

B.C.A 5th sem

Roll No. ....

Total Pages : 03

NBCA/D-25

37031

JAVA OOP FOUNDATIONS

B23-CAP-301

Time : Three Hours]

[Maximum Marks : 50

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. Answer the following :

- (a) What is the difference between JDK and JRE ?
- (b) Define event delegation model.
- (c) What is the difference between throw and throws ?
- (d) Explain Final, finally and finalize.
- (e) What is a package ? Give an example.

**Unit I**

2. Explain the concept of Object-Oriented Programming (OOP) by describing its four main principles : encapsulation, inheritance, polymorphism and abstraction. Illustrate how these principles work in the structure of a simple Java program.

3. (a) Differentiate between primitive data types in Java with examples.
- (b) Write a Java program to demonstrate typecasting and looping constructs.

## Unit II

4. Define interfaces in Java and explain, how are they implemented and extended. Illustrate your explanation with an example that demonstrates how Java achieves multiple inheritance using interfaces.
5. Explain the concept of packages in Java and differentiate between built-in and user-defined packages. Write a Java program that demonstrates the use of a userdefined package to organize classes effectively.

## Unit III

6. What are Exceptions ? Discuss the various types of exceptions in Java-Programming. How can you handle them ? Write Java code to handle your own Exception.
7. (a) Differentiate between Byte Stream and Character Stream in Java.
- (b) Write a Java program to read and write data using File I/O operations.

## Unit IV

8. What are Event Listeners in Java AWT ? Describe the working of at least *three* common event listeners with suitable examples and explain why the delegation event model is preferred over the inheritance-based model.
9. What are AWT Classes ? Write Java Program to generate Even numbers and Odd numbers in TextField 'T1 and T2 respectively' while pressing Button 'Even' and 'Odd'.





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Roll No. ....

Total Pages : 03

NBCA/D-25

37032

LINUX AND SHELL PROGRAMMING  
B23-CAP-302

Time : Three Hours]

[Maximum Marks : 50

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. (a) Explain, how to switch users and use the su and sudo commands ? 2
- (b) Discuss the symbolic mode of chmod command using examples. 2
- (c) How can the symbolic links be created ? Explain. 2
- (d) Explain the steps involved in process creation in Linux. 2
- (e) What are standard input, standard output and standard error in the shell ? Explain. 2

## Unit I

2. (a) What are Linux distributions ? List and discuss at least *five* popular Linux distributions. 5
- (b) Explain the overall architecture of the Linux operating system, detailing each main component and its function. 5
3. (a) Explain the process of logging in and logging out in Linux. How are user accounts and authentication handled ? 5
- (b) Compare Linux with Unix for similarities and dissimilarities. 5

## Unit II

4. Discuss process and communication oriented commands (*three* each) using syntax and examples. 10
5. (a) What are regular expressions and why are they important in Linux ? How can regular expressions be used with the grep command to search for patterns in text files ? 5
- (b) Discuss the date, script and expr commands with their format and suitable examples. 5

### Unit III

6. Explain the various types of file systems used in Linux. Also discuss the structure of file systems. 10
7. (a) What is the difference between cron, at, and batch scheduling tools in Linux ? Discuss using commands and syntax. 6
- (b) What is an initialization process in Linux ? Explain the role of init and systemd during the system boot process. How do they manage services and targets ? 4

### Unit IV

8. (a) Write down the cursor movement commands in vi editor. 5
- (b) What are shell variables in Linux ? Explain the difference between user-defined variables and environment variables with examples. 5
9. (a) Discuss the various loops in shell programming in Linux using examples. 5
- (b) Write a shell script to print integer numbers from 1 to 20. 5



B.C.A 5th sem

Roll No. ....

Total Pages : 2

NBCA/D-25

37066

## SOFTWARE ENGINEERING

Paper-B23-CAP-501

Time Allowed : 3 Hours]

[Maximum Marks : 50

**Note** : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions are compulsory.

### Compulsory Question

1. Write short notes on the following : 10
  - (a) Define the Software.
  - (b) What is Metric?
  - (c) What is Data Dictionary?
  - (d) What do you mean by SRS ?
  - (e) What is Integration testing?

### UNIT-I

2. Discuss the different phases in Software development in detail. 10

37066/K/801/3,050

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3. Explain Waterfall model along with its advantages and limitations. 10

### UNIT-II

4. What is the need of SRS? Discuss its components and characteristics. 10
5. Explain the following : 10
- (a) Data Flow Diagram.
  - (b) E-R diagrams.

### UNIT-III

6. Explain Project Monitoring plans of a Software project in detail. 10
7. Explain the following : 10
- (a) Software Configuration Management.
  - (b) Risk Management.

### UNIT-IV

8. What is Integration testing? Explain different integration testing techniques. 10
9. Discuss the different types of Software maintenance in detail. 10

Roll No. ....

Total Pages : 3

GSQ/D-25

37106

## ARTIFICIAL INTELLIGENCE

Paper-BCA-353

Time Allowed : 3 Hours]

[Maximum Marks : 80

**Note** : Attempt five questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

### Compulsory Question

1. Answer the following questions in brief :
  - (a) Define the Artificial Intelligence (AI).
  - (b) Discuss the concept of Local Maxima in the context of Hill Climbing.
  - (c) What is the difference between procedural knowledge and declarative knowledge?
  - (d) List three main Goals of Natural Language Processing.

### UNIT-I

2. (a) Explain the necessity of Problem Representation in AI. What are the key elements used to represent a problem state?

37106/K/709/400

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- (b) Provide three distinct application areas of AI and briefly state the AI task performed in each.
3. (a) Explain the difference between Weak AI and Strong AI.
- (b) What is a Heuristic? Why is it essential for solving complex real-world problems?

## UNIT-II

4. (a) Draw and label the three main components of an Expert System. Briefly describe the function of each component.
- (b) Explain the use of Frames as a method of Knowledge Representation.
5. (a) Define Predicate Logic. Provide a simple example of representing a rule or fact using first-order logic.
- (b) What are Inference Chains? Differentiate between Forward Chaining and Backward Chaining as inference strategies.

## UNIT-III

6. (a) Explain the concept of Brute Force Search. What is its main limitation for solving large state-space problems?

- (b) What is Best-First Search? How does it use a heuristic function to guide the search process?
- 7. (a) Explain the difference between the Heuristic function  $h(n)$  and the cost function  $g(n)$  used in  $A^*$ .
- (b) Explain the purpose of Alpha-Beta Pruning in game search algorithms. How does it improve efficiency?

#### UNIT-IV

- 8. (a) Describe the phenomenon of Lexical Ambiguity in NLP. Provide a simple example to illustrate it.
- (b) Define Speech Recognition. Briefly describe the steps a system takes to convert an acoustic signal into text.
- 9. (a) Define Robotics. List the three essential parts of a Robot.
- (b) Describe the concept of Validation in AI systems. Why is it particularly challenging for expert or machine learning systems?

Roll No. ....

Total Pages : 2

NBCA/D-25

**37067**

## **BACK-END DEVELOPMENT**

Paper-BCA : B23-CAP-502

Time Allowed : 3 Hours]

[Maximum Marks : 35

**Note** : Attempt five questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

### **Compulsory Question**

1. Answer the following questions :

- (a) What is Node.js ? Where are you use it?
- (b) Differentiate between Node.js and Express.js.
- (c) Differentiate between Authentication and Authorization.
- (d) List the name of Caching Strategies.

### **UNIT-I**

2 What is the role of Web-Server in a typical Web Application Architecture? Also explains the advantages of Apache Web Server.

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3. What is Server-side Language? What are the Syntax and Semantics of Chosen Server-side Language?

### **UNIT-II**

4. What is Integrated Development Environment (IDE)? List some popular IDEs. What are the key features of an IDE? Explain how to write and execute basic Server-side scripts?
5. Explain the different types of Optimization Techniques. Explain Query Optimization in detail.

### **UNIT-III**

6. What is SQL ? Explain the key features of SQL. Also differentiate between SQL and NoSQL.
7. What are the CRUD operations? Explain all these operations with the help of an example.

### **UNIT-IV**

8. What is Express.js ? Mention the features of Express.js. Also explain the structure of an Express.js application.
9. Explain the following Web Security basic measures :
  - (a) SQL Injection.
  - (b) XSS.
  - (c) CSRF.