

**MASTER OF COMPUTER
APPLICATION
(MCA-NEW)**

Term-End Examination

June, 2023

MCS-220 : WEB TECHNOLOGIES

Time : 3 Hours

Maximum Marks : 100

Note : (i) *Question no. 1 is compulsory.*

*(ii) Attempt any **three** questions from the rest.*

1. (a) Differentiate between web server and web container. Give example for each. 5

- (b) Compare GenericServlet with HttpServlet.

5

- (c) What is session management ? Explain how cookies can be used to session management. 5
- (d) Write JSP program using scriptlets that adds numbers from 1 to 10 and prints the results. Support your code with suitable comments. 5
- (e) What is a ValueStack in struts ? How ValueStack is related to OGNL (Object Graph Navigation Language) ? 5
- (f) Differentiate between Spring and Hibernate. 5
- (g) What is Dependency Injection in spring framework ? Name the ways through which Dependency Injection can be performed. 5
- (h) What is Bootstrap ? Briefly discuss the factors that makes Bootstrap a popular choice for the development of web applications. 5

2. (a) What is Spring Boot ? Write the steps to deploy Spring Boot web application as JAR and WAR files ? 10
- (b) What is Hibernate Query Language (HQL) ? How does HQL differ from SQL ? Write HQL queries for Select, Update, Delete and Insert (make suitable assumptions). 10
3. (a) Briefly discuss the term “Spring Data Repository”. Also explain the CrudRepository, PagingAndSorting Repository, and JpaRepository interfaces of Spring DataRepository. 10
- (b) Explain the following : 10
- (i) Java Cryptography Architecture (JCA)
- (ii) Java Secure Socket Extension (JSSE)
4. (a) What is Spring Security ? Discuss the terms “Authentication” and “Authorization” in context of Spring Security. Also mention methods for both. 10

(b) Why login form customization is required in an application ? Explain the customized login form configuration with a simple code. Also, discuss loginPage() and loginProcessingUrl() in Spring Boot Security Configuration. 10

5. Write short notes on the following : $5 \times 4 = 20$

- (i) Servlet Architecture
- (ii) JSP life cycle
- (iii) Annotations and its types
- (iv) Aspect-oriented programming

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December, 2023

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Maximum Marks : 100

Note : (i) *Question no. 1 is compulsory.*

*(ii) Attempt any **three** questions from the rest.*

1. (a) What is J2EE ? Briefly discuss the components of J2EE. 5
- (b) What is a servlet ? Briefly discuss the lifecycle of servlet. 5
- (c) Differentiate between session and cookie. Give suitable example for each. 5

- (d) Write JSP program for Fibonacci series. Support your code with suitable comments. 5
- (e) What are Interceptors in struts2 ? Briefly discuss the role of Interceptors in struts2. 5
- (f) Differentiate between spring boot and spring MVC. 5
- (g) Briefly discuss the term “Inversion of Control (IoC)”. Also, draw block diagram for IoC flow. 5
- (h) What is Custom CSS ? How custom CSS can be included in to JSP ? Discuss. 5
2. (a) What is the need of application properties in spring boot ? Explain how application properties of spring boot can be set through properties files, command-line arguments and environment variables. 10
- (b) What is Hibernate ? Briefly discuss the various states of Hibernate Entity Life Cycle. Also, draw block diagram for the same. 10

3. (a) What is the relationship between JPA, spring data JPA and Hibernate ? Explain Eager and Lazy loading in Hibernate. How does the Eager and Lazy loading improves the performance of Hibernate applications ? 10
- (b) What is Message Digest ? How does message digest differ from message authentication code ? Give characteristics of both. 10
4. (a) Briefly discuss the following security vulnerabilities of any web app : 10
- (i) Cross Site Scripting (XSS)
 - (ii) Cross-Site Request Forgery (CSRF)
 - (iii) SQL Injection (SQLi)
 - (iv) Denial-of-Service (DoS)
 - (v) Insecure Direct Object References (IDOR)
- (b) Describe role-based login. Write the sample code to configure the role-based login. 5

- (c) What is role based access control ? Write the simple configuration code to restrict the URL access based on role. 5
5. Write short notes on the following : 5×4=20
- (i) Design Patterns
 - (ii) Servlet Collaboration
 - (iii) Components of JSP
 - (iv) Spring Framework

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| 1. (a) Differentiate between web server and web container. | 5 |
| (b) What are “Creational Design Patterns” ? Write their utility. | 5 |

- (c) How struts 2 differs from struts 1 ? List the various features of struts 1. 5
- (d) What is Hibernate framework in Java ? What is the utility of Hibernate ? Give advantages of Hibenate framework. 5
- (e) Differentiate between load() and get() methods. 5
- (f) Explain the term Aspect Oriented Programming with suitable example. 5
- (g) Compare spring boot and spring MVC. 5
- (h) What is message digest ? Write the steps to send encrypted data with message digest and for the validation of encrypted data. 5
2. (a) Explain the various components of J2EE architecture with suitable block diagram. 7
- (b) Explain the servlet life cycle. Also compare the generic servlet with HTTP servlet. 8

- (c) Discuss the role of cookies in session management. How does persistent cookies differ from non-persistent cookies ? 5
3. (a) Explain the cooking and flow of struts 2 with suitable block diagram. 10
- (b) How does Built-in Java Annotation differ from Java Custom Annotation ? Briefly discuss the various annotations classified under each. 10
4. (a) What is spring boot ? Explain the need of spring boot. Describe the working of spring boot with suitable block diagram. 8
- (b) Explain any ***four*** of the following web application security vulnerabilities : $4\times3=12$
- (i) Cross site scripting
 - (ii) Cross site request forgery
 - (iii) SQL injection
 - (iv) Denial of Service
 - (v) Insecure direct object reference

5. Write short notes on the following : $4 \times 5 = 20$

- (a) Java Secure Socket Extension (JSSE)
- (b) Spring security modules
- (c) Role Based Access Control (RBAC)
- (d) Cross Site Request Foregery (CSRF)
- (e) Hibernate Query Language (HQL) and
Insert, Delete, Update, Select queries in
HQL

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Note : Question No. 1 is compulsory. Attempt any three questions from the rest.

1. (a) What is J2EE ? Discuss the basic parts of the J2EE application model. 5
- (b) Differentiate between Structural design patterns and Behavioral design patterns. 5
- (c) What is Spring Boot ? Discuss the essential components of Spring Boot. 5
- (d) Differentiate between save() and persist() method. 5

- (e) Discuss the term Dependency Injection with a suitable example. 5
- (f) What are Annotations in Java ? Discuss the applications of Java Annotations. 5
- (g) How does Crud Repository differ from JPA Repository ? Under what conditions it's better to choose JPA Repository over Crud Repository ? 5
- (h) Explain the encryption of data in-transit and at-rest. Give utility of each. 5
2. (a) What are design patterns in Java ? Explain the repository design pattern with suitable diagram. 7
- (b) What is WAR packaging ? How does it differ from JAR packaging ? Describe the creation, deployment and extraction of WAR file. 8
- (c) Discuss the architecture of servlet with a suitable block diagram. 5

3. (a) Discuss spring framework. Explain the role of Dependency Injection (DI), Inversion of control (IoC) and Aspect Oriented Programming (AOP) in spring framework.

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- (b) What is Object Relational Mapping (ORM) ? Give its utility and also, explain the various types of ORM. 7

- (c) What is Maven ? Draw the block diagram to exhibit the execution flow of Maven. 5

4. (a) What is Bootstrap ? Briefly discuss the different ways to configure Bootstrap into JSP or HTML. 8

- (b) Differentiate between the following :

$$3 \times 4 = 12$$

- (i) Model-I (MVC) and Model-2 (MVC) Architecture of web application development.

- (ii) Struts and Spring architecture

- (iii) Spring Boot and Spring MVC

- (iv) Spring and Hibernate

5. Write short notes on the following : $4 \times 5 = 20$

- (i) Java Cryptography Architecture (JCA)
- (ii) Servlet filters
- (iii) Role Based Login
- (iv) Spring Boot Actuator and its advantages
- (v) Hibernate Entity life cycle

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No. of Printed Pages : 6

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Time : 3 Hours Maximum Marks : 100

Note : Question No. 1 is compulsory. Attempt any three questions from the rest.

1. Answer the following questions : $5 \times 8 = 40$
 - (a) Explain J2EE, with the help of a diagram.

- (b) Discuss the significance of servlets in J2EE architecture. How do they facilitate the development of web applications ?
- (c) What is “Session” in web development ? Explain its importance. Differentiate between httpsession and cookie.
- (d) Write a JSP program that allows users to convert temperature between Celsius and Fahrenheit. Indude user input validation and display the results.
- (e) Explain the role of interceptors in a struts-2 framework. How do they intercept and manipulate requests in the request processing lifecycle ?

- (f) What is the primary goal of Spring Boot ? Compare and contrast with spring MVC.
- (g) Explain the principle of Inversion of Control (IoC). How does IoC differ from traditional procedural programming in web development ?
- (h) What is custom CSS ? Describe the process of defining custom CSS rules with in a JSP file.
2. (a) Explain the concept of a ‘design pattern’ in your own words. How does it relate to software development ? How do design patterns promote code reusability and maintainability ? 10

- (b) Explain Hibernate configuration using annotations and their benefits over XML configuration. How does Hibernate simplify the process of database configuration ? 10
3. (a) What is a message digest ? Explain the purpose of using message digests in cryptographic protocols and applications and give the properties of a secure message digest algorithm. 10
- (b) What are the key features of Hibernate that make it suitable for web development ? Discuss the benefits of using Hibernate for Object Relational Mapping (ORM) in web applications. 10

4. (a) Discuss the advantages of using Spring-Boot for building microservices architecture. How does Spring Boot simplify web development ? Explain a real-world scenario where Spring Boot would be beneficial in developing a web application. 10

(b) What is lazy loading in Hibernate and how does it optimize database performance ? How does Hibernate support transaction management in Java applications ? 10

5. (a) Discuss the following security vulnerabilities in web application : 10

(i) SQL Injection

(ii) Session Management

Vulnerabilities

(iii) Cross Site Request Forgery (CSRF)

(iv) Cross Site Scripting (XSS)

(b) Explain the difference between role-based authentication and permission-based authentication. Describe the advantages of using role-based authentication over other authentication methods. How does role-based login contribute in industry ? 10

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