TY BSc IT Sem V 29/10/2025

(Time: 2½ Hours) [Total Marks: 75]

N.B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

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

a. Discuss the various professional roles involved in developing an IoT system and explain how collaboration among them ensures an effective and user-friendly product.
b. Analyze the positive and negative impacts of IoT on modern technology and society.
c. What does it mean by 'Graceful Degradation' of applications/devices?
d. Compare and contrast static and dynamic IP address.
e. Write a short note on Internet protocol suit with its diagram
f. Describe technological changes observed in IPv6? Explain.

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

a. Analyze how the choice of prototyping platform can influence the overall project cost and development effort.
b. Discuss open-source hardware and software. Why should one has to think about open source technology?
c. Compare Raspberry Pi and Arduino based on cost, power supply, and storage options
d. How to choose the right platform for an Internet of Things device?
e. Illustrate how sensors and actuators work together to make an IoT system interactive.
f. Identify the features and write about 'The Good Night Lamp' IOT device built with Arduino.

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

a. Elaborate various non-digital methods of prototyping used in physical design?
b. Write a short note on Message Queuing Telemetry Transport Protocol.
c. What is POLLING? Explain in brief.
d. Define an API. Explain the concepts of API Mashing and Screen Scraping with suitable IoT-based examples.
e. Compare 3D Printing and CNC Milling as physical prototyping techniques. Mention their processes, applications, and advantages in IoT prototyping.
f. Describe the working principle, software requirements, and key factors to consider while choosing a laser cutter.

4. Attempt *any Three* of the following: **15**

a. Discuss the limitations of memory in embedded devices. How is it managed?
b. With the help of example, compare stack and heap.

c. Write a short note on Libraries for embedded systems
d. Describe how *Key Activities* and *Key Resources* work together to support the *Value Proposition* in the Business Model Canvas.
e. How Venture Capital plays role in funding IOT projects?
f. Why are lean startups a good idea for an IoT startup?

5. Attempt *any Three* of the following: **15**

a. Illustrate the steps for manufacturing PCBs.
b. Explain the need of certification in IoT devices
c. Why is privacy important for Internet of Things?
d. What is 'sensor commons' project? What are the critical requirements for a sensor commons project.
e. Write short note on cautious optimism as solution for IoT.
f. How can IoT be a part of the Solution to reduce environmental waste?

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

a. Differentiate between SQL and NoSQL Databases.
b. What are the different V's of big data?
c. What are NRW notations? How are reads and writes implemented in NoSQL databases?
d. Compare ACID Vs BASE.
e. Write a short note on Non-Relational Approach.
f. List and explain applications of Big Data.

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

a. Describe MapReduce concept and its application in MongoDB.
b. Discuss he concept of Sharding in detail.
c. Write MongoDB queries to create, drop and manage indexes.
d. What is Binary JSON(BSON)?
e. Explain the following terms: i) Capped Collection. ii) _id.
f. Write a short note on Master/Slave replication of MongoDB.

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

a. What is a Wired Tiger Storage Engine?
b. List and explain the limitations of Sharding
c. What is GridFS in MongoDB?
d. "With the rise of the Smartphone, it's becoming very common to query for things near a current location". Explain the different indexes used by MongoDB to support such location-based queries.
e. Design a schema for a social networking website in the MongoDB database.
f. Discuss how data is written using Journaling.

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

a. Explain the concept of Oracle 12c "in-Memory Databases".
b. Discuss Spark architecture with a neat diagram.
c. Define In-Memory Database. What are the techniques used in In-Memory Database to ensure that data is not lost?

d. What is DOM in jQuery? How does it work?
e. Write a jQuery to demonstrate method chaining.
f. Describe event delegation in jQuery.

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

a. List and explain various data types in JSON.
b. Discribe six structural character tokens in JSON.
c. Write a short note on JSON Arrays.
d. Discuss the stringify object for JSON Object.
e. "JSON is better than XML." Comment.
f. Describe members of Web Storage API.

TYBSCIT Sem VI

01/11/2025

2½ Hours **Total Marks: 75**

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

a. Describe the various Java EE Technologies and their roles
b. Discuss the use of Servlet Config and Servlet Context in a web applicaiton
c. Illustrate the structure and contents of web.xml file
d. What are different types of statement in JDBC explain them
e. What are the various steps the servlet life cycle goes through illustrate with diagram
f. Why servlet is preferred over CGI ?

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

a. Give the significance of Request Dispatcher and its methods
b. What is a cookie? Discuss their methods ,advantage and disadvantage
c. How Session Tracking can be achieved using URL Rewriting.
d. Describe the complete lifecycle of an HttpSession object with the help of a diagram
e. Discuss how the Non-Blocking I/O works in Servlets.
f. How file can be uploaded in Java Servlets. What are the steps and APIs involved?

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

a. What is the use of Config implicit objects in JSP
b. Differentiate between JSP and Servlets
c. State the use of Action Elements in JSP
d. Discuss the various steps the JSP lifecycle goes through
e. What is JSTL and how the core tags works
f. Discuss the formatting tags available in JSTL

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

a. What is session beans and explain its types
b. Explain Naming Services in Java EE and their role in resource lookup.
c. How the Message Driven Bean works explain
d. What are different types types of EJB and the advantages of using EJB
e. What are the two types of interfaces in season beans
f. Show the steps of connecting JNDI to a database

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

a. What are the features of hibernate framework

b. Illustrate and explain the Hibernate mapping file

c. Discuss the working of JPA

d. Describe the purpose and usage of the generator class in Hibernate.

e. What is a persistence unit in JPA

f. Evaluate the key features of the Java Persistence API (JPA) in comparison with traditional JDBC approaches, highlighting its advantages in managing persistent data.

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TYBSc IT Sem
Dec 31/10/2025

(2½ Hours) [Total Marks: 75]

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

a. Describe the four major categories used to define Artificial Intelligence.
b. Write a short note on the Rational Agent approach.
c. Discuss any four Foundations of Artificial Intelligence.
d. What is an Agent? Explain the following task environments
   i. Static vs. Dynamic.
   ii. Discrete vs. continuous.
e. What does PEAS stand for? Explain the PEAS components in the task environment of a self-driving taxi.
f. Explain the Model-based Reflex agent with diagram.

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

a. Explain the standard formulation of the 8-puzzle problem in Artificial Intelligence.
b. Explain Greedy best-first search.
c. What is Uninformed Search? Explain the Bidirectional Search.
d. Explain the concept of Hill Climbing search algorithm. What are the challenges it encounters?
e. Describe the concept of AND-OR search trees.
f. Write a short note on the mechanism of the Genetic algorithm.

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

a. Discuss the Alpha-Beta Pruning method and show its application using an example.
b. Explain the working principle of the minimax algorithm in game-playing.
c. Explain any two state of the art Game Programs.
d. Describe the various logical connectives used in Propositional Logic.
e. Explain the concept of a Knowledge-Based Agent.
f. Explain Bayes Theorem with its formula.

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

a. Explain the concept of Equality in First-Order Logic.
b. Describe the two standard quantifiers used in First-Order Logic.
c. Write a short note on Forward Chaining.
d. Explain Conjunctive Normal Form (CNF) in First-Order Logic.
e. Discuss the different types of Artificial Neural Network (ANN).
f. Explain the architecture of an Artificial Neural Network (ANN).

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

a. Describe the GRAPHPLAN algorithm.
b. Explain the concepts of PDDL and Action.
c. Describe the Blocks World planning problem and illustrate it with a diagram.
d. Write a short note on Contingent Planning.
e. Explain Multiagent Planning.
f. Discuss Generative AI.

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1. **Attempt *any three* of the following:** 15
a. What is .NET framework? Draw and explain .Net framework architecture.
b. Describe in detail the main features of the Common Language Runtime (CLR).
c. Explain the working of the foreach loop in C# with a suitable example.
d. Describe the characteristics and uses of these classes in c#
i) abstract ii) sealed iii) static iv)partial v) derived
e. What is an Assembly? Explain Types of Assembly.
f. Elaborate on the concepts of Boxing and Unboxing and explain their importance in .NET type conversion.

2. **Attempt *any three* of the following:** 15
a. Describe the different files and folders used in an ASP.NET application and discuss their purpose in detail.
b. What is web.config file? Explain <CustomError> and <ConnectionStrings> tags in web.config file.
c. Elaborate on the various types of validation controls available in ASP.NET and explain how they are implemented.
d. Describe the AdRotator control in ASP.NET and explain how it is used with an example.
e. Differentiate between the ListBox and DropDownList controls in ASP.NET. Describe any three common properties of these controls.
f. What is Postback? Explain Ispostback property with suitable example

3. **Attempt *any three* of the following:** 15
a. Describe the concept of user-defined exceptions. How can they be implemented in a C# program?
b. How can you create, add, and set the expiry of a cookie in ASP.NET? Illustrate with an example program.
c. Describe the different types of state management in ASP.NET and elaborate on Application state management.
d. What is the connection between Master Pages and Content Pages? Explain how they work together in ASP.NET.
e. Explain exception handling mechanism with example.
f. Explain how View State works in ASP.NET. List its major benefits and limitations.

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

a. What is ADO.NET ? Explain its Architecture.
b. Differentiate between DataSet and DataReader.
c. Explain the DataReader object in ADO.NET and discuss how it retrieves data from a database.
d. Explain the concept of data sources in ASP.NET and elaborate on their types and uses.
e. Differentiate between ListView and GridView controls in ASP.NET. Explain the ListView control with an example.
f. Discuss the core components of the ADO.NET Data Provider and their roles in data access.

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

a. What do you understand by Authentication and Authorization in web applications?
b. Describe the use of Typography classes in Bootstrap. Which class is used to apply bold styling to text?
c. Discuss the benefits and working of AJAX in ASP.NET with reference to UpdatePanel and ScriptManager.
d. Explain how Bootstrap simplifies front-end development and list its major features.
e. What is meant by NuGet Application? Why it is used in web based application?
f. Elaborate on how UpdateProgress provides feedback during asynchronous operations in AJAX-enabled web pages.

TY BSCIT Sem V

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

a. Define a project and list the key differences between software projects and other types of projects.
b. Analyze the role of stakeholders and the project charter in determining project success or failure. How do they influence project objectives?
c. What is the relationship between software development and project development life cycle?
d. Explain given terms: 1. Payback period 2. Return on investment
e. Explain the concept of Risk Evaluation in the context of Project Evaluation and Programme Management. Discuss the steps involved in identifying, assessing, and prioritizing risks during a software project.
f. Explain stepwise method framework of project planning.

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

a. Explain incremental delivery model with its advantages and disadvantages.
b. Describe the concept of software effort estimation and discuss its significance in the planning and successful execution of a software project.
c. Write a detailed note on staffing patterns.
d. Explain extreme programming and its core practices.
e. Discuss in detail the different Scrum ceremonies and explain how they help in planning, tracking, and reviewing work in Agile projects.
f. Explain Atern process model.

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

a. Describe the product based approach used for project planning.
b. Explain the framework for dealing with risk.
c. What is a forward pass in network planning model? Explain how it is used to determine the earliest start and finish times, with an example.
d. List and explain Burma's priority list.
e. What are the different rules followed for constructing Network model?
f. Explain nature of resources and their scheduling.

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

a. Explain the importance of Gantt charts and slip charts in review process.

b. Describe the software configuration management (SCM) process and explain the key activities involved in managing software versions and changes.

c. How is Earned Value Analysis used to evaluate a project's performance against its planned schedule and budget?

d. Define fixed-price contracts and discuss their features, advantages, and disadvantages in detail.

e. What are the common stress factors in software environments? Suggest strategies for stress management, health, and safety at the workplace.

f. Explain Maslow's hierarchy of needs.

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

a. Explain working in teams. What are the stages of development of a team?

b. Describe the different software quality models and explain their significance in assessing and improving software quality.

c. Discuss about dispersed teams with their advantages, disadvantage and challenges.

d. What kind of communication genre is preferred in each stage of project development? Explain in detail.

e. Explain different types of leadership styles.

f. Outline the steps involved in project closure, including financial closure and preparation of a project closeout report

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