINTER : 2023**
**SUBJECT : SOFTWARE ENGINEERING**

Day : Thursday
Date : 23-11-2023

**W-26287-2023**

Time : 02:00 PM-05:00 PM
Max. Marks : 70

**N.B.:**

1) Attempt **ANY FIVE** questions from Section – I and **ANY TWO** questions from Section – II.
2) Answers to both the section should be written in **SAME** answer book.
3) Figures to the right indicate **FULL** marks.

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## SECTION – I

**Q.1** Differentiate between Incremental Model & RAD model. **(12)**

**Q.2** What is SDLC? Explain various stages of SDLC in detail. **(12)**

**Q.3** What is requirement engineering? Explain the different types of requirements elicitation techniques in detail. **(12)**

**Q.4** State and explain function oriented modelling and design. How is it different from structured modelling? **(12)**

**Q.5** Explain in detail Entity Relationship Diagram with example. **(12)**

**Q.6** Explain with neat diagram following software development process models: **(12)**
a) Waterfall model
b) V Model
c) Prototyping model

**Q.7** Write short note on (**ANY TWO**): **(12)**
**a)** Qualities of Good SRS
**b)** Software modules
**c)** Software Quality Assurance

## SECTION – II

**Q.8** **a)** Explain the need of feasibility study. What are different types of feasibility study? **(10)**
**b)** What is the role of team leader in software development? Explain functions of programmes in software development in brief. **(10)**

**Q.9** **a)** Draw a data flow diagram up to two levels for student admission system. **(10)**
**b)** Draw E-R diagram for the same specify (entities, attributes & cardinality). **(10)**

**Q.10** **a)** State and explain cohesion and coupling. **(10)**
**b)** What is data dictionary? Explain the importance of data dictionary. **(10)**

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**BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2022 COURSE)**

**B.C.A. Sem-III : WINTER : 2023**

**SUBJECT : JAVA PROGRAMMING**

Day : Saturday | Time : 02:00 PM-05:00 PM

Date : 25-11-2023 | **W-26288-2023** | Max. Marks : 100

**N. B. :**

1) Attempt **ANY FIVE** questions form Section – **I**. Each question carries **12** marks.
2) Attempt **ANY TWO** questions form Section – **II**. Each question carries **20** marks.
3) Figures to the right indicate **FULL** marks.
4) Answers to both the sections should be written in **SAME** answer book.

## SECTION – I

**Q. 1** Explain exception handling with example. **(12)**

**Q. 2** What is inheritance? Explain its different types. **(12)**

**Q. 3** Explain different features of Java. **(12)**

**Q. 4** What is an applet? Explain its life cycle. **(12)**

**Q. 5** Explain different looping statements used in Java with suitable example. **(12)**

**Q. 6** What is stream? Explain different streams used in Java. **(12)**

**Q. 7** Write short notes on **ANY THREE** of the following: **(12)**

**a)** super keyword

**b)** static keywords

**c)** GUI controls

**d)** final keyword

## SECTION – II

**Q. 8** **a)** Write a program in Java to find factorial of a given number. **(10)**

**b)** Write a program in Java to design a class student and initialize its data members rollno and sname by the values 100 and "Rajesh" respectively using constructor. **(10)**

**Q. 9** Write a Java program to read the content from one file and write it to another file. **(20)**

**Q.10** **a)** Write a Java program to multiply following two matrices. **(10)**

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$$

**b)** Write a program in Java to add two numbers using method. **(10)**

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**BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2022 COURSE)**

**B.C.A. Sem-III : WINTER : 2023**

**SUBJECT : STATISTICS**

Day : Monday | Time : 02:00 PM-05:00 PM

Date : 27-11-2023 | **W-26289-2023** | Max. Marks : 100

**N.B.:**

1) Attempt **ANY FIVE** questions from Section – I and **ANY TWO** questions from Section – II.
2) Answer to both the sections should be written in **SAME** answer book.
3) Figures to the right indicate **FULL** marks.

## SECTION – I

**Q.1** Calculate mean deviation about mean for following frequency distribution. **[12]**

| Age in years | 0 -10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 |
|---|---|---|---|---|---|---|
| f | 7 | 9 | 14 | 20 | 17 | 13 |

**Q.2** In a Beauty Contest Ranks for 10 contestants were given by two judges is as follows. Calculate Rank Correlation. **[12]**

| Judge 1 | 6 | 10 | 2 | 9 | 8 | 1 | 5 | 3 | 4 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| Judge 2 | 5 | 4 | 10 | 1 | 9 | 3 | 8 | 7 | 2 | 6 |

**Q.3** Estimate the value of X corresponding to Y = 200 from the following data **[12]**

| X | 250 | 248 | 297 | 338 | 463 | 393 |
|---|---|---|---|---|---|---|
| Y | 137 | 147 | 184 | 196 | 276 | 260 |

**Q.4** Represent following data with histogram , frequency polygon and ogive curves. **[12]**

| x | 100 – 200 | 200 – 300 | 300 – 400 | 400 – 500 | 500 – 600 | 600 – 700 |
|---|---|---|---|---|---|---|
| f | 12 | 18 | 25 | 40 | 15 | 10 |

**Q.5** The mean of 200 items was 50. Later on it was discovered that two items were misread as 92 and 8 instead of 192 and 88 respectively. Find the correct mean. **[12]**

**Q.6** Explain different measures of central tendency along with their merits and demerits. **[12]**

**Q.7** Write short notes on **ANY TWO** of the following: **[12]**

**a)** Merits and demerits of Karl Pearson's coefficient of correlation

**b)** Coefficient of variation

**c)** Types of data

**P.T.O.**

## SECTION – II

**Q.8** For the following raw data of marks of test conducted for 50 students. Prepare frequency distribution and calculate mean, median and mode: **[20]**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 45 | 43 | 37 | 03 | 15 | 35 | 12 | 15 | 04 | 37 |
| 40 | 25 | 35 | 20 | 30 | 13 | 48 | 49 | 05 | 10 |
| 30 | 31 | 15 | 17 | 18 | 25 | 08 | 17 | 15 | 35 |
| 36 | 47 | 04 | 42 | 19 | 20 | 25 | 27 | 33 | 38 |

**Q.9** Given the median sales of a shop were ₹ 2,400 and the missing frequency. Calculate mean and mode of the completed frequency distribution. **[20]**

| x | 0 – 1000 | 1000 – 2000 | 2000 – 3000 | 3000 – 4000 | 4000 – 5000 |
|---|---|---|---|---|---|
| F | 5 | 25 | -- | 18 | 7 |

**Q.10** Find if there is any significant correlation between heights and weights using Karl Pearson's coefficient of correlation. Also draw scatter diagram for the same. **[20]**

| Height (in inches) | 57 | 59 | 62 | 63 | 64 | 65 | 55 | 58 | 57 |
|---|---|---|---|---|---|---|---|---|---|
| Weight (in lbs) | 113 | 117 | 126 | 130 | 129 | 111 | 126 | 116 | 112 |

Give your interpretation about the result.

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