

WEB DEVELOPMENT WITH NODE AND EXPRESS (CSEN 4239)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Which of the following areas, Node.js is not advised to be used?

(a) Single Page Applications	(b) JSON APIs based Applications
(c) CPU intensive applications	(d) Data Intensive Realtime Applications (DIRT)
- (ii) Which object in JavaScript doesn't have a prototype?

(a) Base Object	(b) All objects have a prototype
(c) None of the objects have a prototype	(d) None of the above
- (iii) Given the following classes and prototype relationships:


```
class Person {}
class Employee extends Person {}
class Manager extends Employee {}
const sumit = new Manager();
```

 What will be the value of line 1 and line 2 in the snippet below:


```
Object.getPrototypeOf(sumit) === Manager.prototype; // line 1
Object.getPrototypeOf(sumit) === Employee.prototype; // line 2
```

(a) true, false	(b) true, true
(c) false, true	(d) false, false
- (iv) What is the equivalent arrow function for following function?


```
function multiNum(x) {
  return function(y) {
    return x * y;
  };
}
```

(a) Not possible to represent in arrow function	(b) const multiNum = (x) => (y) => x * y;
(c) const multiNum = (x,y) => x * y;	(d) const multiNum = (x,y) => { var z=0; z= x*y; return z; }
- (v) The syntax of fs.readFile() method to read the physical file asynchronously is
fs.readFile(fileName [,options], callback)
Which of the following statements is not correct?

(a) filename is the full path and name of file	(b) options is an object or string which can include encoding and flag. The default encoding is utf8 and default flag is "r".
(c) callback is a function with two parameters err and fd called when readFile operation completes.	(d) options is a string which can include encoding and flag. The default encoding is utf8 and default flag is "rw".
- (vi) What are the two objects from 'express-validator' module required for server side validation in an express application?

(a) check and validationResult	(b) validate and validationResult
(c) check and validationError	(d) None of them
- (vii) What is the name of the library used in Node.js for implementing the "event loop"?

(a) libevent	(b) libuv
(c) libelooop	(d) None of them
- (viii) In Express Validator how can you customise validation error message?

(a) .withMessage("Invalid Email")	(b) .withErrors("Invalid Email")
(c) .error("Invalid Email")	(d) None of them
- (ix) What is the purpose of Multer storage engine and how can you create it in your application code?

(a) Storage engine contains information about how the files will be named and can be created by calling the folderName method.	(b) Storage engine contains information about how the storage is managed and can be created by calling the createSengine method.
(c) Storage engine contains information about the directory and how the files will be named and can be created by calling the diskStorage method.	(d) None of them

- (x) You can connect to mysql database using mysql driver either using mysql.createConnection() or mysql.createPool() method. Which are the following statements are valid when you use mysql.CretePool method?
- (a) Connection will last until you close it OR connection closed by MySQL.
 - (b) You will receive a connection that is not currently being used, or a new connection.
 - (c) A single connection is blocking while executing one query, it cannot execute others.
 - (d) While one connection is busy running a query, others can be used to execute subsequent queries.

Fill in the blanks with the correct word

- (xi) _____ module of Node.js is used for reading the content line by line from any readable stream. It can also be used to read data from the _____.
- (xii) There are many popular libraries that make creation of the web servers a breeze, like ExpressJS for NodeJS and _____ for Python.
- (xiii) Multer does the work of _____ by attaching the values of text fields as well as creates a new object which holds information about _____.
- (xiv) An Express application is essentially a series of middleware function calls, what's known as a _____.
- (xv) _____ comes as the view engine for Express by default.

Group - B

2. (a) Say you have written following lines of code in JavaScript:
- ```
function Animal(legs) { this.legs = legs; }
Animal.prototype.walk = function() { console.log('walking on ' + this.legs + ' legs'); }
```
- Now write a code snippet to do following activities:
- Create a Bird object inheriting the animal object using classical inheritance pattern with object.create().
  - Add a fly method in Bird prototype object which will display "Bird can fly too".
  - Create a pigeon object and call the walk and fly methods. [[C01](Understand/LOCQ)]
- (b) ECMAScript 2015 or ES2015 or often called ES6 is a significant update to JavaScript programming language. Write at least four new features introduced by ES6.
- You have defined a class as shown below :
- ```
let Comedy = class Book2 {
  constructor(title, author){
    this.title = title;
    this.author = author;
  }
};
```
- What is the output of Comedy.name? [[C01](Understand/LOCQ)]
- (c) Define the modules in Node.js? What is the purpose of the module.exports and require() ? Explain with an example. [[C02](Analyze/IOCQ)]

$$5 + (2 + 1) + (2 + 2) = 12$$

3. (a) What are the three ways of making objects in JavaScript? Give example of each. [[C02](Remember/LOCQ)]
- (b) What are the three ways of writing asynchronous program in JavaScript? Say you want to access movies from a web site using an API and display the movie list in a console application. Write the code snippet in each way. You can use request object or Axios (a promise-based HTTP client) for this purpose. [[C02](Analyze/IOCQ)]
- (c) What are different types of module available in Node.js? Describe each briefly. What is the function of core modules namely module and require? [[C02](Remember/LOCQ)]

$$3 + 6 + 3 = 12$$

Group - C

4. (a) What is the purpose of the process module in NodeJs? Why importing of process module is not necessary while using its constructs? Write the names of four events exposed by process object. Write a code snippet to display a message "Process ends \${msg}" when process exited, where msg parameter value is "successfully". [[C03](Understand/LOCQ)]
- (b) Write code snippet using process object to ask two questions "What is your Institute Name?" and "Like your Institute?" to user and display the response when process exit. Response should be `Thank you for your answers. Your responses are \${name} and \${like}`, where name and like are answers of the questions. [[C03](Analyze/IOCQ)]
- (c) Explain the difference between Event and Callback with suitable example. Write a code snippet and explain how custom event is raised and handled in NodeJs. [[C03](Analyze/IOCQ)]

$$4 + 4 + 4 = 12$$

5. (a) What is the function of fs module in Node.js? Write code snippets for reading a text file using synchronous and asynchronous methods. Write down the names of three methods for creating files. Write code snippet for deleting and renaming files. [[C02](Understand/IOCQ)]

- (b) Write a code snippet to read a text file line by line and display each line using fs and readline module. After completion of reading show message "Read file completed". [[CO2](Understand/IOCQ)]
- (c) Write a code snippet to prompt a question "Are you an Engineering Graduate?" in console and if the answer is "Yes" display message "You are eligible to apply for this job" otherwise "Sorry! Your qualification is not enough for this job" in console. You must use readline module of Node.js. When you close the prompt show message "Done accepting prompt". [[CO2](Understand/IOCQ)]
- (2 + 2 + 2) + 3 + 3 = 12**

Group - D

6. (a) What is Template? What is the function of Template Engine for Node.js ? Write the names of at least four template engine for Node.js ? Write fundamental rules of Jade Template Engine. Write the Jade template which will generate following html.
- ```
<ul id="topics">
 Introduction to R
 Data Science

<input type="text" placeholder="your name"/>
<div id="content">
 <div class="block">
 <input id="instName" class="in1 in2"/>
 </div>
</div>
```
- [[CO5](Remember/LOCQ)]
- (b) Say you have created a Javascript object containing student name and student skills such as sing, dance, and debate in an array. You have to display this information in a web page using ejs template. You have to show '[name] has skill on' in the first line where [name] is the name of the student stored in the object and below it show all the skills in a list. Write suitable ejs template and code snippet to render this template in web page. [[CO4](Analyse/IOCQ)]
- (3 + 2 + 3) + 4 = 12**
7. (a) Describe briefly Net module. Explain at least three key functionalities of this module. [[CO3](Remember/LOCQ)]
- (b) Write a simple TCP client-server application in node.js using net module where a client sends lines of text to the server and the server sends back the lines capitalized. When client connect to the server, server must send the acknowledgement to client and subsequently client accept a line from console and send to the server. Server will be capitalized it and send it back. [[CO6](Analyze/IOCQ)]
- (3 + 3) + 6 = 12**

### Group - E

8. Say you have created a faculty table in MySql database InstDB. Write a REST API for performing following CRUD operations using MVC pattern. You need to use following specifications:
- Name and data type of different fields of Table faculty : id – int, facName – varchar(60), deptCode – char(3), qualification – varchar(10)
  - Database Server - HOST: "localhost", USER: "root", PASSWORD: "hit4536", DB: "InstDB"
  - Three CRUD operations to be developed : Create a new faculty , Find faculty by id, Update faculty information by id
  - Develop model controller and router code in separate js files.
  - Use Express router object.
  - Create a database connection using configuration in db.js file.
  - Create a server.js for starting the web server
- [[CO6](Apply/HOCQ)]
- 12**
9. (a) What is the purpose of multer storage engine?  
Create a storage engine which will upload the file in images folder under root and use file name as concatenation of name of file type field ( html file upload control) used in the form + '-' + date and time + original file extension.  
Configure multer with an storageEngine ( say sengine) already supplied and add following validation rules :
- Maximum file size allowed 1 Mb
  - File type can be one of jpeg, jpg or png
- What will happen if you do not supply storage property during configuration? [[CO5,CO6](Remember/IOCQ)]
- (b) Assume that you have already configured multer for using in your express application and created upload object as var upload = multer({.....})  
Write route handlers for uploading single and multiple file using Multer as an Express Middleware and after successful upload send the file object in request as response. [[CO5,CO6](Remember/IOCQ)]
- (1 + 3 + 3 + 1) + (2 + 2) = 12**

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	33.33	54.17	12.50

