TANTA UNIVERSITY
FACULTY OF COMPUTERS AND INFORMATICS

EXAMINATION FOR (LEVEL 3)

COURSE TITLE: ADVANCED NETWORK | COURSE CODE: IT322

DATE:2/6/2024 | TOTAL ASSESSMENT MARKS: 60 | PAGES : 4 | TIME ALLOWED: 2 HOUR

Q1) Choose the correct answer(42 Marks):

1. **Processing delay is primarily determined by:**
a) The length of the physical link b) The processing capacity of the router
c) The number of packets in the queue d) The congestion level of the network
2. **What is an Autonomous System (AS) in computer networking?**
a) A computer system that operates independently without any external control
b) A collection of routers and networks under a common administration sharing a common routing strategy
c) A system that automatically updates software without human intervention
d) A network where all devices are controlled by a centralized server
3. **What is the purpose of a virtual switch in virtualized environments?**
a) To physically connect multiple physical servers b) To manage network traffic between virtual machines
c) To store and manage virtual machine images d) To monitor server performance in real-time
4. **In virtual CPU (vCPU) terminology, what does a vCPU represent?**
a) A physical processor core dedicated to a virtual machine.
b) A logical processor core within a physical CPU.
c) A virtualized CPU instruction set.
d) A hardware component responsible for executing virtual machine instructions.
5. **Which wireless network topology allows devices to communicate with each other directly without the need for a central access point?**
a) Star topology b) Mesh topology c) Bus topology d) Ring topology
6. **What security** protocol **is commonly used to encrypt data transmitted over Wi-Fi networks?**
a) WEP b) WPA c) HTTPS d) SSL
7. **Which of the following routing protocols is considered a distance vector protocol?**
A) OSPF B) RIP C) EIGRP D) BGP
8. In RIP, what is the maximum hop count allowed?
A) 10 B) 15 C) 100 D) 255
9. **Which of the following is a drawback of RIP compared to OSPF?**
A) Convergence time is faster. B) Limited scalability.
C) Has less overhead. D) Supports larger networks
10. **Which wireless networking technology allows devices to connect over short distances, typically within a few meters?**
a) Wi-Fi b) Bluetooth c) NFC d) Zigbee
11. **What is computer virtualization?**
a) It refers to the process of physically dividing a computer into multiple parts.
b) It involves creating virtual instances of physical computer hardware to run multiple operating systems or applications simultaneously.
c) It is a technique used to optimize the performance of a single computer by allocating more resources.
d) It is a security measure used to protect computer systems from virtual threats.

12. Which type of AS relationship typically involves one AS providing transit services to another AS?

a) Customer-provider b) Peer-to-peer c) Sibling d) Confederation

13. What is a Stub Autonomous System (Stub AS) in computer networking?

a) An AS that does not participate in inter-AS routing
b) An AS that connects directly to the backbone network
c) An AS that exclusively uses OSPF for routing
d) An AS that employs only a single router for all network traffic

14. In a Multihomed Stub AS scenario, what is the purpose of having multiple connections to different upstream provider ASes?

a) To increase redundancy and fault tolerance in case of link failures
b) To reduce latency and improve network performance for local traffic
c) To enforce strict traffic engineering policies within the AS
d) To minimize routing overhead and administrative complexity

15. What is network delay?

a) The time it takes for a packet to travel from source to destination
b) The maximum number of packets that can be transmitted per second
c) The percentage of packets that do not reach their destination
d) The amount of time it takes for a router to process a packet

16. What is throughput in a network context?

a) The amount of data that can be transmitted per unit time
b) The time it takes for a packet to travel from source to destination
c) The percentage of packets that do not reach their destination
d) The number of routers a packet traverses before reaching its destination

17. What are the four primary sources of packet delay in computer networks?

a) Transmission delay, propagation delay, queuing delay, processing delay
b) Routing delay, transmission delay, jitter, latency
c) Congestion delay, transmission delay, propagation delay, latency
d) Queuing delay, routing delay, latency, processing delay

18. Which of the following factors can affect network throughput?

a) Packet loss b) Network latency c) Bandwidth availability d) Processing delay

19. If a network experiences high congestion levels, which source of delay is likely to be affected the most?

a) Transmission delay b) Propagation delay
c) Queuing delay d) Processing delay

20. If a packet of 1500 bytes is transmitted over a link with a bandwidth of 1 Mbps, and there is no queuing delay or processing delay, what is the transmission delay in milliseconds?

a) 1.5 ms b) 12 ms c) 15 ms d) 120 ms

21. A network has a link with a length of 5000 km and a propagation speed of 200,000 km/s. What is the propagation delay in milliseconds for a packet traversing this link?

a) 0.025 ms b) 0.025 s c) 25 ms d) 250 ms

22. Which of the following is a benefit of computer virtualization?

a) Increased physical hardware requirements b) Decreased flexibility in resource allocation
c) Improved utilization of hardware resources
d) Reduced complexity in managing multiple servers

23. What is a hypervisor in the context of virtualization?

a) An application used for optimizing network performance
b) A hardware component responsible for processing virtualization instructions

c) A software layer that allows multiple operating systems to run concurrently on a single physical machine
d) A security protocol used to encrypt virtual machines

24. Which of the following statements about virtual memory is true?
a) Virtual memory always resides on physical RAM.
b) Virtual memory is only used in single-tasking operating systems.
c) Virtual memory allows programs to use more memory than is physically available.
d) Virtual memory is always slower than physical memory.

25. What is the primary benefit of using virtual memory?
a) It reduces the need for physical RAM.
b) It improves CPU performance.
c) It enables multitasking by allowing multiple programs to run concurrently.
d) It increases the speed of data transfer between CPU and RAM.

26. Which type of virtualization involves creating multiple virtual machines (VMs) on a single physical server?
a) Application virtualization b) Network virtualization
c) Server virtualization d) Storage virtualization

27. Which of the following is a potential drawback of over-provisioning vCPUs in a virtualized environment?
a) Improved virtual machine performance b) Increased resource utilization
c) Decreased overall system performance d) Enhanced scalability

28. What is the primary advantage of wireless networks?
a) Higher data transmission speeds compared to wired networks.
b) Reduced susceptibility to interference.
c) Flexibility in device mobility and connectivity.
d) Lower cost of infrastructure setup and maintenance.

29. How are vCPUs allocated to virtual machines in a virtualized environment?
a) Each virtual machine is assigned a fixed number of vCPUs.
b) vCPUs are dynamically allocated based on virtual machine workload.
c) vCPUs are exclusively owned by the host operating system.
d) vCPUs are shared among all virtual machines running on a physical server.

30. What is the primary function of a wireless access point (WAP) in a Wi-Fi network?
a) To connect wireless devices to a wired network. b) To provide power to wireless devices.
c) To encrypt and decrypt data transmitted over the network.
d) To amplify Wi-Fi signals for extended coverage.

31. What is the impact of reducing processing delay in a router?
a) Increased throughput b) Decreased latency
c) Reduced jitter d) Improved network security

32. Which of the following types of delays encompasses the time taken by routers to process packets?
a) Transmission delay b) Propagation delay
c) Queuing delay d) Processing delay

33. What is the primary purpose of the CSMA/CD algorithm?
a) To prevent collisions in wireless networks b) To maximize network throughput
c) To efficiently manage network congestion
d) To detect and handle collisions on shared media networks

34. Which of the following is an example of a type-1 hypervisor?
a) VMware Workstation b) Microsoft Hyper-V

c) Oracle VirtualBox d) VMware vSphere Hypervisor (ESXi)

35. What is CPU ballooning in virtualization?

a) A technique used to increase CPU clock speed temporarily
b) A method for dynamically adjusting CPU core assignments
c) A process of allocating CPU resources based on demand
d) A mechanism for reclaiming unused memory from virtual machines

36. OSPF uses Bellman-Ford algorithm to build and maintain routing tables?

A) true B) false

37. EBGP is primarily used for routing between Routers within the same VLAN

A)true B) false

38. OSPF stand for Open Source Path First

A) true B) false

39. OpenFlow is a protocol commonly associated with SDN.

A)true B) false

40. EBGP routers exchange routing information through peering sessions established manually or using BGP routing policies.

A)true B) false

41. CSMA/CDbecomes inefficient with high network traffic and large numbers of devices

A)true B) false

42. The primary purpose of a VLAN is to segment a network into smaller, isolated sub-networks.

A)true B) false

Q2) Answer the following questions (18 marks)

1) What is SDN and How it Changes the Network?

2) State and explain the networking planes?

3) With drawing Compare between Xen and KVM?

4) How do packet delay and loss occur?

5) How does CSMA/CD handle data collisions on a network?

6) What are types of hypervisors?

	TANTA UNIVERSITY FACULTY OF COMPUTERS AND INFORMATICS	
	EXAMINATION FOR (LEVEL 3)	
	COURSE TITLE: ADVANCED SOFTWARE ENGNEERING — COURSE CODE: CS352	
	MODEL (1)	
DATE: 6/6/2024	TOTAL ASSESSMENT MARKS: 60 — PAGES : 4 TIME ALLOWED: 2 HOUR	

Choose the coorect Answer (60 - Degree)

1. **What is software engineering?**
   a) Designing a software
   b) Testing a software
   c) Application of engineering principles to the design a software
   d) None of the above
2. **Which step in the Software Development Life Cycle (SDLC) involves analyzing the scope of the project and planning the schedule and resources?**
   a) Communication
   b) Requirement Gathering
   c) Feasibility Study
   d) System Analysis
3. **What is the purpose of the feasibility study in the SDLC?**
   a) To gather user requirements
   b) To analyze the limitations of the software product
   c) To determine if the project is financially, practically, and technologically feasible
   d) To design the software product
4. **Which paradigm is a subset of the Software Design Paradigm?**
   a) Programming Paradigm
   b) Software Development Paradigm
   c) Requirement Gathering Paradigm
   d) Maintenance Paradigm
5. **What is the primary focus of the software engineering process?**
   a) Developing efficient and reliable software products
   b) Gathering business requirements
   d) Maintaining and updating software products
6. **Which step in the Software Development Life Cycle (SDLC) involves designing the structure and components of the software product?**
   a) Requirement Gathering b) System Analysis c) Software Design d) Programming
7. **What is the purpose of the communication step in the SDLC?**
   a) To negotiate the terms with the service provider
   b) To initiate the request for a software product
   c) To submit the request in writing
   d) All of the above
8. **What is the purpose of the integration step in the SDLC?**
   a) To gather user feedback on the prototype
   b) To combine individual software components into a complete system
   c) To analyze the scope of the project
   d) To design the structure and components of the software product
9. **Which of the following is not a part of Software evolution?**
   a) Re-engineering activities
   b) Maintenance activities
   c) Development activities
   d) Negotiating with client
10. **Which of the following factors are influenced on the architect?**
    a) Background and experience of the architects
    b) Developing an organization
    c) Customers and end users
    d) All of the above
11. **Which of these models is not appropriate for accommodating any change?**
    a) Waterfall Model
    b) Prototyping Model
    c) Build & Fix Model
    d) RAD Model
12. **What is the primary focus of software architecture?**
    a) Internal design of software process
    b) Coordination among software components
    c) Software development methodologies
    d) Software testing procedures
13. **Software architecture and design are two distinct phases in which software development life cycle?**
    a) Requirements analysis
    b) Coding and integration
    c) Domain analysis
    d) Design and development

14. **Which of the following is a goal of software architecture?**
    a) Exposing implementation details
    b) Focusing only on functional requirements
    c) Improving quality and functionality
    d) Ignoring stakeholder requirements
15. **Which of the following is a limitation of software architecture?**
    a) Lack of standardized ways to represent architecture
    b) Lack of the improvement of quality and functionality
    c) Lack of tools for requirements analysis
    d) All of the above
16. **What role does not a software architect play in a project?**
    a) Implementation and coding tasks
    b) Managing the project schedule
    c) Facilitating communication among team members
    d) Testing and quality assurance
17. **Which of the following is a deliverable of a software architect?**
    a) Detailed design and coding guidelines
    b) User manuals and documentation
    c) System requirements document
    d) Clear, complete, and achievable functional goals
18. **What are quality attributes in software architecture?**
    a) System properties separate from functionality
    b) Functional requirements of the system
    c) Dynamic behaviors of the system
    d) Source code and design patterns
19. **Which type of quality attributes reflects the structure of a system?**
    a) Static quality attributes
    b) Dynamic quality attributes
    c) Functional quality attributes
    d) Non-functional quality attributes
20. **What do quality scenarios specify?**
    a) System requirements and specifications
    b) Performance metrics of the system
    c) User interface design guidelines
    d) Steps to prevent faults from becoming failures
21. **What does the architectural style define?**
    a) System's use cases and scenarios
    b) Detailed design and coding guidelines
    c) Principles and framework for organizing a system
    d) Test criteria and evaluation methods
22. **When software design is typically carried out in the software development life cycle?**
    a) After coding and integration
    b) During requirements analysis
    c) Before domain analysis
    d) After software architecture definition
23. **What is software architecture?**
    a) The organization of a system
    b) The design of user interfaces
    c) The implementation of algorithms
    d) The testing phase of software development
24. **Which of the following is NOT an architectural style?**
    a) Data Centered Architectures
    b) Data Flow Architectures
    c) Object Oriented Architecture
    d) Data Modification Architecture
25. **Which architectural style promotes integrability of components?**
    a) Data Centered Architectures
    b) Call and Return Architectures
    c) Object Oriented Architecture
    d) Layered Architecture
26. **Which of the following is NOT a common software architectural style?**
    a) Client-Server b) Peer-to-Peer c) Object-Oriented d) Procedural
27. **The selection of programming language, framework, and platforms is part of the software architect's expertise in:**
    a) Design b) Domain c) Technology d) Methodology
28. **The role of a software architect includes expertise in which areas?**
    a) Design, domain, technology, and methodology
    b) Programming languages, project management, and quality assurance
    c) User interface design, testing, and maintenance
    d) Requirements analysis, data modeling, and database management

29. Which of the following is a key characteristic of SOA?

a) Tight coupling between components
b) Monolithic architecture
c) Loose coupling between services
d) Strong reliance on a single technology stack

30. What is Service-Oriented Architecture (SOA)?

a) A programming language used for web development
b) A design pattern for building modular and interoperable systems
c) A database management system
d) A project management methodology

31. In SOA, what is a service?

a) A physical server hosting the application
b) A software component providing a specific functionality
c) A user interface for interacting with the application
d) A database management system

32. What is the primary benefit of using SOA?

a) Improved security
b) Increased performance
c) Enhanced maintainability and reusability
d) Reduced development cost

33. Which one of the following NOT a type of architecture from the viewpoint of an enterprise and collectively?

a) Business Architecture
b) Application Architecture
c) Hardware Architecture
d) Information Architecture

34. Information technology (IT) architecture …….

a) Defines the hardware and software building blocks
b) Defines the logical and physical data assets
c) Defines the key business processes within an enterprise
d) Serves as the blueprint for individual application systems

35. Software architecture can be defined using:

a) UML b) ADL c) Architecture View Model d) All of the mentioned

36. Which diagram represents the static aspects of a system?

a) Use Case diagram b) Class diagram c) Activity diagram d) Sequence diagram

37. An architecture description language (ADL) is ……..

a) a language that defines the software architecture
b) a notation specification
c) a formal specification language
d) all of the mentioned

38. Service Oriented Architecture (SOA) is

a) Strongly Coupled
b) Loosely Coupled
c) Strongly Cohesive
d) Loosely Cohesive

39. "Designs that make easier to change are better" which principle said that?

a) Principle of Economy
b) Principle of Adequacy
c) Principle of Changeability
d) Principle of Feasibility

40. Which of the following software engineering activities is not an activity of the software process?

a) Software specification
b) Software dependence
c) Software development
d) Software validation

41. In data-centered architecture, how do components communicate with each other?

a) Through shared data repositories
b) Through direct method calls
c) Through message passing
d) Through a central control unit

42. Which architectural style is commonly used in database systems?

a) Data Centered Architectures
b) Object Oriented Architecture
c) Layered Architecture
d) Call and Return Architectures

43. Which architectural style is commonly found in AI applications and speech recognition systems?

a) Data Centered Architectures
b) Call and Return Architectures
c) Object Oriented Architecture
d) Blackboard Architecture Style

44. What are the major parts of the Blackboard Model?

a) Knowledge Sources, Data Structure, and Control
b) Data Accessors and Repository
c) Input Stream and Output Stream
d) Pipes and Filters

45. Which architecture style is known for its support of concurrency and scalability?

a) Data Centered Architectures
b) Blackboard Architecture Style
c) Layered Architecture
d) Object Oriented Architecture

46. **What kind of architecture is used when input data is transformed into output data through computational components?**
    a) Data Centered Architectures
    b) Data Flow Architectures
    c) Layered Architecture
    d) Object Oriented Architecture
47. **Which type of execution sequence is associated with data flow architecture?**
    a) Batch sequential
    b) Pipe and filter
    c) Process control
    d) All of the above
48. **Which architectural style is suitable for applications involving independent data transformations?**
    a) Data Centered Architectures
    b) Blackboard Architecture Style
    c) Data Flow Architectures
    d) Layered Architecture
49. **What are the qualities achieved by the data flow architecture?**
    a) Reuse and modifiability
    b) Scalability and reusability
    c) Data integrity and backup features
    d) Concurrency and scalability
50. **What is the disadvantage of data flow architecture?**
    a) It frequently degenerates to a batch sequential system
    b) It does not allow applications that require greater user engagement
    c) It is not easy to coordinate two different but related streams
    d) All of the above
51. **Which architectural style is commonly used in business data processing applications?**
    a) Data Centered Architectures
    b) Call and Return Architectures
    c) Object Oriented Architecture
    d) Data Flow Architectures
52. **What is the main feature of the Pipe and Filter architecture?**
    a) High latency and low throughput
    b) Concurrency and high throughput
    c) Dynamic interactions
    d) External control for implementation
53. **What kind of architecture is suitable for embedded system software design?**
    a) Pipe and Filter b) Process Control c) Call and Return d) Virtual Machine
54. **What does a controller unit in the Process Control architecture calculate?**
    a) Controlled Variable
    b) Input Variable
    c) Manipulated Variable
    d) Set Point
55. **Which architecture style is used to create a program that is easy to scale and modify?**
    a) Pipe and Filter b) Process Control c) Call and Return d) Virtual Machine
56. **In object-oriented architecture, how is coordination and communication between components established?**
    a) Inheritance b) Encapsulation c) Message passing d) Polymorphism
57. **Which of the following is an example of a unary relationship?**
    a) Association b) Aggregation c) Inheritance d) Composition
58. **What is the purpose of encapsulation in object-oriented systems?**
    a) To hide the internal details of a class from outside
    b) To establish relationships among classes
    c) To allow objects to communicate through message passing
    d) To create new classes by extending existing classes
59. **Which analysis technique is used to identify objects, classes, and relationships in object-oriented analysis?**
    a) Object modeling
    b) Dynamic modeling
    c) Functional modeling
    d) Inheritance modeling
60. **Which term is used to describe the relationship between classes where one class is made up of objects of other classes?**
    a) Association b) Encapsulation c) Inheritance d) Composition

Best Wishes
Dr. Arwa Abulwafa

	TANTA UNIVERSITY FACULTY OF COMPUTERS AND INFORMATICS	
	EXAMINATION FOR (LEVEL 3)	
	COURSE TITLE: PATTERN RECOGNETION	COURSE CODE: IT325
DATE:6/6/2024	TOTAL ASSESSMENT MARKS: 60	PAGES : 5 TIME ALLOWED: 2HOUR

Q1) Choose the correct answer (46 Marks)

1- Which AI technique involves teaching a computer to perform a task by providing it with examples, rather than programming it with specific rules?

a) Supervised Learning b) Unsupervised Learning
c) Reinforcement Learning d) Deep Learning

2- In Supervised Learning, the training data includes:

(a) Only raw, unlabeled data. (b) Data with features but no target variable.
(c) Data points with both features and labeled outputs. (d) Textual descriptions of desired outcomes.

3- What is the primary goal of supervised learning in machine learning?

a) To identify patterns and insights in data without labels
b) To optimize a model's performance through trial and error
c) To train a model to make predictions based on labeled training data
d) To group similar data points into clusters

4- In machine learning, what is the term for the process of evaluating a model's performance on data it has never seen before?

a) Training b) Testing c) Validation d) Inference

5- Which machine learning technique is used for finding patterns or insights in data without the need for labeled examples?

a) Supervised Learning b) Unsupervised Learning
c) Reinforcement Learning d) Semi-supervised Learning

6- What is the primary goal of clustering algorithms in machine learning?

a) To predict a continuous value based on input features
b) To group similar data points together based on their characteristics
c) To classify data points into predefined categories or classes
d) To optimize a model's performance by adjusting its parameters

7- What is the term for the process of fine-tuning a machine learning model's parameters to improve its performance on a specific task?

a) Training b) Testing
c) Validation d) Hyperparameter tuning

8- Which machine learning technique is commonly used for predicting continuous values, such as house prices or stock prices?

a) Classification b) Regression c) Clustering d) Dimensionality Reduction

9- In machine learning, what does the term "overfitting" refer to?

A) A model that performs well on training data but poorly on test data
B) A model that generalizes well to new, unseen data
C) A model with too few parameters
D) A model that is underperforming on both training and test data

10- Which of the following algorithms is commonly used for clustering in unsupervised learning?

a) Linear Regression b) K-Means Clustering
c) Decision Trees d) Support Vector Machines (SVM)

11- Which of the following algorithms is commonly used for classification tasks in supervised learning?

a) Linear Regression b) K-Means Clustering
c) Decision Trees d) Principal Component Analysis (PCA)

12- What is the purpose of the "training" phase in supervised learning?

a) To evaluate the model's performance on unseen data.
b) To adjust the model's parameters to minimize prediction errors.
c) To validate the model's predictions against ground truth labels.
d) To generate new data points for testing the model.

13- Which of the following evaluation metrics is commonly used for regression problems in supervised learning?

a) Accuracy b) Precision
c) Mean Squared Error (MSE) d) F1 Score

14- What is the primary objective of the k-means algorithm?

a) Supervised classification b) Unsupervised clustering
c) Feature selection d) Regression analysis

15- Which step in the k-means algorithm involves initializing cluster centroids?

a) Assignment step b) Update step
c) Termination step d) Initialization step

16- In the k-means algorithm, how are cluster centroids typically initialized?

a) Randomly b) Based on class labels
c) Based on feature importance d) According to a predetermined order

17- What is the termination condition in the k-means algorithm?

a) Maximum number of iterations reached b) Minimum number of clusters achieved
c) Minimum change in cluster centroids d) Maximum change in cluster centroids

18- How does the k-means algorithm handle the issue of selecting the optimal number of clusters (k)?

a) It tries multiple values of k and selects the one with the lowest inertia.
b) It uses a validation set to determine the optimal k.
c) It automatically determines the optimal k based on data distribution.
d) It requires the user to specify the value of k.

19- What is the Naive Bayes algorithm primarily used for?

a) Regression b) Classification c) Clustering d) Dimensionality reduction

20- What is the underlying assumption of the Naive Bayes algorithm?

a) Independence of features b) Correlation between features
c) Linearity of data d) Heteroscedasticity

21- Which probability theorem forms the basis of the Naive Bayes algorithm?

a) Central Limit Theorem b) Bayes' Theorem
c) Law of Large Numbers d) Conditional Probability Theorem

22- Which type of Naive Bayes classifier assumes that features follow a Gaussian distribution?

a) Gaussian Naive Bayes b) Bernoulli Naive Bayes
c) Multinomial Naive Bayes d) Complement Naive Bayes

23- Which scenario is Naive Bayes particularly well-suited for?

a) Text classification b) Image segmentation
c) Time series forecasting d) Anomaly detection

24- What is the primary objective of linear regression?

a) Classification b) Clustering

c) Prediction of a continuous outcome d) Feature selection

25- In simple linear regression, how many independent variables are there?

a) One b) Two c) Three or more d) None

26- What is the main assumption of linear regression regarding the relationship between independent and dependent variables?

a) Non-linearity b) Collinearity c) Independence d) Linearity

27- Which method is commonly used to estimate the parameters in linear regression?

a) Gradient descent b) Expectation-maximization

c) Least squares d) Principal component analysis

28- What is the purpose of data preprocessing in the context of linear regression?

a) To remove outliers from the dataset

b) To transform variables to meet the assumptions of linear regression

c) To improve the interpretability of the model

d) To increase the complexity of the model

29- Which of the following techniques can be used to handle missing data in linear regression?

a) Removing instances with missing data

b) Imputing missing values with mean or median

c) Predicting missing values using another regression model

d) All of the above

30- What does feature extraction involve in data preprocessing?

a) Generating new features from existing ones

b) Removing redundant or irrelevant features

c) Converting categorical features into numerical ones

d) Normalizing the range of features

31- The process of adjusting the weight is known as?

a) activation b) synchronization c) learning d) none of the mentioned

32- To estimate the unknown parameters of Bernoulli density function by using MLE, we use----

a) $\hat{p} = 1/n(x_1 + \cdots + x_n)$ b) $\hat{p} = n(x_1 + \cdots + x_n)$

c) $\hat{p} = n * 1/n(x_1 + \cdots + x_n$ d) $\hat{p} = 10/n(x_1 + \cdots + x_n)$

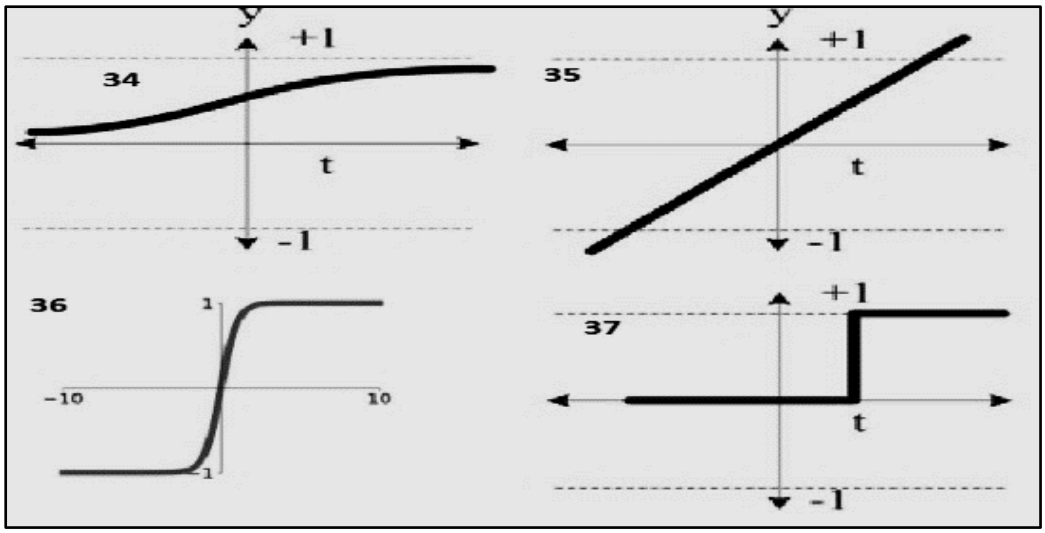
33- Which of the following is not a step of the machine learning life cycle.

a) gathering dataset b)select model c)add noise d)data clearing

34- Choose the name of each activation function in (fig.1). (questions 34,35,36,37)

a)Step function b) Sigmoid

c) linear d) Tanh



38- ---------is a method of estimating the parameters of a statistical model, given observations

a) Probability theory b) Maximum likelihood estimation (MLE)

c)normalization d)generalization

39- What is the main objective of feature selection in machine learning?

A) To increase the dimensionality of the dataset

B) To remove redundant and irrelevant features to improve model performance

C) To ensure that all features are used in the model

D) To increase the complexity of the model

40- In the context of feature selection, what does the term "embedded method" refer to?

A) Methods that incorporate feature selection as part of the model training process

B) Methods that use statistical tests to select features

C) Methods that build models using a subset of features

D) Methods that transform features into a lower-dimensional space

41- What is the primary purpose of a reward function in reinforcement learning?

A) To initialize the state space B) To determine the agent's starting position

C) To provide feedback to the agent about the quality of its actions

D) To define the transition probabilities between states

Problem Description and Grid Layout

Consider a 4x4 grid representing a room with a robot starting at the top-left corner (0,0). The grid has obstacles (denoted by 'X') that the robot cannot traverse. The goal is for the robot to visit all accessible spaces in the room. The robot can move up, down, left, or right.

Grid:

	0	1	2	3
0	**Start**	**0**	**0**	**0**
1	**0**	**X**	**0**	**0**
2	**0**	**0**	**X**	**0**
3	**X**	**0**	**0**	**0**

S: Starting position of the robot

0: Open space

X: Obstacle

Questions

42- What is the starting position of the robot in the given grid?

A) (0,1) B) (0,0) C) (1,0) D) (1,1)

43- Which cells can the robot move to from its starting position (0,0)?

A) (0,1) and (1,0) B) (0,1) and (0,2) C) (1,0) and (1,1) D) (0,0) and (0,2)

44- Which of the following paths represents a valid sequence of moves for the robot to visit the bottom-right corner (3,3) without hitting an obstacle?

A) (0,0) → (0,1) → (1,1) → (2,1) → (3,1) → (3,2) → (3,3)

B) (0,0) → (0,1) → (0,2) → (0,3) → (1,3) → (2,3) → (3,3)

C) (0,0) → (1,0) → (1,1) → (2,1) → (2,2) → (3,2) → (3,3)

D) (0,0) → (0,1) → (1,1) → (2,1) → (3,1) → (3,0) → (3,3)

45- If the robot is currently at position (2,0), which move is not possible?

A) Move to (1,0) B) Move to (2,1) C) Move to (3,0) D) Move to (2,2)

46- How many total accessible cells are there in the grid for the robot to visit (including the starting position)?

A) 9 B) 10 C) 13 D) 12

Q2)Choose (A) for True and (B) for False (14 Marks)

47- If we have dependant dataset which has a specific function of dependency, we can use supervioused learning algorithm
48- In a Markov process, the future state depends only on the current state and not on the sequence of events that preceded it
49- The sum of the transition probabilities from any given state to all possible next states in a Markov chain is always equal to 1.
50- An optimal policy in reinforcement learning is one that maximizes the cumulative reward over time
51- We can use linear programming to get the unknown parameters in Reinforcement problems
52- K-means automatically adjusts the number of clusters.
53- Maximum likelihood estimation (MLE) can estimate only one unknown parameter
54- Perceptron algorithm is an unsupervised algorithm
55- Noise is any unwanted anomaly in the data
56- The artificial neural network is used for classification tasks
57- Supervised Learning can solve classification and regression problems
58- Backpropagation algorithm is used to estimate the unknown parameters
59- To prevent overfitting by penalizing large weight valuesregularization techniques such as L1 and L2 regularization in neural networks
60- Hidden Markov model is one of common example about reinforcement learning algorithm

TANTA UNIVERSITY
FACULTY OF COMPUTERS AND INFORMATICS

EXAMINATION FOR (LEVEL 3)

COURSE TITLE: ADVANCED NETWORK | COURSE CODE: IT322

DATE:25/3/2024 | TOTAL ASSESSMENT MARKS: 20 | PAGES : 2 TIME ALLOWED: 1HOUR

Choose the correct answer:

1. What is an Autonomous System (AS) in computer networking?
a) A computer system that operates independently without any external control
b) A collection of routers and networks under a common administration sharing a common routing strategy
c) A system that automatically updates software without human intervention
d) A network where all devices are controlled by a centralized server

2. Which of the following is NOT a characteristic of an Autonomous System?
a) It has a unique Autonomous System Number (ASN)
b) It may consist of multiple routers and networks under a single administrative domain
c) It must use only a single routing protocol for internal and external routing
d) It may connect to other Autonomous Systems for internet connectivity

3. Which type of AS relationship typically involves one AS providing transit services to another AS?
a) Customer-provider b) Peer-to-peer c) Sibling d) Confederation

4. Which of the following is a primary reason for using Autonomous Systems on the internet?
a) To reduce the complexity of routing tables
b) To provide centralized control over all network devices
c) To enable scalable and flexible routing policies
d) To ensure secure communication between routers

5. What is a Stub Autonomous System (Stub AS) in computer networking?
a) An AS that does not participate in inter-AS routing
b) An AS that connects directly to the backbone network
c) An AS that exclusively uses OSPF for routing
d) An AS that employs only a single router for all network traffic

6. Which statement best describes the typical role of a Stub AS in a network topology?
a) Stub ASes act as transit points for traffic between other ASes
b) Stub ASes primarily focus on routing traffic within their own network
c) Stub ASes serve as the backbone of the entire network infrastructure
d) Stub ASes are reserved exclusively for hosting web servers and services

7. Which statement accurately describes local traffic in the context of an Autonomous System (AS)?
a) Local traffic refers to traffic exchanged between different ASes.
b) Local traffic refers to traffic that originates and terminates within the same AS.
c) Local traffic refers to traffic routed through a transit AS to reach its destination.
d) Local traffic refers to traffic exchanged exclusively between peer ASes.

8. What is the primary function of a Transit AS in a network topology?
a) Transit ASes exclusively provide internet connectivity to Stub ASes.
b) Transit ASes serve as the backbone of the entire network infrastructure.
c) Transit ASes exchange routing information with other Transit ASes only.
d) Transit ASes provide a path for traffic between different Stub ASes.

9. In a Multihomed Stub AS scenario, what is the purpose of having multiple connections to different upstream provider ASes?

a) To increase redundancy and fault tolerance in case of link failures
b) To reduce latency and improve network performance for local traffic
c) To enforce strict traffic engineering policies within the AS
d) To minimize routing overhead and administrative complexity

10. What is network delay?

a) The time it takes for a packet to travel from source to destination
b) The maximum number of packets that can be transmitted per second
c) The percentage of packets that do not reach their destination
d) The amount of time it takes for a router to process a packet

11. Which of the following types of delays encompasses the time taken by routers to process packets?

a) Transmission delay b) Propagation delay c) Queuing delay d) Processing delay

12. What is throughput in a network context?

a) The amount of data that can be transmitted per unit time
b) The time it takes for a packet to travel from source to destination
c) The percentage of packets that do not reach their destination
d) The number of routers a packet traverses before reaching its destination

13. Which of the following factors can affect network throughput?

a) Packet loss b) Network latency c) Bandwidth availability d) Processing delay

14. What are the four primary sources of packet delay in computer networks?

a) Transmission delay, propagation delay, queuing delay, processing delay
b) Routing delay, transmission delay, jitter, latency
c) Congestion delay, transmission delay, propagation delay, latency
d) Queuing delay, routing delay, latency, processing delay

15. Processing delay is primarily determined by:

a) The length of the physical link b) The processing capacity of the router
c) The number of packets in the queue d) The congestion level of the network

16. If a network experiences high congestion levels, which source of delay is likely to be affected the most?

a) Transmission delay b) Propagation delay c) Queuing delay d) Processing delay

17. If a packet of 1500 bytes is transmitted over a link with a bandwidth of 1 Mbps, and there is no queuing delay or processing delay, what is the transmission delay in milliseconds?

a) 1.5 ms b) 12 ms c) 15 ms d) 120 ms

18. A network has a link with a length of 5000 km and a propagation speed of 200,000 km/s. What is the propagation delay in milliseconds for a packet traversing this link?

a) 0.025 ms b) 0.025 s c) 25 ms d) 250 ms

19. What is computer virtualization?

a) It refers to the process of physically dividing a computer into multiple parts.
b) It involves creating virtual instances of physical computer hardware to run multiple operating systems or applications simultaneously.
c) It is a technique used to optimize the performance of a single computer by allocating more resources.
d) It is a security measure used to protect computer systems from virtual threats.

20. Which of the following is a benefit of computer virtualization?

a) Increased physical hardware requirements
b) Decreased flexibility in resource allocation
c) Improved utilization of hardware resources

d) Reduced complexity in managing multiple servers

21.What is a hypervisor in the context of virtualization?

a) An application used for optimizing network performance
b) A hardware component responsible for processing virtualization instructions
c) A software layer that allows multiple operating systems to run concurrently on a single physical machine
d) A security protocol used to encrypt virtual machines

22.What is the purpose of a virtual switch in virtualized environments?

a) To physically connect multiple physical servers b) To manage network traffic between virtual machines
c) To store and manage virtual machine images d) To monitor server performance in real-time

23. Which of the following statements about virtual memory is true?

a) Virtual memory always resides on physical RAM.
b) Virtual memory is only used in single-tasking operating systems.
c) Virtual memory allows programs to use more memory than is physically available.
d) Virtual memory is always slower than physical memory.

24.What is the primary benefit of using virtual memory?

a) It reduces the need for physical RAM.
b) It improves CPU performance.
c) It enables multitasking by allowing multiple programs to run concurrently.
d) It increases the speed of data transfer between CPU and RAM.

25.In virtual CPU (vCPU) terminology, what does a vCPU represent?

a) A physical processor core dedicated to a virtual machine.
b) A logical processor core within a physical CPU.
c) A virtualized CPU instruction set.
d) A hardware component responsible for executing virtual machine instructions.

26.How are vCPUs allocated to virtual machines in a virtualized environment?

a) Each virtual machine is assigned a fixed number of vCPUs.
b) vCPUs are dynamically allocated based on virtual machine workload.
c) vCPUs are exclusively owned by the host operating system.
d) vCPUs are shared among all virtual machines running on a physical server.

27.What is the primary advantage of wireless networks?

a) Higher data transmission speeds compared to wired networks.
b) Reduced susceptibility to interference.
c) Flexibility in device mobility and connectivity.
d) Lower cost of infrastructure setup and maintenance.

28.Which wireless networking technology allows devices to connect over short distances, typically within a few meters?

a) Wi-Fi b) Bluetooth c) NFC d) Zigbee

29.What is the primary function of a wireless access point (WAP) in a Wi-Fi network?

a) To connect wireless devices to a wired network. b) To provide power to wireless devices.
c) To encrypt and decrypt data transmitted over the network.
d) To amplify Wi-Fi signals for extended coverage.

30.What is the primary purpose of the CSMA/CD algorithm?

a) To prevent collisions in wireless networks
b) To maximize network throughput
c) To efficiently manage network congestion
d) To detect and handle collisions on shared media networks