Code No: R204105M **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January – 2024

API AND MICROSERVICES

(OE-III: CSE, CSE-AIML, CSE-AI, CSE-DS, CSE-AIDS, AIDS, AIML & CSD)

Time: 3 hours Max. Marks: 70

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Describe the process of configuring the Spring IoC container using Java-based configuration. [7]

b) Create a simple Java application that demonstrates the challenges of managing dependencies manually. Then create a Spring-based application that uses the Spring IoC container to manage these dependencies, highlighting the advantages of using Spring. [7]

(OR)

2 a) Explain the advantages of using the Spring Framework for application development. [7]

b) Explain how Auto Scanning helps with component discovery and configuration. [7]

UNIT - II

3 a) Explain the steps involved in creating a basic Spring Boot application. [7]

b) Build a Spring Boot application with an aspect that handles exception-related advice, and apply this aspect to a controller method. [7]

(OR)

4 a) Explain the concept of cross-cutting concerns and how AOP can address them in a Spring Boot application. [7]

b) Describe the different types of advice in AOP, such as before advice, after advice, and around advice and provide use cases for each. [7]

UNIT - III

5 a) Explain the role of Spring Boot's auto-configuration in a Spring Data JPA application. [7]

b) Explain the importance of transactions in database operations and the benefits of using Spring's transaction management. [7]

(OR)

6 a) Write a custom repository implementation that extends the functionality of a Spring Data JPA repository. [7]

b) Create a program that shows how to handle runtime exceptions within a transaction using the @Transactional annotation. [7]

UNIT – IV

7 a) What is Service-Oriented Architecture (SOA), and how does it differ from traditional monolithic software architecture? [7]

b) Create a basic RESTful web service that exposes resources and demonstrate how to perform CRUD operations on those resources. [7]

(OR)

8 a) Describe the role of standards and protocols in ensuring interoperability between web services. [7]

b) Compare and contrast SOAP-based web services with RESTful web services in terms of architecture and communication style. [7]

UNIT - V

9 a) Explain the key principles and features of RESTful architecture in the context of Spring. [7]

b) Provide a code example of creating a simple Spring REST controller that exposes an endpoint to retrieve data. [7]

(OR)

10 a) Describe the use of the @ExceptionHandler annotation and the creation of custom exception classes for error handling. [7]

b) Implement basic authentication for a Spring REST API using Spring Security. [7]

Code No: R204105M **R20** **Set No. 2**

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Time: 3 hours **Max. Marks: 70**

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ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Define the Spring Framework and its core features. [7]

b) Create a Java program that shows how dependency injection works without Spring and then refactor it to use Spring's dependency injection mechanism. [7]

(OR)

2 a) Provide an example of using Constructor Injection in a Spring application. [7]

b) List some of the key modules in the Spring Framework and briefly describe their purposes. [7]

UNIT - II

3 a) Explain the significance of the **@RestController** annotation in a Spring Boot application and provide an example. [7]

b) What are the main advantages of using Spring Boot for creating Java applications? [7]

(OR)

4 a) Describe the different modes of auto wiring in Spring Boot and when you might use each mode. [7]

b) Explain the differences between singleton and prototype bean scopes in Spring Boot. [7]

UNIT - III

5 a) Explain the issues related to SQL injection and data mapping when using the JDBC API. [7]

b) Develop a Spring Boot application that performs an update operation on a database record using a Spring Data JPA repository method. [7]

(OR)

Code No: R204105M **R20** **Set No. 2**

6 a) Write a native SQL query using the @Query annotation in Spring Data JPA and execute it in a Spring Boot project. [7]

b) Explain best practices for optimizing database queries and improving performance in a Spring Data JPA application. [7]

UNIT - IV

7 a) Explain how web services facilitate integration and communication between distributed applications. [7]

b) How do web services enable different applications to communicate over the internet or an intranet? [7]

(OR)

8 a) Explain the structure of a SOAP message, including its headers, body, and envelopes. [7]

b) Provide a sample code snippet for creating a RESTful web service using a web framework or library of your choice. [7]

UNIT - V

9 a) Explain the use of the Response Entity class in Spring REST and when to return it from a controller method. [7]

b) Provide a code example that demonstrates parameter injection using @PathVariable, @RequestParam, and @MatrixVariable. [7]

(OR)

10 a) Develop a Spring REST controller that performs input data validation and returns validation error messages to clients. [7]

b) Explain the concept of versioning in Spring REST and the different strategies for versioning APIs. [7]

Code No: R204105M **R20** **Set No. 3**

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API AND MICROSERVICES

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Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Discuss briefly about modules in Spring Framework. [7]

b) Give an example of using Setter Injection to inject dependencies in a Spring bean. [7]

(OR)

2 a) Develop a basic Spring application that demonstrates the structure and components of a Spring project, such as creating a Spring configuration file and defining a Spring bean. [7]

b) What is Constructor Injection in Spring? How does it work? [7]

UNIT - II

3 a) Give an example of when you might use a request or session scope for a bean in a web-based Spring Boot application. [7]

b) Provide an example of using logging to record application events in a Spring Boot application. [7]

(OR)

4 a) Create a Spring Boot application with a custom configuration file that specifies the server port and context path. [7]

b) What is Aspect-Oriented Programming (AOP), and how does it differ from Object-Oriented Programming (OOP). [7]

UNIT - III

5 a) Provide an example of a Spring Boot application that incorporates Spring Data JPA for database access. [7]

b) Explain how to use the @Modifying annotation to execute update and delete queries in Spring Data JPA. [7]

(OR)

Code No: R204105M **R20** **Set No. 3**

6	a)	Create a Spring Data JPA application that showcases a custom repository method for a specific use case.	[7]
	b)	How does the JDBC API make it complex to handle transactions and connection management?	[7]

UNIT - IV

7	a)	Provide examples of key components in a typical SOA-based system.	[7]
	b)	Define REST and the principles of Representational State Transfer (REST).	[7]
		(OR)	
8	a)	Explain the use of HTTP methods (GET, POST, PUT, DELETE) in RESTful services and how they map to CRUD operations.	[7]
	b)	Provide examples of real-world use cases for each type of web service (e.g., when to use SOAP or REST).	[7]

UNIT - V

9	a)	Provide an example of a Spring REST controller that receives and processes JSON data using @RequestBody and returns a custom Response Entity.	[7]
	b)	How can you validate and enforce data integrity in Spring REST services?	[7]
		(OR)	
10	a)	What are the security considerations for Spring REST endpoints, and how can you secure them?	[7]
	b)	Discuss exception handling in Spring REST.	[7]

Code No: R204105M **R20** **Set No. 4**

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Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

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UNIT - I

1 a) Explain the concept of Dependency Injection in the context of the Spring Framework. [7]

b) List some of the key modules in the Spring Framework and briefly describe their purposes. [7]

(OR)

2 a) How does Setter Injection differ from Constructor Injection in Spring? [7]

b) Create a Java program that shows how dependency injection works without Spring, and then refactor it to use Spring's dependency injection mechanism. [7]

UNIT - II

3 a) Provide an example of auto wiring in a Spring Boot application, including the use of **@Autowired**. [7]

b) Discuss best practices for error handling, logging, and testing in Spring Boot applications. [7]

(OR)

4 a) How can you configure and apply AOP aspects in a Spring Boot application using annotations or XML configuration? [7]

b) Build a Spring Boot application with multiple components that use constructor auto wiring to inject dependencies. [7]

UNIT - III

5 a) Create a Spring Boot application that implements sorting for a list of database records using Spring Data JPA. [7]

b) Provide a programmatic example of an update operation that modifies multiple records in a Spring Data JPA repository. [7]

(OR)

Code No: **R204105M** **R20** **Set No. 4**

6 a) Implement a dynamic query approach using Criteria API in a Spring Boot application with Spring Data JPA. [7]

b) What are some best practices for structuring a Spring Data JPA project, including package organization and naming conventions? [7]

UNIT - IV

7 a) Describe the key characteristics of RESTful web services, such as statelessness and the use of HTTP methods. [7]

b) Define web services and explain the fundamental concept of services in the context of web-based communication. [7]

(OR)

8 a) What are web services? Discuss types of web services? [7]

b) How does SOA promote reusability and flexibility in software development? [7]

UNIT - V

9 a) Explain how to handle optional and required parameters in Spring REST and the implications for request handling. [7]

b) Provide a code example of a Spring REST controller that handles exceptions and returns appropriate error responses. [7]

(OR)

10 a) Explain the use of validation annotations like @Valid and @NotBlank in request DTOs. [7]

b) Provide an example of configuring CORS support in a Spring REST application using @CrossOrigin and global CORS configuration. [7]