

Bharati Vidyapeeth Institute of Technology, Navi Mumbai
Question Bank (K – Scheme)
Unit Test-I

Program: - CM/IF6K

Semester: - IV

Course and code: - Emerging Trends in Computer Engineering and Information Technology (316313)

Chapter 1 Introduction to AI and ML

(A) Artificial Intelligence (AI)

1. **Who is known as the father of Artificial Intelligence?**
(a) Alan Turing **(b) John McCarthy** (c) Andrew Ng (d) Geoffrey Hinton
2. **Which discipline is NOT directly a part of AI core contributors?**
(a) Mathematics (b) Psychology **(c) Astrology** (d) Linguistics
3. **What is the ultimate goal of Artificial Intelligence?**
(a) Only solve mathematical problems. **(b) Mimic human intelligence to solve complex tasks.** (c) Operate machines without human intervention. (d) Build hardware devices.
4. **Charles Babbage and Boole demonstrated the power of _____**
(a) Logic (b) Cognition logic (c) pure reasoning **(d) Computation logic**
5. **The core components and constituents of AI are derived from the concept of _____**
(a) Logic (b) Cognition (c) Computation **(d) All of the above**
6. **_____ is a rule of thumb, strategy, trick, simplification, or any other kind of device which drastically.**
(a) Heuristic (b) Critical (c) Value based (d) Analytical
7. **What test did ELIZA successfully pass?**
(a) Medical Diagnosis Test (b) Customer Service Test **(c) Turing Test** (d) Financial Advisor Test
8. **_____ is not from the Type-1 AI?**
(a) Narrow AI **(b) Reactive Machine** (c) General AI (d) Strong AI
9. **Which statement fits "Weak AI" or Narrow AI?**
(a) Has general human-level intelligence. (b) Excels at multiple tasks simultaneously. **(c) Performs dedicated tasks within a limited scope.** (d) Can reason like a human.

10. What differentiates Super AI from General AI?

- (a) Super AI has narrowly focused skills.
- (b) General AI can exceed human intellectual performance.
- (c) **Super AI surpasses human intelligence in every domain.**
- (d) Super AI has no cognitive abilities.

11. _____ is one of the best examples of Limited Memory systems.

- (a) **Self-driving car** (b) IBM's Deep Blue system (c) Google's AlphaGo (d) Apple Siri

12. Which type of AI is commonly used for speech recognition and image recognition?

- (a) **Narrow AI** (b) General AI (c) Super AI (d) Strong AI

13. The AI Systems which are capable of hearing and comprehending the language in terms of sentences and their meanings while a human talks to it is called_____

- (a) Gaming (b) Natural Language Processing (c) **Speech Recognition Systems** (d) Expert Systems

14. _____ only focus on current scenarios and react on it as per possible best action.

- (a) **Reactive Machines** (b) Limited memory (c) Theory of Mind (d) Self-Awareness

15. Reactive Machines in AI are characterized by

- (a) The ability to store past experiences. (b) **Purely reacting to current inputs without memory.** (c) Being self-aware. (d) Understanding human emotions.

16. What is the major focus of Theory of Mind AI?

- (a) Data storage (b) **Understanding emotions and beliefs** (c) Performing calculations quickly (d) Robot mechanics

17. Which AI category is still hypothetical and involves consciousness?

- (a) Reactive Machines (b) Limited Memory (c) **Self-Awareness AI** (d) Narrow AI

18. AI helps in healthcare by

- (a) **Diagnosing diseases and patient monitoring.** (b) Replacing doctors fully. (c) Only recording patient data. (d) Eliminating all human interaction.

19. What role does linguistics play in AI?

- (a) Hardware design (b) **Natural Language Processing** (c) Robotics control (d) Statistical analysis

20. Artificial Super intelligence (ASI) is:

- (a) A real-world system (b) **Hypothetical AI surpassing human intelligence**
- (c) Limited memory AI (d) A type of robotics

21. In the context of AI, what does NLP stand for?

- (a) **Natural Language Programming** (b) Natural Logic Protocol (c) Neural Linguistic Processing (d) Natural Language Processing

22. How does the functionality of "Limited Memory AI" differ from "Reactive Machines"?

- (a) Limited Memory AI can plan and think about the future, while Reactive Machines cannot.
- (b) Reactive Machines are used for complex tasks, whereas Limited Memory AI is used for simple tasks.
- (c) **Limited Memory AI uses past data to make more informed decisions, while Reactive**

Machines have no memory and react to the present situation.

(d) Reactive Machines can understand emotions, whereas Limited Memory AI cannot.

23. An AI developer is designing a system that would possess emotions, beliefs, and a deep understanding of human social interactions. Based on the classification in the document, what type of AI is the developer aiming for?

(a) Reactive Machines (b) Limited Memory AI **(c) Theory of Mind AI** (d) Self-Aware AI

(B) Machine Learning (ML)

1. _____ build knowledge from specific data and past experience with the principles of statistics, probability theory, logic, combinatorial optimization, search, reinforcement learning, and control theory.

(a) Dynamic Algorithms **(b) Machine Learning Algorithms** (c) Greedy Algorithms (d) Divide and Conquer Algorithms

2. _____ is a branch of science that deals with programming the systems in such a way that they automatically learn and improve with experience.

(a) Machine learning (b) Deep learning (c) Neural Network (d) IoT Algorithms

3. Machine Learning is best described as:

(a) Programming specific instructions explicitly **(b) Training systems to learn from data** (c) Hardware manufacturing (d) Software debugging

4. _____ is an example of supervised learning.

(a) Machine Learning (b) Deep Learning **(c) Classifying e-mails as spam** (d) Hierarchical clustering

5. _____ makes sense of unlabeled data without having any predefined dataset for its training.

(a) Supervised Learning **(b) Unsupervised Learning** (c) Reinforcement learning (d) Semi- Supervised Learning

6. Machine learning algorithms build a knowledge from specific data, known as _____

(a) Training Data (b) Testing Data (c) Transfer Data (d) Data Training

7. _____ is an example of supervised learning.

(a) Machine Learning (b) Deep Learning **(c) Classifying e-mails as spam** (d) Hierarchical clustering

8. Which is an example of supervised learning?

(a) Clustering customer groups **(b) Email spam filtering with labeled emails** (c) Random data generation (d) Exploring databases

9. What algorithm is mainly used in supervised learning?

(a) K-means clustering **(b) Logistic regression** (c) PCA (d) Reinforcement learning

10. Unsupervised learning primarily involves:

(a) Learning from labelled data. **(b) Discovering patterns from unlabelled data.** (c) Making decisions based on rewards. (d) Pre-programmed rules.

11. **Reinforcement learning is based on**
(a) **Receiving rewards or penalties through trial and error.** (b) Grouping data clusters.
(c) Identifying keywords. (d) Using labeled data only.
12. **Which of the following is NOT an example of ML application?**
(a) Fraud detection. (b) Spam detection. **(c) Chess playing with fixed rules only.** (d) Customer segmentation.
13. **Q-learning is a technique used in**
(a) Unsupervised Learning. (b) Supervised Learning. **(c) Reinforcement Learning** (d) Data Mining.
14. **ML benefits retail mainly by**
(a) Robotics automation. **(b) Customer behaviour analysis and recommendations.** (c) Manufacturing. (d) Network security.
15. **Which technique is part of unsupervised learning?**
(a) Support Vector Machines. **(b) K-means clustering.** (c) Decision Trees. (d) Reinforcement learning.
16. **_____ is a common approach to unsupervised learning.**
(a) Support Vector Machines (b) neural Networks (c) Naive Bayes classifier **(d) self-organizing maps**
17. **Which field overlaps with AI/ML but is focused on data-driven insights?**
(a) Physics. **(b) Data Science.** (c) Hardware Engineering. (d) Linguistics.
18. **_____ is a type of machine learning in which an agent learns to make decisions by interacting with an environment.**
(a) Supervised learning **(b) Reinforcement learning** (c) Semi-supervised learning
(d) Unsupervised learning
19. **What is the type of machine learning that enables AI systems to learn by interacting with an environment and receiving rewards or penalties?**
(a) Supervised Learning (b) Unsupervised Learning **(c) Reinforcement Learning** (d) Deep Learning
20. **How is Supervised Learning different from Unsupervised Learning?**
(a) Supervised learning uses labeled data, while unsupervised uses unlabeled
(b) Both use only unlabeled data
(c) Supervised is used only in robotics, unsupervised only in finance
(d) They are identical approaches
21. **A bank wants to build a fraud detection system. Which ML approach should it use?**
(a) Unsupervised Learning (to detect anomalies) (b) Reinforcement Learning
(c) Self-Aware AI (d) GANs
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(C) Deep Learning (DL)

1. ____ is a subfield of machine learning.
(a) **Deep Learning** (b) Artificial Intelligence (c) Shallow Learning (d) Artificial Neural Network
2. In ____, the goal is for the software to use what it has learned in one area to solve problems in other areas.
(a) Machine learning (b) **Deep learning** (c) Neural networks (d) Data Visualization
3. ____ Algorithms are inspired by the structure and function of the brain called artificial neural networks.
(a) Machine Learning (b) Artificial Intelligence (c) Shallow Learning (d) **Deep Learning**
4. **Deep Learning primarily uses**
(a) Decision Trees. (b) **Neural Networks with many layers.** (c) Statistical methods only. (d) Simple linear regression.
5. **Deep Learning models excel at processing**
(a) Simple numeric data only. (b) **Complex unstructured data like images and speech.**
(c) Only texts. (d) Only numerical data.
6. **An advantage of Deep Learning is**
(a) Manual feature engineering. (b) **High accuracy in complex tasks.**
(c) Low computational resources needed. (d) Easy interpretability.
7. **A big challenge in Deep Learning is**
(a) Lack of data. (b) **Difficulty to interpret results (black-box).** (c) Simplicity of models.
(d) Universal understanding by humans. (Note: source lists "Excessive interpretability" as a foil, but source clarifies the "black box" nature).
8. **GPUs are important in DL because they**
(a) Provide more storage. (b) **Accelerate complex computations efficiently.**
(c) Reduce data requirements. (d) Produce data labels.
9. **What is overfitting in Deep Learning?**
(a) Model performs well on new data only. (b) **Model fits training data too closely, reducing generalization.** (c) Model training completed fast. (d) Data normalization process.
10. **Deep learning models improve with**
(a) **More data and training time.** (b) Less computational power. (c) Fixed data only.
(d) Manual intervention in feature selection.
11. **Which layer in deep learning captures transformations?**
(a) Input Layer (b) **Hidden Layers** (c) Output Layer (d) Data preprocessing
12. **An example of DL application in healthcare is**
(a) Algorithmic trading. (b) **Medical image analysis.** (c) Automated marketing. (d) Cyber security threat detection.
13. **Which is a disadvantage of DL models?**
(a) They require minimal data. (b) **Difficult to interpret results (black-box).** (c) Easy to train on CPUs. (d) Limited applicability.

14. A hospital wants an AI system for early disease diagnosis using X-ray scans. Which AI technique would be most suitable?

- (a) Reinforcement Learning **b) Deep Learning with Computer Vision** c) Expert Systems only d) NLP

15. A government wants to track disease spread using social media posts. Which AI area will help.

- (a) NLP + Data Mining** b) Computer Vision c) GANs d) Robotics
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(D) Neural Networks

1. Neural networks are inspired by

- (a) **Human brain neurons** (b) Computer circuits (c) Statistical models (d) Logistic regression

2. Computer programs that mimic the way the human brain processes information is called_____

- (a) Computer Network (b) Artificial Network **(c) Neural Network** (d) Human Network

3. ____specialize in clustering information and recognizing complex patterns, giving computers the ability to use more sophisticated processes to analyze data.

- (a) Artificial Intelligence (b) Machine Learning (c) Deep Learning **(d) Neural Networks**

4. The activation function in neural networks:

- (a) Summarizes inputs linearly. (b) Normalizes weights. **(c) Introduces non-linearity.** (d) Connects layers.

5. The learning process in neural networks involves

- (a) Manually adjusting weights. **(b) Weight adjustment through backpropagation.** (c) Clustering data. (d) Data labelling.

6. What is weighted sum in neural networks?

- (a) Sum of all inputs without weights. **(b) Sum of inputs multiplied by weights.** (c) Average of output values. (d) Total number of nodes.

7. Neural networks are widely used for

- (a) **Pattern recognition and classification.** (b) Operating systems. (c) Hardware design. (d) Network set-up.

8. What is the output layer's job?

- (a) Process input data. (b) Adjust weights during training. **(c) Generate final model prediction.** (d) Store training data.

9. Why neural networks are sometimes called "black box" systems?

- (a) Because they are simple to understand. **(b) Their internal decision processes are complex and hard to interpret.** (c) Because they use black colored hardware. (d) They do not produce outputs.

10. Which method helps neural networks learn from error?

- (a) Forward propagation. **(b) Backpropagation.** (c) Data preprocessing. (d) Parameter tuning.

11. **Layers between input and output layers are called**
(a) Data layers. **(b) Hidden layers.** (c) Input layers. (d) Output layers.
12. **Neural networks can adapt and recognize patterns better than_____**
(a) Rule-based systems. (b) Linear models. (c) Traditional programming. **(d) All of the above.**
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(E) Generative AI and Transformers

1. **Generative AI is designed to**
(a) Analyze but not create content **(b) Create new content from learned patterns** (c) Only classify data (d) Run hardware operations
2. **Which data format is NOT used to train Generative AI?**
(a) Text (b) Images (c) 3D signals **(d) Only numeric tables**
3. **The "Foundation Model" in Generative AI is**
(a) A small lightweight model. **(b) A large neural network trained on massive diverse data.** (c) A simple decision tree. (d) A rule-based system.
4. **The self-attention mechanism in Transformers helps**
(a) **Focus on all parts of the input sequence for context.** (b) Filter irrelevant data before training. (c) Generate random outputs. (d) Only translate languages.
5. **Multi-head attention means**
(a) **Running several attention layers in parallel.** (b) One attention head per sequence. (c) Removing attention heads. (d) Simpler output generation.
6. **Positional encoding in Transformers is used because**
(a) **Transformers have no inherent sequence processing.** (b) To encode data size. (c) To speed-up training. (d) To eliminate tokens.
7. **An example of text generation model is**
(a) DALL-E **(b) GPT** (c) MidJourney (d) Jukebox
8. **One application of Generative AI in finance is**
(a) Fraud detection. **(b) Automated report generation.** (c) Stock trading without AI. (d) Network security hardware.
9. **Which architecture do Transformer models use?**
(a) **Encoder-decoder** (b) Recurrent networks (c) Feedforward only (d) Clustering layers
10. **Why are Transformers better for long text sequences compared to RNNs?**
(a) They ignore sequence order **(b) They use self-attention to capture dependencies**
(c) They require no training (d) They process only short sequences
11. **Which AI concept is most relevant in chatbots like ChatGPT?**
(a) Computer Vision (b) NLP + Transformers (c) Robotics (d) Expert Systems only

12. A student uses Generative AI to create fake news articles. This is an example of:
(a) Positive AI use (b) **Misuse of AI** (c) Reinforcement Learning (d) Supervised Learning
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(F) AI and ML in Digital Security

1. **Poisoning attack targets the**
(a) **Training data** (b) Network hardware (c) End-user (d) Only output layer
 2. **Evasion attack happens during the**
(a) Training phase (b) **Testing phase** (c) Analysis phase (d) Coding Phase
 3. **A broad term for attacks where inputs are intentionally manipulated to fool an AI model and cause incorrect predictions is called:**
(a) Data poisoning attack (b) **Adversarial attack** (c) Model extraction attack
(d) Backdoor attack
 4. **Deepfakes are generated using:**
(a) **GANs (Generative Adversarial Networks)** (b) Reinforcement Learning (c) CNNs only
(d) Decision Trees
 5. **Which type of AI attack modifies input data slightly to trick the model?**
(a) Poisoning Attack (b) Privacy Attack (c) **Evasion Attack** (d) Model Tampering
 6. **What does Multi-Factor Authentication (MFA) provide?**
(a) Faster login speed (b) single password for all accounts (c) **An additional layer of identity verification** (d) Automatic software updates
 7. **What is the main purpose of using AI tools in digital security?**
(a) To replace human security teams (b) To slow down internet speed (c) **To outpace and counter AI-powered attackers** (d) To eliminate passwords
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Chapter 2 . Internet of Things

General IoT Concepts

1. **What is the Internet of Things (IoT)?**
(a) A technology used only for smartphones
(b) **A network of interconnected physical devices that exchange data**
(c) A type of computer virus
(d) A communication protocol for websites

2. Which of the following is a key characteristic of IoT?

- (a) Manual operation
- (b) Isolation of devices
- (c) Interconnectivity**
- (d) Lack of automation

3. Which feature enables devices to operate without human involvement?

- (a) Automation**
- (b) Virtualization
- (c) Encryption
- (d) Translation

4. 'Things' in IoT refers to:

- (a) Only smartphones
- (b) Any physical object with a sensor and connectivity**
- (c) Website links
- (d) Only computers

5. Which communication technology is widely used in IoT?

- (a) HDMI
- (b) USB
- (c) Wi-Fi**
- (d) VGA

6. IoT allows devices to collect and share data using:

- (a) Sensors**
- (b) CDs
- (c) Printers
- (d) Speakers

7. Which of the following is a limitation of IoT?

- (a) High scalability
- (b) Security and privacy issues**
- (c) Increased efficiency
- (d) Better data collection

8. Which characteristic of IoT enables devices to work together?

- (a) Fragmentation
- (b) Interoperability**
- (c) Decoupling
- (d) Sampling

9. Smart watches, fitness trackers, and medical sensors fall under which IoT application area?

- (a) Industrial automation
- (b) Healthcare**
- (c) Transport
- (d) Agriculture

10. Which component is essential in IoT devices?

- (a) Sensors and actuators**
- (b) Chalk and board
- (c) Pen drive
- (d) Hard disk

11. Which IoT application is widely used in agriculture?

- (a) Weather-based irrigation systems**
 - (b) Online shopping portals
 - (c) Music streaming
 - (d) Video editing
-

Physical and Logical Design of IoT

1. Physical design of IoT mainly focuses on:

- (a) Data flow
- (b) Hardware components**
- (c) Cloud services
- (d) Software standards

2. Which of the following is part of the physical design of IoT?

- (a) IoT protocols
- (b) Sensors and actuators**
- (c) Cloud databases
- (d) Data analytics

3. Logical design of IoT deals with:

- (a) Hardware wiring
- (b) Functional blocks and data flows**
- (c) Power supply
- (d) Battery types

4. An actuator in IoT is used for:

- (a) Receiving data

- (b) Storing data
- (c) Performing actions**
- (d) Testing networks

5. The network layer in IoT architecture is responsible for:

- (a) Storing data only
- (b) Processing raw data
- (c) Transmitting data**
- (d) Displaying output

6. Which of these is a communication technology used in physical design?

- (a) Wi-Fi**
- (b) Excel
- (c) Twitter
- (d) HTML

7. IoT logical design uses functional blocks such as:

- (a) Power blocks
- (b) Communication blocks**
- (c) Display blocks
- (d) Motor blocks

8. Which of the following is part of the IoT functional block?

- (a) Security**
- (b) Shoes
- (c) Bulb
- (d) Wire

9. Physical design includes which component?

- (a) Cloud API
- (b) Sensors**
- (c) SQL database
- (d) Data warehouse

10. The main job of the IoT communication block is:

- (a) To cook food
- (b) To transfer data between devices**
- (c) To store raw data
- (d) To protect files

11. In IoT architecture, which layer handles data routing?

- (a) Application
- (b) Network**
- (c) Perception
- (d) Storage

12. RFID tags are used in IoT for:

- (a) Audio output
- (b) Object identification**
- (c) Multimedia sharing
- (d) Gaming

13. Which protocol is used in IoT logical design for messaging?

- (a) MQTT**
- (b) HDMI
- (c) VGA
- (d) FTP

14. Which layer ensures user-specific IoT services?

- (a) Network
- (b) Application**
- (c) Perception
- (d) Transport

15. An example of a physical design communication device is_____

- (a) LDR sensor.
- (c) SQL server.
- (b) Bluetooth module.**
- (d) Cloud analytics.

16. Which layer includes device addressing?

- (a) Application
- (b) Network**
- (c) Perception
- (d) Security layer

17. Which of following is a bidirectional, fully duplex communication model that uses a persistent connection between the client and server

- (a) Request-Response communication model
- (b) Publish-Subscribe communication model
- (c) Push-Pull communication model
- (d) Exclusive Pair communication model**

18. Which communication API follows the request- response communication model.

- (a) WebSocket
- (b) REST-based**
- (c) Web Socket-based
- (d) None of Above

19. A gateway in IoT is mainly used for

- (a) Cooking
- (b) Bridging devices with the internet.**
- (c) Taking photos.
- (d) Increasing sound,

20. Which of the following is not a characteristic of IoT?

- (a) Self-Configuring
- (b) Unique Identity
- (c) Self-Adapting
- (d) Artificial Intelligence**

21. _____uses a network of sensors to monitor the vibration levels in the Structures such as bridges and buildings.

- (a) Smart Roads
- (b) Smart Parking
- (c) Structural Health Monitoring**
- (d) Fleet Tracking

22. _____System is uses Sensors to determine moisture amount in soil

- (a) Green House control
- (b) Smart Irrigation**
- (c) Weather Monitoring
- (d) River Flood Detection

23. _____systems use security cameras and sensors (PIR sensors and door sensors) to detect intrusion and raise alerts.

- (a) Smart Lighting
- (b) Smoke/Gas Detectors
- (c) Intrusion Detection**
- (d) Smart Parking

24. The IEEE stands for _____

- (a) Institute of Electrical and Electronics Engineers**
- (b) Institute of Electronics and Electrical Engineers
- (c) Institute of electrical and economical engineers
- (d) Institute of Ethernet and Electronics Engineering

25. _____ protocols determine how the data is physically sent over the network's physical layer or medium.

- (a) Link layer**
- (b) Physical layer

- (c) Network layer
- (d) Transport layer

26. IEEE 802.11 is a collection of communication standards

(a) Wireless local area network

- (b) Mobile
- (c) Ethernet
- (d) Wireless broadband

27. 6LOWPAN works with the _____ link layer protocol.

(a) 802.15.4

- (b) 802.16
- (c) 802.11
- (d) 802.3

28. _____ standards form the basis of specifications for high level communication protocols such as ZigBee.

- (a) 802.3
- (b) 802.11
- (c) 802.16
- (d) 802.15.4**

29. PSTN Core network is used in _____ mobile network.

- (a) 5G
- (b) 4G
- (c) 3G
- (d) 2G**

30. Wi Max, Wi-Fi, LTE Technology is used in _____ mobile network.

- (a) 2G
- (b) 3G
- (c) 4G**
- (d) 5G

31. _____ protocol allows full-duplex communication over a single socket connection for sending messages between client and server.

- (a) Web Socket**
- (b) MQTT
- (c) XMPP
- (d) AMQP

32. MQTT stands for _____

- (a) Message Queue Telemetry Things
- (b) Message Queue Transport Things
- (c) Message Queue Telemetry Transport**
- (d) Message Queue Transport Telemetry

33._____ uses 128-bit address scheme that allows total of 2^{128} or 3.4×10^{38} addresses

- (a) IPv4
- (b) IPv6**
- (c) 6LOWPAN
- (d) None of These

34. IoT devices generate data that is processed mainly in _____

- (a) Device memory
- (b) Cloud**
- (c) Local disk
- (d) Bluetooth

35. Why is IPv6 important in IoT?

- (a) More bandwidth
- (b) Huge number of unique addresses**
- (c) Works only in smart homes
- (d) Short messages

36. Which technology is mostly used for short-range IoT communication?

- (a) LTE
- (b) Bluetooth**
- (c) Satellite
- (d) Optical fiber

37. Which layer ensures data transmission in IoT?

- (a) Perception layer
- (b) Network layer**
- (c) Application layer
- (d) Processing

38. A patient's heartbeat data is sent to a doctor through IoT. Which layer is responsible for data transfer?

- (a) Application layer
- (b) Network layer**
- (c) Perception layer
- (d) Processing layer

39. A smart parking system detects free slots. Which sensor is most suitable?

- (a) Temperature
- (b) Humidity
- (c) Proximity**
- (d) Gas

40. A farmer uses a smartphone app to control irrigation pumps remotely. The app belongs to

- (a) Perception layer

- (b) Network layer
- (c) Application layer**
- (d) Processing layer

41. In a smart greenhouse, humidity sensors detect soil dryness and trigger water sprinklers. The sprinkler is

- (a) Sensor
- (b) Actuator**
- (c) Processor
- (d) Storage

42. A city deploys sensors for real-time traffic management. Which combination is applied?

- (a) NGN + Cloud storage
 - (b) 5G + Smart City IoT**
 - (c) Only Wi-Fi 6
 - (d) Edge + Manual monitoring
-

Sensors and Actuators

1. _____ sensors are used in IoT systems to monitor systems and devices that are driven by pressure signals.

- (a) Smoke
- (b) Pressure**
- (c) Gas
- (d) Humidity

2. In the retail industry, _____ sensors are used to monitor customers visiting the store through IoT network.

- (a) Motion
- (b) Gas
- (c) IR
- (d) Image**

3. _____ is an actuator that creates motion in a straight line

- (a) Relay
- (b) Solenoid
- (c) Linear Actuator**
- (d) DC Motor

4. The actuators used as an electromagnet is _____

- (a) Solenoid**
- (b) Relay
- (c) DC Motors
- (d) Fleet Tracking

5. A sensor is a device that:

- (a) Performs physical action
- (b) Converts physical quantity into electrical signals**
- (c) Stores data
- (d) Only transmits data

6. Which of the following is an example of an actuator?

- (a) Temperature sensor
- (b) Soil moisture sensor
- (c) DC motor**
- (d) LDR sensor

7. A PIR sensor is used to detect:

- (a) Light
- (b) Pressure
- (c) Motion**
- (d) Sound

8. Which sensor is used for measuring temperature?

- (a) LDR
- (b) Ultrasonic sensor
- (c) LM35**
- (d) IR sensor

9. Which of the following detects light intensity?

- (a) DHT11
- (b) LDR**
- (c) Load cell
- (d) MQ-2

10. The MQ-2 sensor is used to detect:

- (a) Motion
- (b) Gas**
- (c) Water level
- (d) Pressure

11. Which actuator converts electrical energy into rotational motion?

- (a) Relay
- (b) DC motor**
- (c) LDR
- (d) Thermistor

12. A servo motor is an actuator used for:

- (a) Temperature sensing
- (b) Precise angular movement**
- (c) Sound detection
- (d) Light measurement

13. Which sensor is used for distance measurement?

- (a) Ultrasonic sensor**
- (b) Thermistor
- (c) IR flame sensor
- (d) MQ-135

14. Which sensor is commonly used in smart homes for humidity and temperature?

- (a) LDR
- (b) DHT11**
- (c) Load cell
- (d) Motion sensor

15. Load cells are used to measure:

- (a) Light
- (b) Gas
- (c) Weight / force**
- (d) Altitude

16. Which of these is NOT a sensor?

- (a) Gyroscope
- (b) Accelerometer
- (c) Relay**
- (d) Thermistor

17. An actuator that allows switching of high-voltage devices is:

- (a) Servo motor
- (b) Relay**
- (c) LDR
- (d) IR sensor

18. A thermistor is used for:

- (a) Temperature measurement**
- (b) Sound detection
- (c) Distance measurement
- (d) Vibration detection

19. Which sensor is used in smartphones for screen rotation?

- (a) Gyroscope**
- (b) Gas sensor
- (c) PIR sensor
- (d) LDR

20. Accelerometers measure:

- (a) Temperature
- (b) Gas concentration
- (c) Acceleration / tilt**
- (d) Noise level

21. A buzzer in IoT acts as a:

- (a) Sensor
- (b) Actuator**
- (c) Controller
- (d) Storage device

22. Which sensor is used in smoke detection?

- (a) MQ-2**
- (b) BMP180
- (c) LDR
- (d) PIR

23. Which sensor is used to detect fire?

- (a) LDR
- (b) Flame sensor**
- (c) DHT11
- (d) Ultrasonic

24. A stepper motor is used when:

- (a) Rotation in steps is required**
- (b) Gas detection is needed
- (c) Temperature must be sensed
- (d) Light measurement is needed

25. Which sensor detects sound levels?

- (a) BMP180
- (b) Sound sensor**
- (c) Ultrasonic
- (d) Gyroscope

26. The BMP180 sensor is used for:

- (a) Gas detection
- (b) Altitude and pressure**
- (c) Vibration measurement
- (d) Light sensing

27. A water level sensor is used to:

- (a) Monitor humidity
- (b) Detect water depth or presence**
- (c) Measure gas
- (d) Control motor speed

28. Devices that transforms electrical signals into physical movements.

- (a) Sensors
- (b) Actuators
- (c) Switches
- (d) Display

29. The IR sensor mainly detects:

- (a) Infrared radiation and object presence**
- (b) Temperature
- (c) Water flow
- (d) Gas leakage

30. A relay can be classified as:

- (a) Input sensor
- (b) Output actuator**
- (c) Storage device
- (d) Power supply

31. Which sensor is suitable for soil moisture measurement?

- (a) PIR
- (b) Capacitive soil moisture sensor**
- (c) MQ-135
- (d) Ultrasonic

32. A vibration sensor is used for:

- (a) Detecting movement in machines**
- (b) Measuring humidity
- (c) Reading light intensity
- (d) Checking pressure

33. A photodiode is primarily used for:

- (a) Gas detection
- (b) Light sensing**
- (c) Sound detection
- (d) Temperature measurement

34. Which of these is an example of an actuator used in home automation?

- (a) Ultrasonic sensor
- (b) Gas sensor
- (c) Electric door lock**
- (d) DHT11

35. A flow sensor is used to measure:

- (a) Gas
- (b) Fluid movement**
- (c) Sound
- (d) Pressure

36. The role of an actuator in IoT is to:

- (a) Process data
- (b) Sense environmental changes
- (c) Perform an action based on input**
- (d) Store cloud information

37. Which sensor is commonly used in IoT-based weather monitoring systems?

- (a) PIR sensor
- (b) DHT22**
- (c) Ultrasonic sensor
- (d) Relay

38. Which actuator is used to control water flow in smart systems?

- (a) Servo motor
- (b) Solenoid valve**
- (c) LDR
- (d) Gyroscope

38. A Hall Effect sensor is used to measure:

- (a) Temperature
- (b) Magnetic field**
- (c) Humidity
- (d) Sound

5G and Next Generation Networks (NGN)

1. The brain of NGN that manages signaling and call control is:

- (a) Media Gateway
- (b) Media Gateway Controller (MGC)**
- (c) Application Server
- (d) Media Server

2. 5G networks can achieve data rates up to:

- (a) 2 Gbps
- (b) 10 Gbps
- (c) 20 Gbps**
- (d) 50 Gbps

3. In telecommunication networks, NGN stands for _____

- (a) Next Generation Network**
- (b) Network Growth Nucleus
- (c) Network Generation Nexus
- (d) New Global Network

4. Number of layers in NGN architecture is _____

- (a) 7
- (b) 6
- (c) 5
- (d) 4**

5. Layers of NGN are _____

- (a) Access, Transport, Control, Service Layer**
- (b) Physical, Data Link, Network, Session Layer
- (c) Application, Session, Transport, Network
- (d) Network, Application Layer

6. Which of the following is not a characteristic of 5G?

- (a) Low Data Transfer speed**
- (b) Low latency
- (c) Higher download speeds
- (d) Increased network coverage

7. Media Gateways are located in _____ of NGN.

- (a) Access Layer**
- (b) Transport Layer
- (c) Control Layer
- (d) Service Layer

8. The _____ provide the connectivity for all components and physically separated functions within the NGN

- (a) Access network functions
- (b) Gateway functions
- (c) Transport functions**
- (d) Resource and admission control functions (RACF)

9. The _____ receive content from the application support functions and service support functions, store, process, and deliver it to the end-user functions using the capabilities of the transport functions, under control of the service control functions.

- (a) Service control functions (SCF)
- (b) Content delivery functions (CDF)**
- (c) Application support functions (ASF)
- (d) End-user functions

10. What is the primary function of a Label Switch Router?

- (a) To forward packets based on their IP addresses
- (b) To forward packets based on their labels**
- (c) To perform security functions on network traffic
- (d) To provide Quality of Service (QoS) for network traffic

11. _____ is a router that supports MPLS.

- (a) Label Switch Router**
- (b) Edge Router
- (c) Broadband Router
- (d) Core Router

12. The _____ is located in the service provider's network and is under the control of the MGC or application server, to provide announcements and tones, and collect user information.

- (a) Media Server**
- (b) Application Server
- (c) IP Core Network
- (d) Access Network

13. The _____ receive content from the application support functions and service support functions, store, process, and deliver it to the end-user functions using the capabilities of the transport functions, under control of the service control functions.

- (a) Service control functions (SCF)
- (b) Content delivery functions (CDF)**
- (c) Application support functions (ASF)
- (d) End-user functions

14. The _____ provides the signaling interface between the VoIP network and the PSTN signaling network

- (a) Access Gateway
- (b) Trunk Media Gateway
- (c) Remote monitoring of crops and lives**
- (d) Media Gateway

15. Which of the following is an example of a 5G application for the agriculture industry?

- (a) Virtual reality gaming
- (b) Online shopping
- (c) Remote monitoring of crops and livestock**
- (d) Social media

16. In 5G-enabled smart farming, which IoT application is enhanced?

- (a) Manual irrigation
- (b) Precision agriculture**
- (c) Only soil testing
- d) None

17. Which of the following is a key characteristic of 5G that enables real-time applications like autonomous driving?

- (a) High power consumption
- (b) Ultra-low latency**
- (c) Limited device connectivity
- (d) Low data rates

18. What is the purpose of network slicing in 5G technology?

- (a) To increase power consumption
- (b) To create multiple virtual networks on the same infrastructure**
- (c) To reduce network coverage
- (d) To limit device connectivity

19. Which of the following is an application of 5G in smart cities?

- (a) Remote gaming
- (b) Traffic management with real-time sensor data**
- (c) Virtual reality training for surgeons
- (d) Precision farming

20. Which 5G characteristic improves energy efficiency for IoT devices?

- (a) High latency
- (b) Optimized power consumption**
- (c) Limited bandwidth
- (d) Low reliability

21. Which of the following is a key characteristic of 5G that enables real-time applications like autonomous driving?

- (a) High power consumption
- (b) Ultra-low latency**
- (c) Limited device connectivity
- (d) Low data rates

22. Which 5G feature allows it to support up to 1 million devices per square kilometre?

- (a) Network slicing
- (b) Massive Machine-Type Communications (mMTC)**
- (c) Ultra-Reliable Low-Latency Communications (URLLC)
- (d) Beamforming

23. 5G networks are mainly designed to support:

- (a) Only voice calls
- (b) Low-speed IoT devices
- (c) High-speed, low-latency communication**
- (d) Cable TV signals

24. Which frequency band is commonly used in 5G?

- (a) Low-frequency AM band
- (b) 700 MHz - 52 GHz**
- (c) 10-20 kHz
- (d) 1-5 kHz

25. 5G IoT applications in transportation include:

- (a) Self-driving cars**
- (b) Typewriters
- (c) Postal mail
- (d) Bicycle sensors

26. Next Generation Network (NGN) is primarily based on:

- (a) Circuit-switching
- (b) Packet-switched IP networks**
- (c) Morse code
- (d) Analog communication

27. NGN is designed to integrate:

- (a) Only audio communication
- (b) Multiple services like voice, video, and data**
- (c) Only video streaming
- (d) Only SMS services

28. A key feature of NGN is:

- (a) Service independence from the network**
- (b) Limited bandwidth
- (c) Analog interface
- (d) No mobility support

29. Which functional block of NGN controls call set-up and teardown?

- (a) Media Gateway
- (b) Media Gateway Controller**
- (c) Application Server
- (d) Router

30. Media Gateway in NGN is responsible for:

- (a) Converting media streams between networks**
- (b) Performing user authentication
- (c) Controlling billing
- (d) Handling email traffic

31. The Application Server in NGN provides:

- (a) Power supply
- (b) Service logic and applications**
- (c) Radio frequency
- (d) Sensor data

32. Which component translates between IP and traditional PSTN networks?

- (a) Router
- (b) Media Gateway**
- (c) Application Server
- (d) GPS module

33. NGN architecture supports mobility using:

- (a) Static channels
- (b) Packet routing**
- (c) Satellite radio
- (d) SMS center

34. Which of these is a benefit of 5G in IoT applications?

- (a) Slow response time
- (b) Reduced device density
- (c) Massive connectivity**
- (d) Weak security

35. The part of NGN that handles service creation is:

- (a) Media Gateway
- (b) Application Server**
- (c) PSTN switch

(d) Antenna

36. A key characteristic of NGN is:

- (a) No support for multimedia
- (b) Quality of Service (QoS)**
- (c) Static switching
- (d) Manual routing

37. In NGN, the Media Gateway Controller controls the Media Gateway using:

- (a) Voice commands
- (b) Signalling messages**
- (c) Laser signals
- (d) GSM only

38. Application servers in NGN are mainly:

- (a) End-user devices
- (b) Service execution platforms**
- (c) Physical switches
- (d) Radio towers

39. NGN supports which type of communication?

- (a) Circuit only
- (b) Multi-service packet communication**
- (c) Manual signalling
- (d) Morse code

40. The combination of 5G and IoT is mainly used for:

- (a) Faster book printing
- (b) Automation and smart connectivity**
- (c) Slower networks
- (d) Manual switching

Cloud-Based IoT Architecture

1. Cloud-based IoT architecture mainly integrates:

- (a) Sensors and printers
- (b) IoT devices with cloud storage and computing**
- (c) Only mobile phones
- (d) Offline storage systems

2. In cloud-based IoT, the role of the cloud is to:

- (a) Only sense environmental data
- (b) Store, process, and analyze IoT data**

- (c) Replace sensors
- (d) Provide audio output

3. Which layer of cloud-based IoT handles sensing and data collection?

- (a) Application layer
- (b) Sensor/Perception layer**
- (c) Network management
- (d) Virtualization layer

4. In cloud-based IoT architecture, the network layer is responsible for:

- (a) Data transmission between devices and cloud**
- (b) Data visualization
- (c) Executing cloud programs
- (d) Powering devices

5. Which cloud service model is commonly used for IoT data analytics?

- (a) IaaS
- (b) PaaS**
- (c) SaaS
- (d) CDP

6. The application layer in cloud-based IoT provides:

- (a) Machine learning analysis
- (b) User-specific services like dashboards and alerts**
- (c) Power supply management
- (d) Hardware manufacturing

7. In a cloud-IoT system, which component typically performs real-time analytics?

- (a) Device
- (b) Router
- (c) End user application
- (d) Cloud platform**

8. Cloud-based IoT improves scalability by:

- (a) Rejecting device connections
- (b) Providing on-demand storage and resources**
- (c) Reducing storage options
- (d) Limiting number of servers

9. Which cloud platform is widely used for IoT?

- (a) Adobe Photoshop
- (b) Microsoft Azure IoT Hub**
- (c) VLC Player
- (d) WinRAR

10. Main benefit of integrating IoT with cloud:

- (a) Offline data processing
- (b) Large-scale storage and real-time processing**
- (c) Reduced connectivity
- (d) Less device automation

11. Which layer in a cloud-based IoT architecture handles device connectivity and data?

- (a) Application Layer
- (b) Perception Layer
- (c) Network Layer**
- (d) Business Layer

12. What is the main purpose of the Cloud Service Layer in IoT architecture?

- (a) Storing and processing IoT data**
- (b) Connecting IoT devices to sensors
- (c) End-user interaction
- (d) Powering IoT hardware

13. Which cloud deployment model is most suitable for organizations wanting full control over IoT data security?

- (a) Public Cloud
- (b) Private Cloud**
- (c) Hybrid Cloud
- (d) Community Cloud

Chapter 3 – Blockchain Technology

(A) Basics of Blockchain Technology

1. Who invented blockchain technology?

- (a) Elon Musk **(b) Satoshi Nakamoto** (c) Bill Gates (d) Tim Berners-Lee

2. What is a blockchain?

- (a) Centralized database **(b) Decentralized digital ledger** (c) Programming language (d) Operating system

3. Blockchain can be best defined as

- (a) A centralized database controlled by a single authority
- (b) A decentralized ledger that records transactions securely**
- (c) A traditional relational database
- (d) A cloud storage system

4. Blockchain is a ?

- (a) Centralized ledger **(b) Distributed ledger on a peer to peer network**

- (c) Currency (d) Cryptocurrency

5. Which of the following statement is true about Blockchain ?

- (a) Blockchain is peer to peer system with no third parties in between.
(b) Blockchain is shared, decentralized and open ledger of transactions.
(c) Blockchain technology was designed to enable true decentralization.
(d) All of these

6. ____ is a common, unchallengeable, digital ledger that allows the process of recording transactions and tracking assets in a business network.

- (a) Blockchain** (b) Cryptography (c) Client Server Network (d) Centralized system

7. State Importance of Blockchain Technology?

- (a) It provides secure transactions.
(b) It is decentralized, no intermediary fees required
(c) It is immutable public digital ledger
(d) All of these

8. What is the first block in a blockchain called?

- (a) Prime block **(b) Genesis block** (c) Initial block (d) Root block

9. The blockchain ledger is:

- (a) Editable **(b) Immutable** (c) Partially mutable (d) Temporary

10. Which feature allows all nodes to keep a copy of the blockchain?

- (a) Transparency **(b) Decentralization** (c) Anonymity (d) Centralization

11. The hash in a blockchain block is:

- (a) The user's password
(b) A unique identifier of the block
(c) The blockchain's name
(d) Transaction amount

12. What links a block to its previous block?

- (a) Timestamp
(b) Previous block's hash
(c) user ID
(d) Transaction amount

13. What process do miners perform?

- (a) Code smart contracts **(b) Verify and add blocks to the blockchain**
(c) Delete invalid transactions (d) Create cryptocurrencies

14. The block which has no previous block for reference is called as ?

- (a) Block 0** (b) Block 1 (c) Block 2 (d) Block 3

15. What happens when a new node joins a blockchain network?

- (a) It receives a full copy of the blockchain**

- (b) It gets limited data
- (c) It controls the network
- (d) It manages mining rewards

16. What is a node in blockchain?

- (a) A centralized server
- (b) A participant computer maintaining the blockchain**
- (c) A programming language
- (d) A data block

17. Which cryptographic function helps identify blocks uniquely?

- (a) Hash function**
- (b) Digital signature
- (c) Public key
- (d) Private key

18. What does the consensus mechanism do?

- (a) Deletes blocks
- (b) Ensures network agreement on blockchain data**
- (c) Hides transactions
- (d) Creates private keys

(B) Key Features of Blockchain

19. The decentralized nature of blockchain ____

- (a) Makes data tampering easy
- (b) Increases risk of failure
- (c) Enhances security by multiple copies**
- (d) Depends on a central server

20. Which is NOT a feature of blockchain?

- (a) Centralized control**
- (b) Immutability
- (c) Transparency
- (d) Decentralization

21. Which of the following is NOT a key feature of blockchain?

- (a) Decentralization
- (b) Transparency
- (c) Immutability
- (d) Volatility**

22. Which feature of blockchain ensures that recorded transactions cannot be altered?

- (a) Decentralization
- (b) Immutability**
- (c) Transparency
- (d) Consensus mechanism

23. Which ensures transactions on the blockchain cannot be altered ?

- (a) Consensus algorithm**
- (b) Digital wallet
- (c) Miners IDs
- (d) Private keys

24. Blockchain Network participants are called:

- (a) Servers
- (b) Miners
- (c) Nodes**
- (d) Clients

25. What property ensures all network copies remain consistent?

- (a) Central authority control
- (b) Consensus protocols**
- (c) Data encryption
- (d) Transaction fees

26. Blockchain transparency allows:

- (a) Anyone to alter the data without detection

- (b) **Participants to view transactions while keeping identities secure**
- (c) Transactions to be hidden from everyone
- (d) Only the administrator to view data

27. **Auditability in blockchain refers to ____**

- (a) Erasing past transactions anytime
- (b) **Traceability and verification of all transactions**
- (c) Central bank control of records
- (d) Only private log keeping

28. **Which feature of blockchain supports financial inclusion?**

- (a) Centralized authority
- (b) **Open access and no intermediaries**
- (c) High transaction fees
- (d) Complex licensing

29. **Blockchain transparency affects users by ____**

- (a) **Increasing trust through visible data**
- (b) Hiding their transaction details
- (c) Removing all privacy
- (d) Centralizing control

(C) Traditional Systems vs Blockchain System

30. **Which system has a single point of failure?**

- (a) Blockchain (b) **Traditional centralized system** (c) Peer-to-peer network (d) Decentralized system

31. **Which system provides higher transparency?**

- (a) Traditional system (b) **Blockchain** (c) Neither (d) Both equally

32. **Which system is typically slower for cross-border transactions?**

- (a) Blockchain (b) **Traditional centralized system** (c) Both the same (d) None of these

33. **Blockchain eliminates the need for ____**

- (a) Cryptography (b) **Intermediaries** (c) Data storage (d) Recording transactions

34. **Traditional systems differ from blockchain systems mainly in that:**

- (a) Traditional systems are decentralized
- (b) Blockchain systems are centralized
- (c) **Blockchain provides immutability and decentralization**
- (d) Traditional systems are faster for all transactions

(D) Types of Blockchain

35. **Public blockchains are ____**

- (a) Permissioned and private
- (b) **Open to anyone**
- (c) Operated by a single company
- (d) Always faster than private blockchains

36. **Private blockchains are ____**

- (a) **More decentralized than public blockchains**

(b) Permissioned and controlled by an organization

(c) Open to the public

(d) The same as public blockchains

37. Consortium blockchains are ____

(a) Solely managed by governments

(b) Governed by multiple organizations

(c) Public blockchains

(d) Controlled by no one

38. Which blockchain type is most suitable for enterprise solutions requiring privacy?

(a) Public blockchain **(b) Private blockchain** (c) Hybrid blockchain (d) Consortium blockchain

39. Hybrid blockchains ____

(a) Combine features of public and private blockchains

(b) Do not use cryptography

(c) Are fully centralized

(d) Are prohibited in most countries

40. ____system has a centralized control with all administrative rights.

(a) Blockchain (b) Cryptography (c) Decentralized (d) **Centralized**

41. Which type of blockchain is controlled by a single organization and restricts participation?

(a) Public Blockchain **(b) Private Blockchain** (c) Consortium Blockchain (d) Hybrid Blockchain

42. What type of blockchain is Ripple known for?

(a) Public blockchain (b) Consortium blockchain (c) Private blockchain **(d) Hybrid blockchain**
