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-a.   Select the command that is used to install the Node.js express module.   (CO1)   1

         (a) $ npm install express

         (b) $ node install express

         (c) $ install express

         (d) None of the above

1-b.   Select the function that is used to include modules in Node.js.   (CO1)   1

         (a) include();

         (b) require();

         (c) attach();

         (d) all of the Above

1-c.   Select the Correct way to store local variables that can be accessed within the application.   (CO2)   1

         (a) Using Config file

         (b) Using database

(c) Using app.locals

(d) Using app.storage

1-d.   Select the core features of the Express framework.   (CO2)   1

(a) It allows us to set up middleware to respond to HTTP Requests.

(b) It defines a routing table that can work as per HTTP Method and URL.

(c) It is used to render the HTML pages dynamically.

(d) All of the above.

1-e.   Select command to compile a module.   (CO3)   1

(a) tsc-m amd mymodule.ts

(b) tsc--module amd mymodule.ts

(c) Both a and b

(d) None ofthe above

1-f.   Identify a tuple from the following.   (CO3)   1

(a) var employee:[number,string]=[1,"Steve"]

(b) var employee=[1,'Bill']; var

(c) var employee:(number|string)=123;

(d) none of the above

1-g.   Select the use of Angular Controllers in the application.   (CO4)   1

(a) Angular controllers are used for controlling the data.

(b) Angular controllers are used for displaying the data.

(c) Both of the above are correct.

(d) None of the above is correct.

1-h.   Select correct option for View in MVC.   (CO4)   1

(a) View represents a database view.

(b) View is responsible for displaying all or a portion of the data to the user.

(c) View is responsible to act and process the data.

(d) None of the all.

1-i.   Choose correct one for Subdocument in MongoDB data modeling.   (CO5)   1

(a) A way to group related data together in a single document

(b) A way to create a foreign key relationship between two documents

(c) A way to add additional metadata to a document

(d) All of the above

1-j.   Choose correct one for Subdocument in Mongoose.   (CO5)   1

(a) A document that has a reference to another document

(b) A document that is embedded in another document

(c) A document that is stored in a separate collection

(d) None of the all.

2. Attempt all parts:-

2.a.	Define Callback in Node.js. (CO1)	2
2.b.	Explain GET method. (CO2)	2
2.c.	Explain the need of TypeScript. (CO3)	2
2.d.	Explain directives and their types. (CO4)	2
2.e.	Explain schema in Mongoose and its importance. (CO5)	2

SECTION B	**30**

3. Answer any <u>five</u> of the following:-

3-a.	Explain the process of installing Node.js and Node inbuilt packages. (CO1)	6
3-b.	Explain Callback function and Asynchronous Programming in Node.js. (CO1)	6
3-c.	Describe Express.js with all the steps involved in implementation. (CO2)	6
3-d.	Write down the characteristics of Express.js in detail. (CO2)	6
3.e.	Explain steps how TypeScript support optional parameters in function, explain with the help of example. (CO3)	6
3.f.	Describe Directives. Name some of the most commonly used directives in AngularJS application and explain them. (CO4)	6
3.g.	Describe indexes in Mongoose, and explain with example to define them in a schema. (CO5)	6

SECTION C	**50**

4. Answer any <u>one</u> of the following:-

4-a.	Name various types of applications that use Node.js. Explain at-least six in detail. (CO1)	10
4-b.	Explain NPM , Node.js module and types of Node Modules. Also show their implementation. (CO1)	10

5. Answer any <u>one</u> of the following:-

5-a.	Show the process to redirect to generated URL with Express.js explain with code in detail. (CO2)	10
5-b.	Explain Express Sessions and Restful APIs in detail with code. (CO2)	10

6. Answer any <u>one</u> of the following:-

6-a. Define controller. Explain view encapsulation in Angular with the help of code. (CO3)   10

6-b. Explain the process of Extending and Implementing Interface with the help of code . (CO3)   10

7. Answer any <u>one</u> of the following:-

7-a. Explain MVC Architecture with example and implementation code. (CO4)   10

7-b. Explain the concept of Controllers in Angular.js, show with the help of implementation code. (CO4)   10

8. Answer any <u>one</u> of the following:-

8-a. Describe Data Validation, and explain its importance about implementing it with an Angular-MongoDB API connection. (CO5)   10

8-b. Explain the concept of CRUD Operation in MongoDB, show with the help of implementation code. (CO5)   10