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21AI71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Advanced AI and ML

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the task environment and properties of task environments. **(10 Marks)**

b. Describe and compare the four basic types of agent programs. **(10 Marks)**

OR

2 a. Explain the concept of adversarial search in game playing agents. How does minimax algorithm help an agent make decisions in a competitive environment? **(10 Marks)**

b. Explain the alpha beta search algorithm also write the effectiveness of alpha beta pricing. **(10 Marks)**

Module-2

3 a. Describe the quantification problem in the context of logical agents acting under uncertainty. **(10 Marks)**

b. How does an agent uses degrees of belief to handle uncertainty in decision making? **(10 Marks)**

OR

4 a. Describe the naïve Bayes model and its assumptions about conditional independence. **(10 Marks)**

b. What is Bayes 'theorem' and how it is applied in combining multiple source of evidence? **(10 Marks)**

Module-3

5 a. Explain the concept of a Perceptron with a neat diagram. Discuss the Perceptron training rule. **(10 Marks)**

b. Explain the derivation of the Back propagation rule. **(10 Marks)**

OR

6 a. Explain the prototypical of a genetic algorithm. **(10 Marks)**

b. Explain the Hypothesis space search in the genetic algorithm. **(10 Marks)**

Module-4

7 a. Explain the association rule mining with an example. **(10 Marks)**

b. Explain the application of collaborative filtering in building recommendation systems. Illustrate with python code Implementation. **(10 Marks)**

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21AI733

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Full Stack Development

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain MVC (Model-view-Controller) Design Pattern. **(05 Marks)**
b. Discuss the process of mapping URL's to views in Django with an example. **(10 Marks)**
c. Describe loose coupling in Django. Why it is important? **(05 Marks)**

OR

2 a. What are Wild card patterns in URL's? Give an example of how they are used in Django. **(10 Marks)**
b. Explain the evolution of Django and mention any two key features. **(05 Marks)**
c. Discuss the concept of views in Django. **(05 Marks)**

Module-2

3 a. Explain Basic Template Tags and Filters. **(10 Marks)**
b. Explain MVT Development Pattern. **(10 Marks)**

OR

4 a. Explain Template inheritance with an example. **(10 Marks)**
b. Explain the steps involved in inserting and updating data in Django model. **(10 Marks)**

Module-3

5 a. What are the benefits of using Django admin interfaces? **(05 Marks)**
b. Describe the process of creating and processing feedback forms in Django. **(10 Marks)**
c. How can custom validation be implemented in Django forms? Provide an example. **(05 Marks)**

OR

6 a. Explain how to activate and use Django admin interfaces. **(05 Marks)**
b. Explain customizing the admin interface. **(10 Marks)**
c. What are URL conf Ticks and why are they used? **(05 Marks)**

Module-4

7 a. Define Generic views and explain its types. **(10 Marks)**
b. Explain the following :
(i) Cookies
(ii) Users and Authentication. **(10 Marks)**

OR

8 a. Describe the process of creating a syndication feed in Django. **(10 Marks)**
b. Describe how to generate non-HTML content like CSV and pdf using Django. **(10 Marks)**

Module-5

9 a. Discuss the settings of JavaScript in Django. **(10 Marks)**
b. Construct a program to develop a search application in Django using AJAX that displays courses enrolled by a student being searched. **(10 Marks)**

OR

10 a. Explain XHTML HTTP Request and Response. **(10 Marks)**
b. Develop a registration page for student enrollment without page refresh using AJAX. **(10 Marks)**

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21CS71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Big Data Analytics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define Big data. Explain big Data characteristics. **(10 Marks)**

b. Explain the classification of data in Big data. **(10 Marks)**

OR

2 a. Define Data, Web Data. Illustrate by considering example of E-commerce, how big data is used. **(10 Marks)**

b. With a neat diagram, explain the function of each of the five layers in big data architecture. **(10 Marks)**

Module-2

3 a. With a neat diagram, explain Hadoop main components and ecosystem. **(10 Marks)**

b. Explain the features of Hadoop HDFS with the functions of Name node and Data node. **(10 Marks)**

OR

4 a. Explain HDFS block replicator and HDFS safe mode. **(10 Marks)**

b. Discuss the Apache Sqoop import and export methods with a neat diagram. **(10 Marks)**

Module-3

5 a. Explain the features of Big Table, RC, ORC and parquet data stores. **(10 Marks)**

b. With example explain Key-values store. **(10 Marks)**

OR

6 a. Explain NOSQL Data store and its characteristics. **(10 Marks)**

b. Describe the features of MongoDB and its industrial application. **(10 Marks)**

Module-4

7 a. Describe the Map task, Reduce tasks and Map reduce execution process. **(10 Marks)**

b. Describe Hive architecture and features. **(10 Marks)**

OR

8 a. Explain the architecture, feature and application of PIG. **(10 Marks)**

b. Illustrate by considering an example the working of the map reduce programming model. **(10 Marks)**

Module-5

9 a. How does Regression analysis predict the value of dependent variable incase of linear regression. **(10 Marks)**

b. Explain with an example and algorithm the working principle of Apriori process for adopting the subset of frequent item set. **(10 Marks)**

OR

10 a. Define the term web mining. Discuss the broad classification of web mining and their application. **(10 Marks)**

b. Define the term social network. Explain social network as graph with Centralities, Ranking and Anomaly detection. **(10 Marks)**

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21CS72

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Cloud Computing

Time: 3 hrs. Max. Marks: 100

Note : ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. With neat diagram, explain Cloud Computing reference model. **(10 Marks)**
b. List the advantages and disadvantages of cloud computing. **(10 Marks)**

OR

2 a. Explain the following :
i) Amazon Web Service (AWS)
ii) Microsoft Azure
iii) Hadoop. **(10 Marks)**
b. Briefly discuss Historical developments of Cloud computing. **(10 Marks)**

Module-2

3 a. List and explain characteristics of Virtualized Environments. **(10 Marks)**
b. Explain different types of Hardware Virtualization techniques. **(10 Marks)**

OR

4 a. List and explain Pros and Cons of Virtualization. **(10 Marks)**
b. Explain the following in detail : i) Xen ii) VM ware. **(10 Marks)**

Module-3

5 a. With a neat diagram, explain Cloud Computing Architecture. **(10 Marks)**
b. Explain different types of Clouds. **(10 Marks)**

OR

6 a. Explain the open challenges faced in Cloud computing in detail. **(10 Marks)**
b. Explain the following in detail :
i) IaaS (Infrastructure or Service)
ii) Platform or Service
iii) Software or Service. **(10 Marks)**

Module-4

7 a. What are the security risk faced by Cloud users? **(10 Marks)**
b. Discuss privacy and privacy impact assessment in Cloud security. **(10 Marks)**

OR

8 a. List and explain Hypervisor Based and VM Based threats. **(10 Marks)**
b. Explain the following :
i) OS Security ii) Trust in cloud computing. **(10 Marks)**

Module-5

9 a. What is AWS? What types of Service does it provide? **(10 Marks)**

b. With a neat diagram, explain Google AppEngine Plat from Architecture. **(10 Marks)**

OR

10 a. What are the most important advantages of Cloud technologies for social networking applications and media applications? **(10 Marks)**

b. Describe an applications of cloud computing technology in scientific applications. **(10 Marks)**

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21CS735

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Internet of Things

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. With a neat diagram, briefly explain evolution of IoT. (10 Marks)
b. List IoT planes and explain various enablers of IoT. (10 Marks)

OR

2 a. Briefly explain IoT networking components. (10 Marks)
b. Discuss classification of addressing strategies in IoT. (10 Marks)

Module-2

3 a. List and explain classification of sensors based on :
i) Power requirements
ii) Sensor output
iii)Property to be measured. (10 Marks)
b. With a block diagram, explain functional blocks of a typical sensor node in IoT. (10 Marks)

OR

4 a. Define sensor. Explain sensor characteristics with an example. (10 Marks)
b. What is actuator? Briefly explain actuator types. (10 Marks)

Module-3

5 a. With neat diagram, explain two types of off-site processing topologies. (10 Marks)
b. Explain IoT device design and selection considerations. (10 Marks)

OR

6 a. Explain three parts of data offloading. (10 Marks)
b. Explain types of data formats and also explain importance of processing in IoT. (10 Marks)

Module-4

7 a. Explain various communication topologies in Zigbee with neat diagram. (10 Marks)
b. With neat diagram, discuss the functional protocol stack of thread in comparision to the OSI stack. (10 Marks)

OR

8 a. Explain an outline of the RFID operation of communication with neat diagram. (10 Marks)
b. With block diagram, explain bluetooth protocol stack. (10 Marks)

Module-5

9 a. Explain any five important features of IPv6. (10 Marks)
b. With block diagram. Explain "Physical web" as one of the discovery protocol. (10 Marks)

OR

10 a. What is MQTT? Briefly explain MQTT message types. (10 Marks)
b. With block diagram of URI link, explain URI. (10 Marks)

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21CS741

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Software Architecture and Design Patterns

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is design pattern? Explain how design patterns solve design problems. **(10 Marks)**
b. Explain four essential elements of design pattern. **(04 Marks)**
c. Explain how design patterns and frameworks are different. **(06 Marks)**

OR

2 a. What is object oriented development? Explain the key concepts of OOD. **(08 Marks)**
b. Describe the common causes of redesign. **(08 Marks)**
c. Define:
i) Cohesion
ii) Coupling
iii) Modularity
iv) Modifiability. **(04 Marks)**

Module-2

3 a. Explain the consequences and implementation issues of bridge pattern. **(10 Marks)**
b. Explain the motivation, applicability and structure of adapter pattern. **(10 Marks)**

OR

4 a. Explain the consequences and implementation issues of decorator pattern. **(10 Marks)**
b. Give the structure of proxy pattern and explain it. **(05 Marks)**
c. Explain the implementation issues of composite design pattern. **(05 Marks)**

Module-3

5 a. Define behavioral patterns. Explain the motivation applicability and structure of chain of responsibility. **(10 Marks)**
b. Explain the structure, implementation and consequences of iterator pattern. **(10 Marks)**

OR

6 a. Explain the consequences and participants of mediator and interpreter patterns. **(10 Marks)**
b. Explain the intent, motivation and applicability of state and memento patterns. **(10 Marks)**

Module-4

7 a. Explain MVC architecture and its alternate view. **(10 Marks)**
b. Mention the characteristics of architectural patterns. **(05 Marks)**
c. Draw the use case for drawing a line and explain it. **(05 Marks)**

OR

8 a. Explain the scheme of implementing undo operation with issues. **(10 Marks)**
b. What are the benefits of design of a sub system? **(05 Marks)**
c. Draw and explain the sequence diagram for adding a line. **(05 Marks)**

Module-5

9 a. With a neat diagram, explain basic architecture of client/server systems. **(10 Marks)**
b. Explain GET and post methods. **(05 Marks)**
c. Explain the state transition diagram for adding a book in library system. **(05 Marks)**

OR

10 a. Explain the steps to set up a remote object system. **(08 Marks)**
b. Explain how the library system is deployed on the world wide web. **(06 Marks)**
c. Explain how to implement object oriented systems on the web. **(06 Marks)**

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21CS745

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Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
NoSQL Database

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is NoSQL? Explain briefly about aggregate data models with a neat diagram. Consider example of relations and aggregates. **(10 Marks)**

b. Define materialized view. How are they different from views? Briefly explain the two main strategies to build a materialized view. **(10 Marks)**

OR

2 a. Describe in detail the attack of clusters. **(07 Marks)**

b. Explain Impedance mismatch with the help of suitable example. **(07 Marks)**

c. What are schemaless databases? Explain. **(06 Marks)**

Module-2

3 a. Explain Master Slave and Peer to Peer distribution models with a neat diagram. **(10 Marks)**

b. Explain about update consistency and read consistency with an example. **(10 Marks)**

OR

4 a. What are Version Stamps? What are the ways to create version stamps? **(10 Marks)**

b. What is CAP theorem? How is it applicable to NoSQL systems? **(10 Marks)**

Module-3

5 a. What is Map Reduce? Explain Map Reduce techniques with an example. **(10 Marks)**

b. What are the features of key value databases? Explain. **(10 Marks)**

OR

6 a. Explain 2 stage Map Reduce with suitable examples and a neat diagram. **(10 Marks)**

b. Explain how data can be read and posted from and to the bucket using queries in Riak. **(05 Marks)**

c. What is key value store? List some popular key value databases. **(05 Marks)**

Module-4

7 a. What are document databases? Explain with example list and explain any 2 features of document database. **(10 Marks)**

b. Explain suitable use cases of document data store. **(10 Marks)**

OR

8 a. Describe scaling and sharding in MongoDB. **(10 Marks)**

b. How to ensure consistency and availability in MongoDB? **(10 Marks)**

Module-5

9 a. What are the features of graph databases? Explain. **(10 Marks)**

b. Explain some suitable use cases of graph databases and describe when we should not use graph databases. **(10 Marks)**

OR

10 a. With a neat diagram, explain the 3 ways in which graph databases can be scaled. **(10 Marks)**

b. How to query on graph? Explain with example. **(10 Marks)**

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21CS752

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to AI and ML

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define AI and briefly explain four approaches to AI. **(10 Marks)**

b. List and discuss the foundations of artificial intelligence. **(10 Marks)**

OR

2 a. Explain Omniscience, learning and autonomy. **(10 Marks)**

b. With block diagram, explain simple reflex agents. **(10 Marks)**

Module-2

3 a. List and explain four-phase problem-solving process for an agent enjoying a touring vacation in Romania as shown in Fig.Q.3(a). **(10 Marks)**

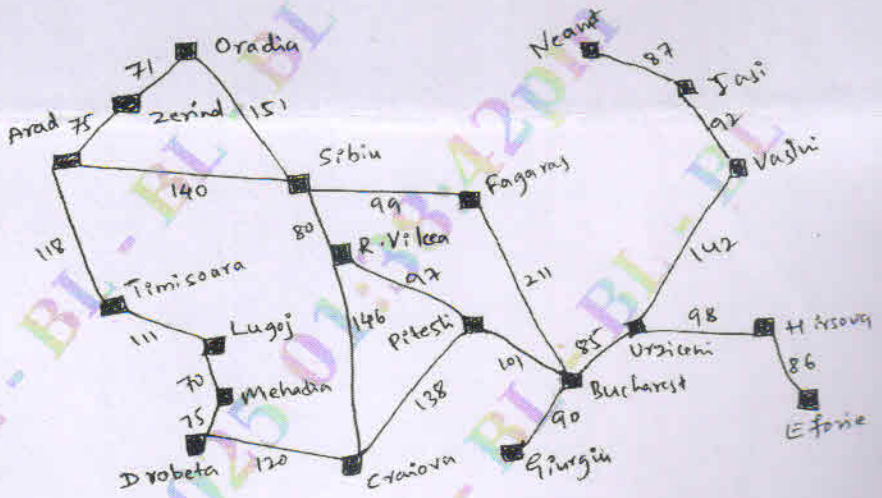

Fig.Q.3(a)

b. Explain the standard formulation and problem definition of the 8 puzzle as shown in Fig.Q.3(b). **(10 Marks)**

7	2	4
5		6
8	3	1

Start state

	1	2
3	4	5
6	7	8

Goal state

Fig.Q.3(b)

OR

4 a. With neat diagram, explain breadth-first search. **(10 Marks)**
b. Explain Bidirectional heuristic search. **(10 Marks)**

Module-3

5 a. List and briefly explain types of machine learning. **(10 Marks)**
b. Explain challenges of machine learning. **(10 Marks)**

OR

6 a. List and explain characteristics of Big Data. **(10 Marks)**
b. Briefly explain data analytics frame work. **(10 Marks)**

Module-4

7 a. With neat diagram, explain learning environment. **(10 Marks)**
b. List and explain four steps of design of learning system. **(10 Marks)**

OR

8 a. Explain weighted K-Nearest-Neighbor algorithm. **(10 Marks)**
b. Explain K-Nearest-Neighbor algorithm. **(10 Marks)**

Module-5

9 a. With neat diagram, explain artificial neural network structure. **(10 Marks)**
b. With neat diagram, explain perceptron model. **(10 Marks)**

OR

10 a. With neat diagram, explain architecture of RBFNN (Radial Basis Function Neural Network). **(10 Marks)**
b. Discuss self-organizing features map algorithm. **(10 Marks)**

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21CS754

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Introduction to Data Science

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1	a.	Explain main categories of data.	(10 Marks)
	b.	Explain NoSQL database in big data technologies.	(10 Marks)
		OR	
2	a.	Explain data science process.	(10 Marks)
	b.	Write the benefits and uses of data science and big data.	(10 Marks)

Module-2

3	a.	Write an overview of techniques to handle missing data.	(10 Marks)
	b.	Why correct errors as early as possible in data science?	(10 Marks)
		OR	
4	a.	Write a note on retrieving data.	(10 Marks)
	b.	Explain presentation and automation.	(10 Marks)

Module-3

5	a.	What is machine learning? Applications for machine learning in data science.	(10 Marks)
	b.	Explain packages for working with data in memory.	(10 Marks)
		OR	
6	a.	Explain modeling process.	(10 Marks)
	b.	Explain types of machine learning.	(10 Marks)

Module-4

7	a.	Explain dashboard development tools.	(10 Marks)
	b.	Design a code to generate total stock overtime graph.	(10 Marks)
		OR	
8	a.	What are uses of data visualization options?	(10 Marks)
	b.	Write a code to generate average stock per medicine graph.	(10 Marks)

Module-5

9	a.	Explain Map Reduce flow for counting the colors in input texts.	(10 Marks)
	b.	What is spark? How does spark solve the problems of Map Reduce?	(10 Marks)
		OR	
10	a.	Explain Data preparation in spark.	(10 Marks)
	b.	List of common hadoop file system commands.	(10 Marks)

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21IS71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025
Cryptography and Network Security

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define substitution and transposition techniques with an example. **(05 Marks)**

b. Define the following terms:
i) Cryptanalysis
ii) Ciphertext
iii) Encryption
iv) Kirchoff's Principles **(08 Marks)**

c. Explain playfair cipher algorithm. Find the ciphertext for plaintext "Computer Science" with key "MONARCHY". **(07 Marks)**

OR

2 a. Distinguish between stream cipher and block cipher. **(04 Marks)**

b. With a neat diagram, explain feistel structure for encryption and decryption. **(08 Marks)**

c. Explain DES encryption algorithm with a neat diagram. **(08 Marks)**

Module-2

3 a. Explain RSA algorithm. Perform encryption and decryption using RSA algorithm where P = 3, Q = 11, C = 3 and M = 9. **(10 Marks)**

b. Explain Public key crypto systems. **(10 Marks)**

OR

4 a. Describe Elgamal cryptographic systems. **(10 Marks)**

b. Perform a diffie-hellman key exchange for prime number q = 71 and primitive root $\alpha = 5$.
i) If user A has private key $X_A = 5$, what is A's public key $Y_A = ?$
ii) If User B has private key $X_B = 12$, what is B's public key $Y_B = ?$
iii) What is shared key? **(10 Marks)**

Module-3

5 a. Explain key distribution scenario, with neat diagram. **(10 Marks)**

b. Explain the distribution of public keys with public key authority. **(10 Marks)**

OR

6 a. Explain secret key distribution with confidentiality and authentication. (10 Marks)

b. Explain distribution of public keys using public key certicates. (10 Marks)

Module-4

7 a. Explain X.509 certificate format. (10 Marks)

b. Describe public key infrastructure, with neat diagram. (10 Marks)

OR

8 a. Explain Kerberos version 4 message exchange with neat diagram. (10 Marks)

b. Explain remote user authentication principles. (10 Marks)

Module-5

9 a. Describe in detail PGP (Pretty Good Privacy) cryptographic functions. (10 Marks)

b. Write short note on :
(i) S/MIME functionality
(ii) Types of S/MIME message (10 Marks)

OR

10 a. Describe IP security architecture, with neat diagram. (10 Marks)

b. Explain Internet Key Exchange (IKE) key determination features. (10 Marks)

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