Third Semester MCA Degree Examination, Dec.2025/Jan.2026
Web Development using Full Stack Open

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is an HTML form? List any five form input types.	10	L1	CO1
	b.	Define JavaScript variable. Mention any five data types.	10	L1	CO1
		OR			
Q.2	a.	Write the basic structure of an HTML document.	10	L1	CO1
	b.	What is an external CSS file? Write any five advantages of using it.	10	L1	CO1
		Module – 2			
Q.3	a.	What is React? List any four benefits of using React.	5	L1	CO2
	b.	Explain JSX. How is it different from HTML?	7	L2	CO2
	c.	Create a simple React functional component to display a welcome message.	8	L3	CO2
		OR			
Q.4	a.	Define React Hook. List any four commonly used hooks.	5	L1	CO2
	b.	Explain useState Hook with a small example.	7	L2	CO2
	c.	Demonstrate the use of useEffect hook for fetching or updating data.	8	L3	CO2
		Module – 3			
Q.5	a.	Explain the architecture of Node.js with a neat diagram.	10	L2	CO3
	b.	Write steps to install npm packages and explain how package.json is generated.	10	L3	CO3
		OR			
Q.6	a.	What is MongoDB? Explain NoSQL database concepts and benefits.	10	L2	CO3
	b.	Write the CRUD operations in MongoDB with syntax using MongoDB Shell or Mongoose.	10	L3	CO3
		Module – 4			
Q.7	a.	What is full-stack development? Explain its structure with client and server roles.	10	L2	CO4
	b.	What is JSON? Explain serialization and parsing with examples.	10	L2	CO4
		OR			
Q.8	a.	Define authentication and authorization. Write differences between them.	8	L2	CO4
	b.	Explain JWT structure (Header, Payload, Signature) and how it is used in user authentication.	12	L3	CO4
		Module – 5			
Q.9	a.	What is CI/CD? Explain continuous integration and continuous deployment cycle.	10	L2	CO5
	b.	Explain how GitHub Actions can automate build and test workflows with a simple example.	10	L3	CO5
		OR			
Q.10	a.	What is Docker? Explain images, containers, and containerization benefits.	10	L2	CO5
	b.	Write the steps to deploy a Node.js backend application using Docker.	10	L3	CO5

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Q1(a) What is an HTML Form? List any five form input types.

HTML Form

An HTML form is used to collect user input and send the data to a server for processing. It acts as an interface between the user and the web application.

Syntax

```
<form action="submit.php" method="post">
  <input type="text" name="username">
</form>
```

Five Input Types

1. **text** – for normal text
2. **password** – hides characters
3. **email** – validates email format
4. **radio** – single selection
5. **checkbox** – multiple selection

Applications

Used in login forms, registration forms, feedback forms, surveys, etc.

Q1(b) Define JavaScript variable. Mention any five data types.

Variable

A JavaScript variable is a named memory location used to store data values.

Declaration

```
var a = 10;
let b = "Hello";
const c = true;
```

Five Data Types

1. Number – 10, 3.5
2. String – "Hello"
3. Boolean – true/false

4. Undefined – variable declared but not assigned
5. Object – collection of key-value pairs

Example

let person = {name:"Ram", age:20};

Q2(a) Basic Structure of HTML Document

```
<!DOCTYPE html>
<html>
<head>
  <title>My Web Page</title>
</head>
<body>
  <h1>Welcome</h1>
  <p>This is HTML document</p>
</body>
</html>
```

Explanation

- <!DOCTYPE> → HTML version
- <html> → Root element
- <head> → Metadata
- <title> → Browser title
- <body> → Visible content

Q2(b) External CSS file and advantages

External CSS

CSS code is written in a separate .css file and linked to HTML.

```
<link rel="stylesheet" href="style.css">
```

Advantages

1. Improves code readability
2. Easy maintenance
3. Reusability
4. Faster loading
5. Uniform design

Q3(a) What is React? Benefits

React

React is an open-source JavaScript library developed by Facebook to build user interfaces.

Benefits

1. Component-based architecture
2. Virtual DOM improves speed
3. Reusable components
4. Easy debugging
5. Large community support

Q3(b) JSX and difference from HTML

JSX

JSX allows writing HTML inside JavaScript.

const element = <h1>Hello</h1>;

Differences

JSX	HTML
JavaScript + HTML	Only markup
className	class
Expressions allowed	Not allowed

Q3(c) React Functional Component

```
function Welcome() {
  return <h1>Welcome to React</h1>;
}
export default Welcome;
```

Explanation

It is a simple JavaScript function returning JSX.

Q4(a) React Hook and examples

Hooks allow functional components to use state and lifecycle.

Common Hooks

1. useState
2. useEffect
3. useContext
4. useRef

Q4(b) useState Hook

```
const [count, setCount] = useState(0);
```

Used to store and update state in functional components.

Q4(c) useEffect Hook

```
useEffect(() => {
  console.log("Component Loaded");
}, []);
```

Used for:

- API calls
- DOM updates
- Timer functions

Q5(a) Node.js Architecture

Node.js follows **event-driven, non-blocking architecture**.

Components

1. Client
2. Event Queue
3. Event Loop
4. Thread Pool
5. Worker Threads

Advantages

- High performance
- Scalable
- Single threaded

Q5(b) npm packages and package.json

Steps

npm init

npm install express

package.json

Contains:

- Project name
- Version
- Dependencies
- Scripts

Q6(a) MongoDB & NoSQL

MongoDB is a NoSQL document-oriented database.

NoSQL Concepts

- Collection

- Document
- Schema-less
- Horizontal scaling

Benefits

- Flexible
- High speed
- Big data support

Q6(b) CRUD Operations

Create

db.users.insertOne({name:"A"})

Read

db.users.find()

Update

db.users.updateOne({name:"A"},{$set:{age:20}})

Delete

db.users.deleteOne({name:"A"})

Q7(a) Full Stack Development

Full stack includes:

- Frontend – HTML, CSS, React
- Backend – Node.js
- Database – MongoDB

Roles

Client → Server → Database

Q7(b) JSON

JSON is used for data exchange.

Serialization

JSON.stringify(obj)

Parsing

JSON.parse(str)

Q8(a) Authentication vs Authorization

Authentication checks identity.
Authorization checks access rights.

Q8(b) JWT Structure

JWT = Header.Payload.Signature

- Header → Algorithm
- Payload → User info
- Signature → Security

Used for secure login.

Q9(a) CI/CD

CI tests code automatically.
CD deploys code automatically.

Benefits

- Fast delivery
- Less errors
- Automation

Q9(b) GitHub Actions

on: push

jobs:

```
 build:
  runs-on: ubuntu-latest
```

Automates build and test.

Q10(a) Docker

Docker is a containerization platform.

Components

- Image
- Container
- Dockerfile

Q10(b) Deploy Node.js using Docker

Steps

1. Create Dockerfile
2. Build image
3. Run container

```
FROM node
WORKDIR /app
COPY . .
RUN npm install
CMD ["node","app.js"]
```