

(2½ Hours)

[Total Marks: 75]

- N. B.: (1) **All** questions are **compulsory**.
 (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
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 (5) Draw **neat labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

1. **Attempt any three of the following:** **15**
 - a. Elaborate artificial intelligence with suitable example along with its applications.
 - b. Discuss the historical evolution of Artificial Intelligence.
 - c. State the relationship between agents and environment.
 - d. Explain the concept of Rationality.
 - e. Explain types of environments.
 - f. Explain reflex agents with state.

2. **Attempt any three of the following:** **15**
 - a. Write the procedure for tree search.
 - b. Explain the algorithm for breadth first search algorithm.
 - c. Give the outline of Uniform-cost search algorithm.
 - d. Explain A* algorithm for the shortest path.
 - e. Give the outline of Hill climbing algorithm.
 - f. Explain the working mechanism of genetic algorithm.

3. **Attempt any three of the following:** **15**
 - a. What is alpha-beta pruning? Explain the function of alpha beta pruning.
 - b. Give the outline of min-max algorithm.
 - c. Write a note on card games.
 - d. What is knowledge based agent? Explain its role and importance.
 - e. Write a note on Wumpus world problem.
 - f. Give the outline of resolution algorithm.

4. **Attempt any three of the following:** **15**
 - a. What are predicates? Explain its syntax and semantics.
 - b. What are Quantifiers? Explain the types with syntax and example.
 - c. Convert the following into predicate form:
 - i. Virat is software engineer.
 - ii. All vehicles have wheels
 - iii. Some-one speaks some language in this class.
 - iv. Everybody loves somebody sometime.
 - v. All software engineer develops software.
 - d. Explain the process of knowledge engineering.
 - e. What is unification? Explain the process of unification.
 - f. Give the outline of simple forward chaining algorithm.

5. **Attempt any three of the following:** **15**
 - a. What is planning? Explain the need of planning.
 - b. Explain block world problem for the following start state and end state.
 - c. Write a note on planning graph.
 - d. What are events? Explain its importance.
 - e. Write a note on semantic network.
 - f. Write a note on Truth maintenance system.

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1. Attempt any three of the following:**15**

- What is Java Enterprise Edition (Java EE)? Explain.
- Write a note on Multi Tire EE application architecture.
- List and explain the tasks that Servlet can do.
- Explain the life cycle of servlet.
- Write a servlet code to display Square and Square root of numbers between 25 and 365 in tabular form.
- List and explain four types of JDBC drivers.

2. Attempt any three of the following:**15**

- Explain Cookie class with its constructor and any five methods.
- Write a servlet program to create a session and display the following:
 - Session ID
 - New or Old
 - Creation Time
- Write a servlet program **GradeServlet.java** that accepts Grade through radio buttons from **index.html** page, if the string is “A”, “B”, “C” OR “D”, the program should dispatch the direct to the **Success.html** page containing message “***Congratulations !!!, You Passed SEM V exam***”, else display “***Try Again***” and load index.html page in current servlet. (**Make suitable assumptions, Only Write the Servlet Code**)
- Explain the following w. r. t. working with files in Servlet.
 - @MultipartConfigure
 - fileSizeThreshold
 - location
 - maxFileSize
 - maxRequestSize
- Explain using a code snippet the onDataAvailable() and onAllDataRead() methods of ReadListener interface.
- What is RequestDispatcher? Explain the two methods of RequestDispatcher.

3. Attempt any three of the following:**15**

- Explain the reasons to use JSP.
- What are directives? Explain page directive with any of its four attributes.
- Develop a simple JSP application to accept values from html page and display on next page. (Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button).
- Explain the <jsp:useBean > tag with its attribute. Support your answer with suitable code snippet.
- List the name of JSP implicit objects. Explain any Two in details.
- What is wrong in using JSP scriptlet tag? How JSTL fixes JSP scriptlet shortcomings?

- 4. Attempt *any three* of the following: 15**
- a Explain benefits of EJB.
 - b Write a note on different types of session beans.
 - c Explain life cycle of a message driven bean using suitable diagram.
 - d Write a stateless session bean code to represent BookInformation. (BookId integer, BookName String, Pages integer, Price double)
 - e What is an interceptor? How an interceptor is defined and how aroundInvoke () is added to it?
 - f What is Java Naming and Directory Interface? Explain.
- 5. Attempt *any three* of the following: 15**
- a. What is Persistence? Explain.
 - b. Explain with suitable diagram architecture of Java Persistence API.
 - c. Write a JSP code to add guest feedback using JPA in GuestBook table in database. (Make suitable assumptions)
 - d. What is Hibernate? Explain Object Relational Mapping.
 - e. Explain the architecture of Hibernate with suitable diagram.
 - f. Write a JSP code to add visitor's feedback using Hibernate in FeedBack table in database. (Make suitable assumptions)
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1. **Attempt any three of the following:** 15
 a. Define and explain Ubiquitous Computing (ubicom),
 b. List and explain the roles of people making IOT.
 c. What is manufactured normalcy field? Explain.
 d. "Data available through IOT device belongs to public or company which implement the IOT device". Discuss.
 e. What is DNS? How does it work?
 f. What are TCP n UDP ports? Explain with examples.
2. **Attempt any three of the following:** 15
 a. What is sketching? Explain its role in prototyping.
 b. "Open source has a competitive advantage". Discuss
 c. How can one tap into the community for promoting IoT devices? Explain.
 d. With the help of an example explain the process of Scaling up the electronics.
 e. Explain the following IoT devices built with Arduino:
 f. i) The Good night lamp. ii) Botanicals iii) Baker treat
3. **Attempt any three of the following:** 15
 a. Explain the sketch iterate and explore process in prototyping.
 b. Write a short note on laser cutters.
 c. What is milling? Explain.
 d. What are the legalities associated with scrapping ?
 e. What is comet? Explain
 f. Explain HTML5 web socket
4. **Attempt any three of the following:** 15
 a Explain different types of memory.
 b With the help of examples, compare stack and heap.
 c What are libraries? Explain with examples
 d Define business model .Explain different factors in the definition.
 e With the help of a diagram, explain business model canvas.
 f What is venture capital? How can one exit?
5. **Attempt any three of the following:** 15
 a. Explain in details the process of designing the kits.
 b. Write a short note on mass-producing the case and other fixtures.
 c. Discuss the issues in scaling up the software for large scale IOT devices.
 d. Discuss the advantage and disadvantages of technology.
 e. "The internet destroys the state". discuss
 f. What is environmental cost of Internet service for IOT device? What is the solution?

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1. Attempt any three of the following:

- Explain the duty of the Linux system administrator in configuring a secure system.
- Write short note on Piping and Redirection.
- Explain Bash shell in detail.
- Explain cron in detail for job scheduling.
- Give differences between symbolic and Hard Links.
- Write steps to Create and Manage Repositories.

2. Attempt any three of the following:

- List and explain different File Systems supported by Linux.
- What are Snapshots? Give steps to Manage Snapshot.
- How can rc scripts be managed using chkconfig?
- What are different SSH security settings? Explain.
- Explain group configuration file.
- What are file and directory permissions? How to change permissions.

15

3. Attempt any three of the following:

- What is Firewall? How to allow basic services through firewall?
- What is NAT? Give steps to Configure NAT.
- Write steps for Creating and Managing Self-Signed Certificate.
- How to Encrypt Files with GPG?
- What is NFS? What are advantages and disadvantages of NFS?
- Give Steps to Configure Samba Server.

15

4. Attempt any three of the following:

- What is DNS server? List and explain DNS server Types.
- Write steps for Setting Up a Cache-Only Name Server.
- Explain the components of email delivery process.
- Explain different Secure Internet Configurations for Postfix.
- What are modes of Apache? Explain some performance parameters for these modes.
- What is Apache Module? How to add modules in Apache web server?

15

5. Attempt any three of the following:

- What are different ways to execute shell script? Explain in detail.
- Write a script to accept the number from user and print its multiplication table.
- How will you setup bonding?
- Explain Configuration of GFS2 File Systems.
- Write steps for Configuring the DHCP Server for PXE Boot.
- Explain kickstart file to perform an automated installation.

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1. Attempt any three of the following:

- What is Big Data? List the different uses of Big Data.
- Briefly explain how is MongoDB different from SQL.
- What is MongoDB? Explain the features of MongoDB.
- Explain how Volume, Velocity and Variety are important components of Big Data.
- Write a short note on Cap theorem.
- Discuss the various categories of NoSQL Databases.

2. Attempt any three of the following:

- Explain Binary JSON(BSON).
- Explain with an example the process of deleting documents in a Collection.
- Discuss the various tools in MongoDB..
- Explain the concept of Sharding in detail.
- Differentiate between Single Key and Compound Index.
- Write a short note on Master/Slave replication of MongoDB.

15

3. Attempt any three of the following:

- Discuss the fields used for Sharding.
- List and explain the limitations of Indexes.
- Explain the MongoDB limitations from security perspective.
- Write a short note on Deployment.
- Define Monitoring. Explain the factors to be considered while using Monitoring Services.
- What is Data Storage Engine? Differentiate between MMAP and Wired storage engines.

15

4. Attempt any three of the following:

- Define In-Memory Database. What are the techniques used in In-Memory Database to ensure that data is not lost?
- Explain how does Redis uses disk files for persistence.
- What is Berkeley Analytics Data Stack? Explain its components.
- What is an Event? State the different types of Events in jQuery.
- Write a short note on jQuery CSS method .
- State the features of jQuery.

15

5. Attempt any three of the following:

- Explain the JSON Grammar.
- Differentiate between XML and JSON .
- Explain Request Headers.
- Write a short note on JSON Parsing.
- Explain the stringify object for JSON Object.
- Discuss the JSON values.

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1. **Attempt any three of the following:** 15
 - a. Define a term project and give the importance of Software Project Management
 - b. Explain the stages involved in project management life cycle in detail.
 - c. Write a note on Project portfolio management.
 - d. What is the importance of identifying the scope and objectives of a project?
 - e. How is resource allocation managed in an activity of programme management?
 - f. Write a note on risk evaluation and management.

2. **Attempt any three of the following:** 15
 - a. Explain different approaches used for fast delivery of a project.
 - b. What are the advantages and disadvantages of a Spiral model?
 - c. Discuss the common problems faced during effort estimation.
 - d. State and explain Capers Jones estimating rules.
 - e. Explain the top down approach associated with parametric models.
 - f. Write a note on COCOMO II model.

3. **Attempt any three of the following:** 15
 - a. What is the necessity of activity planning?
 - b. Explain network planning model and the concept of backward pass.
 - c. Define the term risk and discuss the ways to deal with them.
 - d. Describe Monte Carlo simulation.
 - e. Explain the nature of resources and their scheduling.
 - f. What are the factors considered while allocating tasks to the individuals?

4. **Attempt any three of the following:** 15
 - a. Give the benefits of review in the process of project monitoring and control.
 - b. Write a note on change control.
 - c. Explain the advantages and disadvantages of fixed price contracts.
 - d. Explain the stages in contract placement.
 - e. Write a note on ethical and professional concerns as a member of any organization
 - f. Explain Taylor's model of motivation.

5. **Attempt any three of the following:** 15
 - a. Describe a virtual team and the advantages of forming a virtual team.
 - b. Write a role of different types of people needed to form a balanced team.
 - c. Define the term quality. Explain McCall's quality model.
 - d. State and explain different levels of Capability Maturity Model (CMM).
 - e. Explain the metrics correlated with Software reliability.
 - f. Discuss the reasons for project closure.

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1. Attempt any three of the following:

15

- What are .NET languages? Explain various features of C#.
- What is property? Explain read-write property with proper syntax and example.
- Explain static constructor and copy constructor with examples.
- Explain one dimensional and two dimensional arrays with proper syntax and example.
- Define inheritance. Explain single inheritance with example.
- List various reference types in c#. Also explain boxing operation with example.

2. Attempt any three of the following:

15

- What are .aspx files? Explain code behind class file in detail.
- Explain each of the following in brief:
 - Web forms
 - Post back
 - Page rendering
 - Page Load event
 - Page PreRender event
- List any four category of server controls. Explain common properties of web server controls.
- Explain the basic functionality of each of the following webserver controls.
 - CheckBox
 - TextBox
 - DropDownList
 - Menu
- Write short note on various validator controls.
- What are rich controls? Briefly explain about Calendar and AdRotator controls.

3. Attempt any three of the following:

15

- Explain exception handling mechanism with proper syntax and example.
- Describe session state variables in asp.net.
- Explain state management through persistent cookies.
- Describe the features and benefits of master pages in asp.net.
- What is a theme? How does it work?
- What are the three different ways to use styles on web pages? Explain various category of style setting in New Style dialog box.

4. Attempt any three of the following:

15

- What is data binding? Explain repeated value data binding with example.
- Write any three similarities between FormView and DetailsView controls. Explain about item template of form view.

- c. Explain data binding with a dictionary collection.
- d. Explain various style properties of GridView control.
- e. Briefly explain following features of GridView control.
 - i. Sorting
 - ii. Paging
 - iii. Selecting a row
 - iv. Editing a row
- f. Describe asp.net provider model and direct data access method.

5. Attempt any three of the following:

15

- a. Explain different types of authentication in asp.net.
- b. What is XML? What are its basic characteristics?
- c. What is the use of XMLTextWriter class? Explain various methods of this class.
- d. What is authorization? Explain adding authorization rules in web.config file.
- e. Explain the working of update progress control in detail.
- f. Explain about implementation of timed refreshes of update panel using timer.