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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (2025 - 2026)

Subject: Advanced Java Programming

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

20

1. Attempt all parts:-

- | | | |
|-------|--|---|
| (1.1) | The interface used in JDBC to store and manipulate data retrieved from a database after executing a SQL query(CO1,K1) | 1 |
| | <ul style="list-style-type: none"> (a) Statement (b) Driver (c) ResultSet (d) Connection | |
| (1.2) | A transaction control operation used to undo changes made during a transaction in case of failure or inconsistency(CO1,K1) | 1 |
| | <ul style="list-style-type: none"> (a) next() (b) execute() (c) rollback() (d) close() | |
| (1.3) | JSP implicit object for output(CO2,K2) | 1 |
| | <ul style="list-style-type: none"> (a) out (b) config (c) page (d) app | |
| (1.4) | Which object is used for application scope(CO2,K2) | 1 |
| | <ul style="list-style-type: none"> (a) session (b) request (c) application (d) page | |

- (1.5) @Autowired is used for(CO3,K3) 1
- (a) Dependency injection
 - (b) Logging
 - (c) Exception
 - (d) Security
- (1.6) @Component annotation is used for(CO3,K3) 1
- (a) Defining bean
 - (b) Loop
 - (c) Condition
 - (d) Exception
- (1.7) What does @SpringBootApplication combine?(CO4,K3) 1
- (a) Multiple core Spring annotations
 - (b) @Configuration only
 - (c) @Component only
 - (d) None
- (1.8) Which embedded server is commonly used by default in Spring Boot?(CO4,K4) 1
- (a) MySQL
 - (b) Oracle
 - (c) DB2
 - (d) Tomcat
- (1.9) Creation of EntityManager object is the responsibility of(CO5,K4) 1
- (a) EntityManagerFactory
 - (b) Entity
 - (c) Query object
 - (d) Database
- (1.10) Synchronization of detached entity state with database is performed using(CO5,K5) 1
- (a) merge()
 - (b) delete()
 - (c) insert()
 - (d) read()

2. Attempt all parts:-

- (2.1) State the purpose of Servlet API.(CO1,K2) 2
- (2.2) Explain JSP directives and types.(CO2,K2) 2
- (2.3) Create Spring application using Java configuration.(CO3,K3) 2
- (2.4) Explain the role of @RestController.(CO4,K2) 2
- (2.5) Evaluate the role of @Table annotation in schema mapping.(CO5,K3) 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Illustrate exception handling in JDBC applications including SQLException hierarchy and handling techniques.(CO1,K1) 6

(3.2)	Explain the concept of Servlet technology and its advantages over traditional CGI-based applications.(CO1,K2)	6
Answer any one of the following:-		
(3.3)	Explain JSP API architecture.(CO2,K2)	6
(3.4)	Differentiate JSP and Servlets.(CO2,K3)	6
Answer any one of the following:-		
(3.5)	Explain Factory pattern in Spring.(CO3,K2)	6
(3.6)	Explain POJO concept in Spring.(CO3,K2)	6
Answer any one of the following:-		
(3.7)	Demonstrate the use of ModelAndView in form handling application.(CO4,K3)	6
(3.8)	Explain the importance of Spring Boot Starters in dependency management.(CO4,K2)	6
Answer any one of the following:-		
(3.9)	Design an Employee entity using JPA annotations.(CO5,K5)	6
(3.10)	Demonstrate retrieval of entity using find() method.(CO5,K4)	6
SECTION-C		50
4. Answer any <u>one</u> of the following:-		
(4.1)	Develop a JDBC workflow for a financial system that performs multiple related database operations ensuring atomicity using commit and rollback mechanisms.(CO1,K5)	10
(4.2)	Explain the complete architecture of JDBC including all major components and describe the workflow involved in establishing communication between Java applications and databases.(CO1,K2)	10
5. Answer any <u>one</u> of the following:-		
(5.1)	Discuss advantages and disadvantages of JSP.(CO2,K2)	10
(5.2)	Implement all session techniques: cookies, URL rewriting, hidden fields, and sessions. compare effectiveness and security of each technique.(CO2,K3)	10
6. Answer any <u>one</u> of the following:-		
(6.1)	Design a vehicle booking system involving classes Vehicle, Car, Bike, and Auto, and implement a Factory Pattern to dynamically create objects based on user selection, analyzing its impact on code flexibility.(CO3,K5)	10
(6.2)	Design the system with classes ProductService, InventoryService, and OrderService, and evaluate the limitations of Spring (complexity, configuration overhead) for small-scale applications.(CO3,K5)	10
7. Answer any <u>one</u> of the following:-		
(7.1)	Develop a secure REST API using Spring Boot that validates incoming requests, handles invalid payloads gracefully, and produces consistent API response structures using global exception handling.(CO4,K5)	10
(7.2)	Explain how HTTP methods (GET, POST, PUT, PATCH, DELETE) are implemented in Spring Boot by designing a real-world Order Management REST API.(CO4,K2)	10
8. Answer any <u>one</u> of the following:-		

- | | | |
|-------|--|----|
| (8.1) | Develop a Student Course Registration System using JPA that models Many-to-Many relationships, including enrollment date, semester, and grade details, and explain how an intermediate mapping entity improves normalization and flexibility.(CO5,K5) | 10 |
| (8.2) | Design entity classes for an Employee Department Project enterprise application where one department has many employees and employees can work on multiple projects. Implement suitable relationship mappings and evaluate fetch strategy, cascading, and ownership decisions.(CO5,K5) | 10 |

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