Date 01/12/2023

(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. Define project. Describe the project management life cycle with the help of diagram and state the W5HH principle.
b. What is project product? Explain the product breakdown structure with the help of example.
c. Define Business Case. Explain business case document in detail.
d. How to evaluate and manage risk in software project management? Explain.
e. Describe the main steps of step wise approach to planning software projects overview with help of diagram.
f. Suppose a software development company has undertaken a project that is expected to cost £190,000 to execute and the expected inflow is £25,000 per quarter for the first year, £30,000 per quarter thereafter. What is the payback period for the project?

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

a. Describe the spiral model with the help of diagram and give the advantages and disadvantages of it.
b. Define Atern/Dynamic Systems Development Method. State and explain eight core principles of it.
c. Explain briefly Albrecht/IFPUG function point and solve the following: For a organization, the following table summarizes the weightings to be used for computing function points measures of a software having the following characteristics : Number of user inputs : 10 (simple), Number of user outputs : 7 (simple), Number of user enquires : 3 (average) , Number of files : 6 (average), Number of External interfaces : 1 (complex), Calculate unadjusted function point measures of the size of the software system?
d. Discuss Agile and Scrum as a fast delivery approach of a project in detail.
e. Describe the COCOMO II and discuss its stages.
f. Describe the Capers Jones estimating rules of thumb with the help of relevant examples.

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

a. Describe the nature of resources and their scheduling.
b. List and Describe Bohem's top ten software project risks and the different strategies for reducing it.
c. Explain the concept of forward pass, backward pass, and critical path.
d. Distinguish between PERT and CPM.

[Contd...

9BF3D1FF996635D692980B21450B9EED

e. Suppose four risks namely R1, R2, R3 and R4 have been identified and assigned the probabilities of occurrence of 0.1, 0.2, 0.3 and 0.4 respectively. The likely damages due to the four risks are Rs. 60,000; Rs. 1,00,000; Rs. 70,000; Rs. 80,000 respectively. Calculate the risk exposure of all the risks.

f. Create a precedence activity network using the following details:

Activity	Depends on	Duration (days)
A		5
B	A	7
C	B	6
D	A	5
E	D	10
F	B	15
G	B	8
H	G	8
I	C	4
J	G	4
K	E,F	7
L	I,H	5

Calculate the earliest and latest start and end dates and the float associated with each activity. From this identify the critical path.

4. Attempt *any three* of the following:

a. Define Contract. Explain fixed price contract with its' advantages and disadvantages. **15**

b. Describe Vroom's expectancy theory of motivation.

c. Describe three important categories of stress management techniques.

d. How to control the change? Explain the change control process.

e. Describe the ethical and professional concerns as a member of any organization.

f. Suppose a project is budgeted to cost $150,000. The project is to be completed in 20 months. After two months, the project is 10% complete at an expense of £25,000. It was planned that after 2 months, 15% of the project work should have been completed. Compute the cost performance index and the schedule performance index. Interpret these values to assess the progress of the project.

5. Attempt *any three* of the following:

a. Explain five basic stages of Team development. Also state the different types of people needed to form a balanced team. **15**

b. "Student fails in the project, if the projects are not closed properly". Justify this statement.

c. What is Testing? Give a brief explanation of the main activities involved in Software Testing.

d. What is the importance of Software quality? Discuss six major external software quality characteristics identified by ISO 9126.

e. Discuss reasons for project closure.

f. Explain CMM (Capability Maturity Model) with it's the various levels.

9BF3D1FF996635D692980B21450B9EED

T4B SCIT Sem-IV (Regular & ATKT) Rev 16 Exam Dec-2023

Paper / Subject Code: 53702 / Internet of Things

Date 02/12/2023

(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. List and explain the roles of people making IoT.
b. Explain calm and ambient technology using example of Live wire.
c. What is manufactured normalcy field? Explain.
d. Explain the following concepts with respect to IoT:
   i. Affordances
   ii. Graceful degradation
e. "Data available through IOT device belongs to public or company which implements the IOT device". Discuss.
f. Differentiate between static IP address and Dynamic IP address.

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

a. What factors should be considered when deciding between the cost and ease of prototyping?
b. Describe the difficulties encountered during the transition from a prototype to mass production?
c. "Open source has a competitive advantage". Discuss.
d. Describe Arduino with a focus on the following aspects: Integrated Development Environment (IDE), Pushing Code, Operating System, Programming Language and Openness.
e. Compare Raspberry pi and Beagle bone black.
f. Explain the following IOT devices built with Arduino.
(i) The Good Night Lamp (ii) Botanicals (iii) Baker Treat

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

a. What are non-digital methods and materials commonly used in prototyping?
b. Explain the different methods used for 3D printing.
c. Explain the use of repurposing /recycling in prototyping IoT devices.
d. What is mashing up APIs? Also explain the term scraping.
e. What is comet? Explain.
f. Explain the following protocols suited to Internet of Things applications:
   i. Message Queying telemetry transport (MQTT),
   ii. Constrained Application Protocol (CoAP)

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

a How can you maximize the utilization of available memory in embedded systems, especially when dealing with limited RAM?
b What is debugging for Internet of Things device? Explain.
c Explain different types of libraries for embedded systems which works with limited memory.

[Contd...

C8FBDCA165F35CDA4C2D2BBCD1BE80D2

d Discuss the business model canvas for Internet of Things.
e Explain the following business models:
   i. Subscriptions
   ii. Customization
   iii. Be a Key Resource
f Write a short note on Lean startups.

5. **Attempt *any three* of the following:** 15
a. Discuss the phase of Testing in manufacturing of Internet of Things device.
b. What is the importance of Certification for IoT devices? Explain.
c. Write a short note on mass-producing the case and other fixtures.
d. Discuss different environmental issue in Internet of Things.
e. What do you mean by disrupting control?
f. Explain the five critical requirements for sensor commons project.

Scanned by Easy Scanner

C8FBDCA165F35CDA4C2D2BBCD1BE80D2

(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. Draw and explain .NET framework architecture.
b. How does the Garbage Collector function in the context of .NET? Provide a brief overview of the Base Class Library in .NET.
c. Explain any five properties/methods of Array class.
d. Explain the process of data type conversion in C# and identify its various types.
e. How to derive new class from base class? Give example.
f. What steps are involved in constructing a fundamental Class in C#? Please delineate the different class modifiers.

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

a. Enumerate and elaborate on the different file types accessible within an ASP .NET Application?
b. What is view state? Give the advantages and disadvantages of view state.
c. Provide a concise overview of Application Events.
d. Explain Listbox control with properties and methods.
e. Write short note on AdRotator and Calendar control.
f. What is RangeValidator? Describe any four properties of it.

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

a. Explain exception handling mechanism in C#.
b. Explain the predefined classes related to System Exception.
c. What are the Server-Side State Management techniques? Explain it.
d. Illustrate the usage of Cookies in an ASP.NET Application with an example.
e. What is Theme? Explain Global theme.
f. What is a Master Page? How is it utilized in ASP .NET?

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

a Explain the Data Provider Model within ADO .NET.
b Write short note on Connected and Disconnected Data Access.
c Write a brief explanation of the types of ASP.NET Data Binding.
d Explain the Page Life Cycle with Data Binding.
e Explain the GridView Control and its methods for defining columns.
f Write short note on DetailsView.

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

a. Provide an explanation of the XML TextWriter class, including its methods.
b. Describe the process of reading an XML document using the XDocument class.
c. Elaborate Forms Authentication.
d. Write short note on Authentication and Authorization.
e. What is AJAX? What are its advantages?
f. Write short note on Accordion control with appropriate properties.

2AE962E453B326368F9D42C43AF23C9C

TYBSc IT Sem-V Rev16 (Regular & ATKT) Examination-Dec 2023

Paper / Subject Code: 53704 / Artificial Intelligence

Date 05/12/2023

(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. Explain the working of Goal based agent with diagram.
b. What is Artificial intelligence? Explain with example.
c. What is the purpose of Turing test?
d. Explain PEAS description for taxi's task environment.
e. Explain any five properties of task environments.
f. Write a short note on foundation of Artificial intelligence.

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

a. Explain depth first search algorithm with suitable example.
b. Explain Hill climbing algorithm in detail.
c. Explain 8-queen problem using the concept of genetic algorithm.
d. Formulate Vacuum world problem.
e. Explain how algorithm's performance can be evaluated.
f. Differentiate between informed Search and uninformed search with suitable example.

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

a. Explain min-max algorithm with suitable example.
b. Write a note on card games.
c. What is meant by conjuctive normal form? Explain.
d. Explain simple knowledge-based agent.
e. Explain wumpus world environment giving its PEAS description.
f. Explain resolution theorem with suitable example.

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

a What is first order logic? Discuss basic elements of first order logic.
b Explain the process of knowledge engineering.
c Explain following w.r.t. First Order Logic. 1. Term 2. Atomic Sentences 3. Complex Sentences 4. Universal Quantifiers. 5. Existential quantification.
d Explain how A.I is useful in Electronic Circuits Domain.
e "The law says that it is a crime for an American to sell weapons to hostile nations. The country Nono, an enemy of America, has some missiles, and all of its missiles were sold to it by Colonel West, who is American".
Formulate this knowledge in First order logic.
f Explain in brief about unification algorithm.

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

a. What are events? Explain its importance.
b. Write Planning Domain Definition Language (PDDL) description of an Block worlds,
c. Explain planning graph in detail.
d. Explain Forward (progression) state-space search algorithm.
e. Explain semantic network with example.
f. Explain Internet shopping research agent in detail.

4A200F3A17E7C68AB1CD4CE9789F16C9

(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. Explain the duty of linux system administrator in monitoring and tuning Performance of a system.
b. Explain with the help of an example,
   i) How pipe can be used to add functionality to a command.
   ii) How the result of a command can be sent to a file.
c. What is a linux distribution? State in brief the Linux support offered by Red Hat.
d. With the help of an example, explain how backup can be scheduled and automated using cron.
e. State the features of the two types of links. Show how a deleted file can be restored using a link.
f. Discuss how yum overcomes the limitations of a tar ball and rpm.

2. Attempt *any three* of the following: 15
a. What is the difference between a partition and a logical volume? Highlight in brief the features of the different types of partitions.
b. Discuss the steps to create an encrypted volume.
c. Briefly explain the ifcfg configuration file variables.
d. With the help of an example, explain how to setup SSH port forwarding.
e. Explain the purpose and contents of the following files:
   i. /etc/group
   ii. /etc/shadow
f. State the commands to do the following. Give an example for each.
   i. Display ownership of file or directory
   ii. Change group ownership
   iii. Change user ownership
   iv. Set file permissions for user, group, and others using absolute mode
   v. Set file permissions for user, group, and others using relative mode

3. Attempt *any three* of the following: 15
a. What are tables, chains and rules in a firewall?
b. Enlist the steps to setup iptables logging.
c. State the reasons for which public/private keys are typically used. With the help of an example explain how public/private keys are used to encrypt traffic that is sent to a server.
d. What is GPG signing? State the commands to sign a file using GNU Privacy Guard.
e. Discuss the configuration of NFS server and client.
f. Discuss the generic Samba parameters in the global section of the samba configuration file.

[*Contd...*

4A200F3A17E7C68AB1CD4CE978D44726

4.	Attempt *any three* of the following:	15
a	Write the steps to setup a secondary DNS server.	
b	Explain in brief the most relevant parameters from the dhcpd.conf file.	
c	Briefly discuss the three components play a role in the process of Internet mail.	
d	Name and explain the parameters that should be configured for a mail server handling messages from the Internet.	
e	List and explain the various performance parameters for Apache modes.	
f	Explain the steps to setup a Protected Web Server.	
5.	Attempt *any three* of the following:	15
a.	What is a shell script? State the elements of a good shell script.	
b.	Demonstrate the use of pattern matching operators in a shell script.	
c.	Explain the steps to create an iSCSI target configuration.	
d.	Discuss the steps to troubleshoot a nonoperational cluster.	
e.	Explain the steps to perform a Virtual Machine Network Installation Using a Kickstart File.	
f.	List the steps to configure TFTP server for PXE boot.	

Scanned by Easy Scanner

4A200F3A17E7C68AB1CD4CE978D44726

(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. What are different technologies provided by Java EE platform?
b. Explain 2-tier System Architecture, its advantage and disadvantage.
c. Explain the Life cycle of Servlet with diagram.
d. What is JDBC? Explain architecture of JDBC in Detail?
e. Write short notes on JDBC Drivers?
f. Write a program to accept details of a person and using servlet and store those details in database.

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

a. Explain Request Dispatcher Interface with its methods.
b. What is Cookies? Explain setting sending and reading of Cookie in java Servlet.
c. What is session? Explain lifecycle of Http Session?
d. Write a short note on session management using servlet.
e. Explain the working of Non-Blocking I/O.
f. Write a program to create a servlet application to download a file.

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

a. Distinguish between Servlet and JSP.
b. Explain lifecycle of JSP with diagram.
c. Explain different types of JSP tags with example.
d. Explain different core tags in JSTL.
e. List and explain any 4 JSP Implicit objects with their methods.
f. Explain different scopes of JSP objects.

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

a What are the different types of beans? Explain.
b Explain lifecycle of stateful session beans.
c What is an interceptor? How an interceptor is defined and how aroundInvoke() is added to it?
d Explain the Benefits of Enterprise Java Beans.
e Explain lifecycle of message driven beans.
f Explain naming and directory service with example.

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

a. Explain Persistency in Java.
b. Explain JPA Architecture with diagram.
c. Explain hibernate with advantages.
d. Explain architecture of hibernate.
e. What is Impedance Mismatch? How it can be solved?
f. What are different components of Hibernate? Explain.

F33B634F5009B6E106F98B86CF22A4CE

(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** calculator is **allowed**

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

a. Define Big Data. Describe the various facts of Big Data.

b. Compare and contrast ACID vs BASE.

c. Explain the design decisions considered for MongoDB.

d. State and explain the advantages and disadvantages of NoSQL databases.

e. Describe the categories of NoSQL databases

f. Explain the importance of Big Data in context to its usage.

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

a. Justify the statement : MongoDB has a schema-less architecture.

b. Consider a MongoDB database that has "movies" collection:

```
{
   _id: ObjectId("573a1390f29313caabcd42e8"),
plot: 'A group of bandits stage a brazen train hold-up, only to find a determined posse
hot on their heels.',
genres: [ 'Short', 'Western' ],
runtime: 11,
cast: [
    'A.C. Abadie',
    "Gilbert M. 'Broncho Billy' Anderson",
    'George Barnes',
    'Justus D. Barnes'
  ],
title: 'The Great Train Robbery',
languages: [ 'English' ],
released: ISODate("1903-12-01T00:00:00.000Z"),
directors: [ 'Edwin S. Porter' ], rated: 'TV-G', awards: { wins: 1, nominations: 0, text: '1
win.' }, lastupdated: '2015-08-13 00:27:59.177000000', year: 1903,
imdb: { rating: 7.4, votes: 9847, id: 439 },
countries: [ 'USA' ],
type: 'movie',
tomatoes: {
viewer: { rating: 3.7, numReviews: 2559, meter: 75 },
fresh: 6,
critic: { rating: 7.6, numReviews: 6, meter: 100 },
rotten: 0,
lastUpdated: ISODate("2015-08-08T19:16:10.000Z")
  }
```

[*Contd...*

F33B634F5009B6E106F98B86CF0C643E

Write queries for the following:
i) Find all movies with full information from the 'movies' collection that released in the year 1893.
ii)Find all movies with full information from the 'movies' collection that have a runtime greater than 120 minutes.
iii) Find all movies with title, languages, released, directors, writers, awards, year, genres, runtime, cast, countries from the 'movies' collection in MongoDB that have at least one nomination.
iv) Retrieve all movies with title, languages, released, directors, writers, countries from the 'movies' collection in MongoDB that have a word "scene" in the title.
v) Find all movies with title, languages, released, runtime, directors, writers, countries from the 'movies' collection in MongoDB that have a runtime between 60 and 90 minutes.

c. Illustrate the use of Query Document in MongoDB.
d. Describe the Core Processes and tools of the MongoDB package.
e. Describe the role of various secondaries in MongoDB Replica Set.
f. Explain the types of indexes in MongoDB.

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

a. Delineate the write operations performed using Journaling.
b. Illustrate the working of following methods of GridFS: i) new_file() ii) get_version() iii) get_last_version() iv) delete() v) exists() and put()
c. Write a short note on performance monitoring of MongoDB Query.
d. Outline the limitations of MongoDB with respect to i)Sharding ii)32-bit/ 64-bit version.
e. How are Ajax requests handled in JQuery? Illustrate the use of done(), fail() and always()
f. Discuss the criteria required for determining implementation of Replica and Sharding in the MongoDB environment.

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

a. Draw and explain the syntax diagram of a JSON number.
b. What is the chaining of methods? Write a code snippet using chaining methods. With a suitable code snippet, discuss the various methods used for removing content using JQuery code.
d. With a suitable diagram explain the architecture of TimesTen.
e. How are Ajax requests handled in JQuery? Illustrate the use of done(), fail() and always()
f. What is a Plug-in? Give its usage. Create a JQuery Plug-in that logs out the value of the ID attribute for every element on the page.

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

a. Draw and explain the syntax diagram of a JSON number.
b. Describe the stringify method in detail.
c. JSON data can be made persistent. Justify.
d. Describe the members of Web Storage API.
e. Explain the Response properties of the xhr object.
f. Write a short note on JSONP.

F33B634F5009B6E106F98B86CF0C643E