TYBSCIT- SemV

(2½ Hours) [Total Marks: 75]

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(3) Answers to the **same question** must be **written together**.
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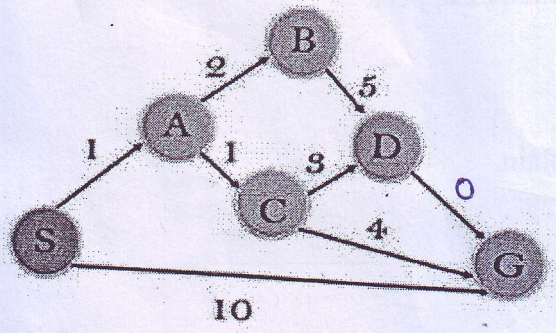
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculator is **allowed**.

1. **Attempt *any three* of the following:** 15
a. What is AI? List the disciplines that contributed ideas, viewpoints, and techniques to AI.
b. What are the various application areas of AI? Explain.
c. Give the PEAS description for the taxi's task environment.
d. What are Fully observable, partially observable and unobservable task environments? Explain.
e. Explain Model-based reflex agents.
f. What are the components of learning agents? Explain.

2. **Attempt *any three* of the following:** 15
a. What are the various components of a problem? Explain.
b. Explain Depth limited search with an example.
c. What is Hill-climbing search? What are the variants of hill climbing?
d. Given the graph with f(n) and h(n) where S is the Start node and G is the goal node. Apply A* algorithm and find out the best path.



State	h(n)
S	5
A	3
B	4
C	2
D	6
G	0

e. How does learning happens in online search? Explain.
f. Write a short note on Simulated Annealing.

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

a. Explain the min-max algorithm working with an example.

b. What are the elements used in defining the game formally? Explain.

c. Covert the following into First order logic.
   i. All birds fly.
   ii. Every man respects his parent.
   iii. Some boys play hockey.
   iv. Not all students like both AI and LA.
   v. Only one student failed in SPM subject.

d. Define Wumpus world problem in terms of first order logic.

e. Write alpha beta pruning algorithm.

f. Explain Bayes theorem with an example.

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

a. Differentiate between forward and backward chaining.

b. What is first order logic? Explain the different elements used in First order logic.

c. What is Unification? Find the most general unifier (MGU) for the following:
   Find the MGU of A(x, f(g(x)), a) and A(b, y, z)

d. Differentiate between propositional logic and first order Logic.

e. Define Artificial Neural Network. Explain the architecture of it.

f. What are the different types of Artificial Neural Networks. Explain.

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

a. Write PDDL description for the following Spare tire problem:
   Consider the problem of changing a flat tire. The goal is to have a good spare tire properly mounted onto the car's axle, where the initial state has a flat tire on the axle and a good spare tire in the trunk. There are just four actions: removing the spare from the trunk, removing the flat tire from the axle, putting the spare on the axle, and leaving the car unattended overnight.
   We assume that the car is parked in a particularly bad neighborhood, so that the effect of leaving it overnight is that the tires disappear.

b. Write a short note on mutual exclusion.

c. Write an algorithm for GraphPlan.

d. Explain state space search for planning.

e. How to solve scheduling problems? Explain.

f. Write a short note on Generative AI.

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

a. Explain various components of CLR (Common Language Runtime) in detail.
b. What is meant by Boxing and Unboxing? Explain it with reference to value type and reference type.
c. Write a short note on Jagged Array supported by Dotnet Framework.
d. Write a short note on namespace in .NET
e. In .NET framework, what are the sealed classes and sealed methods? Why are they used?
f. Compare and contrast between public assembly and private assembly.

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

a. Explain the concept of layer architecture of ASP.NET.
b. Explain importance of Global.asax file in ASP.NET applications.
c. Differentiate between List Box and Drop-Down Lists. List and explain any three common properties of these controls.
d. How Ad Rotator component of ASP.NET is helpful to earn revenue? Explain it with demonstration.
e. Explain how SiteMapPath control is used in ASP.NET application.
f. What are the uses of autopostback and runat properties of ASP.NET web controls?

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

a. Why exception handling is required? Write syntax for exception handling?
b. What is state management? Explain Application state management of ASP.NET applications.
c. Explain relation between content page and master page.
d. What is meant by Cookies? Explain how it is created and used in ASP.NET application.
e. What is user-defined exception? Explain with example.
f. Various common HTTP status codes and messages are generated during ASP.NET tracing mechanism, Explain each of these HTTP status code.

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

a. Write a short note on ADO.NET architecture.
b. Explain following ADO.NET objects.
(i) Connection (ii) Command (iii) Adapter

c. Explain various types of data sources available in ASP.NET.
d. Write a C# code to which display all records from employee table in GridView from database stored in MS SQLServer.
e. With the help of C# code, explain how ListView control can be used to populate data from the table stored in database.
f. What is meant by DataBinding? Explain different types of DataBinding in ASP.NET applications.

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

a. Write a short note on Windows based and Form based authentication of ASP.NET application.
b. What do you mean by Impersonation in ASP.NET? Explain.
c. What is meant by NuGet Application? Why it is used in web based application?
d. What is meant by Bootstrap application? Explain various features of Bootstrap.
e. Write a short note on the following AJAX components.
(i) ScriptManager (ii) UpdatePanel
f. With demonstration, explain how AJAX based application is created using Timer control.

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

a. What is project charter in software project management? What are the elements of project charter.

b. Define business case. Specify the content of business case document.

c. What is project portfolio management. Explain the key aspects of project portfolio management.

d. Define the following terms:
i) Net profit ii) Return of Investment iii) Payback period iv) Net present value
v) Internal rate of return

e. Explain the change control process.

f. Discuss in brief about risk evaluation and management.

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

a. What is Waterfall model? Explain with advantages and disadvantages.

b. State Capers Jones rules of thumb for software estimation.

c. Write a note on COCOMO II model.

d. What is a work breakdown structure (wbs)? Explain.

e. Explain the five major components of Albrecht Function Point Analysis.

f. Write notes on Spiral Model.

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

a. Draw AOA Network and calculate total project duration. Show critical critical path. Calculate EST, EFT, LST.

Activity	Duration days
1-2	4
2-3	5
2-4	7
2-5	4
3-10	15
4-6	7
4-7	Dummy
5-10	10
6-8	6
7-8	7
8-9	12
9-10	10

b. Describe Monte Carlo simulation.
c. Explain Boehm's top ten software project risks and the different strategies for reducing it.
d. Write notes on risk identification process.
e. Explain Boehm's top ten risks and counter measure.
f. Explain the nature of resources and their scheduling.

4. Attempt *any three* of the following: 15
a. Describe the Monitoring and Controlling process for software projects.
b. What is fixed price contract? List the advantages and disadvantages of fixed price contract.
c. Explain Taylor's model of motivation.
d. What is meant by software configuration management? Explain the two principle activities of configuration management.
e. Explain in detail Old-Hackman job satisfaction Model.
f. What is stress? Explain the causes of organizational stress.

5. Attempt *any three* of the following: 15
a. Enumerate McCall's Quality Criteria.
b. Explain different leadership styles.
c. Discuss Boehm's Quality Model.
d. What are the steps of conducting a post implementation project review?
e. Discuss in brief Matrix organization.
f. Write short note on Project Closeout Report.

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

a. Define and explain the Internet of Things.
b. List and explain the roles of people making IOT.
c. Discuss the issue of Privacy in Internet of Things.
d. What is manufactured normalcy field? Explain.
e. What is DNS? How does it work?
f. Define protocol. Explain the following application layer protocols: HTTP, HTTPS, SMTP and FTP.

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

a. What is sketching? Explain its role in prototyping.
b. Discuss the tradeoffs between cost versus ease of prototyping.
c. Discuss the Disadvantages of Open Source.
d. With the help of an example explain the process of scaling up the electronics.
e. Explain the following with respect to prototyping embedded devices: Processor Speed, RAM, Networking and Power Consumption.
f. What are sensors and actuators explain in brief.

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

a. When choosing a laser cutter which two main features should be considered?
b. List and explain non-digital methods or traditional techniques used while prototyping a physical form of a device.
c. Explain the concept of repurposing/recycling with respect to prototyping physical design.
d. What is Clockodillo? Explain how to solve the security issues of an API by Clockodillo?
e. Define JSON and Remote Procedure Calls.
f. Explain the designing a web application for Humans.

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

a. Define Memory Management. List and explain the types of Memory.
b. Give the difference between Stack and Heap.
c. Discuss the concept of debugging in detail.
d. What do you mean by Venture Capital? Explain.
e. Explain the concept of "From craft to mass production".
f. Describe the hobby project and open source.

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

a. Explain the concept of designing kits.

b. What is the design process of PCB? Explain.

c. Discuss the various certification issue for the IOT product.

d. What do you mean by CROWDSOURCING?

e. Describe the Human cost.

f. Define the term "THE OPEN INTERNET OF THINGS DEFINITION".

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

a. What are the different V's of big data?
b. What are two facts about big data?
c. Explain the 4 categories of NoSQL databases.
d. What is the difference between SQL database and MongoDB?
e. What are NRW notations? How read and writes implemented in NoSQL databases?
f. What is CAP theorem in NoSQL?

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

a. Does MongoDB support polymorphism? Justify your answer.
b. Explain MapReduce concept and its application in MongoDB.
c. Write MongoDB queries to create, drop and manage indexes.
d. Consider a MongoDB database that has collection "students" with a given schema:

```
{
_id: 1,
Name: "Full Name",
Age: 18,
Gender: "M",
Class: "TYIT",
Gradepoints: 10
}
```

Write MongoDB queries for following:

i. find all students who are younger than 17 (Age < 17)
ii. find out all of the students with Gradepoints >= 8
iii. find all students who belong to either class TYIT or SYIT
iv. find out all students whose gender is either "M" or they belong to class TYIT or SYIT and whose age is less than or equal to 16
v. find all students with names starting with "St" or "Te" and whose class begins with "TY"

e. Explain the process of election for selecting a primary member in replica set.
f. What is sharding? List and explain sharding components.

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

a. What is the WiredTiger storage engine in MongoDB?
b. Explain limitations of BSON document in MongoDB.
c. Explain Namespace (.ns File) in MMAPv1 storage engine of MongoDB.
d. What is GridFS in MongoDB?
e. Explain limitations of sharding in MongoDB.
f. Design a schema for social networking website in MongoDB database.

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

a. Explain Spark architecture with neat diagram.
b. Write a short note on VoltDB database's partitioning.
c. Write a jQuery to demonstrate slideUp( ), slideDown ( ) and slideToggle( ) methods.
d. What is event propagation in jQuery?
e. What is DOM in jQuery? How it works?
f. Write a short note on disk economics.

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

a. Explain six structural character tokens in JSON.
b. What is document.cookie? Explain functions of setCookie( ) and getCookie ( ) methods.
c. List and explain various data types in JSON.
d. Write a short note on JSONP.
e. Describe members of Web Storage API.
f. Write a short note on JSON.stringify( ) method.

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1. Attempt *any two* of the following: **10**

a. Define the term testing and explain why Testing of a software is context dependent?
b. What are the causes of software defects?
c. What is a role of testing in software development, maintenance and Operations.
d. How quality can be measured with the help of software testing?

2. Answer *any two* of the following: **10**

a. Elaborate the concept of test-driven development.
b. What do you mean by a Confirmation Testing?
c. Explain Alpha and Beta Testing with reference to acceptance Testing.
d. With the help of diagram explain V Model.

3. Answer *any two* of the following: **10**

a. Explain the important elements of review meeting.
b. How is the formal review carried out? Explain the steps.
c. Describe the roles and responsibilities of moderator and manager in review process.
d. Explain Inspection as a formal review technique.

4. Answer *any two* of the following: **10**

a. Describe the significance of statement coverage and decision coverage testing techniques.
b. State and explain the factors considered for choosing Test techniques.
c. Explain the State Transition model.
d. What is the decision table? Describe decision table testing technique.

5. Answer *any two* of the following: **10**

a. Why is test monitoring and control needed?
b. Enlist the skills that are needed for the test staff.
c. What is a Test Plan? State and explain any four components of a Test Plan
d. What is a risk? How project risk can be handled?

6. Answer *any two* of the following: **10**

a. What are the benefits of using tools to support testing?
b. Discuss the features of test management tools
c. Explain the terms Stub and Driver with reference to test harness.
d. Explain any one tool used for Static Testing.

[*Contd...*

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

a. Write a note on Test analysis and Design.
b. Define and explain the term Validation Testing.
c. Explain the concept of Cyclomatic Complexity with example.
d. What is the importance of traceability in test analysis?
e. What are the skills that are needed for the test leader?
f. What is Test comparator? Explain the features.
