

232/2023

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Which of the following is a true statement?
 - (A) PCI is a parallel interface whereas PCIe is a serial interface
 - (B) Both PCI and PCIe are parallel interfaces
 - (C) PCI is a serial interface whereas PCIe is a parallel interface
 - (D) Both PCI and PCIe are serial interfaces

2. Theoretical maximum speed for DDR5 memory :
 - (A) 3200 MT/s
 - (B) 9000 MT/s
 - (C) 4800 MT/s
 - (D) 8800 MT/s

3. How many devices can be connected to a USB host?
 - (A) 128
 - (B) 127
 - (C) 16
 - (D) 1024

4. Name the technology that allows the CPU to access the entire GPU memory at once?
 - (A) Resizable BAR
 - (B) Bounce Buffering
 - (C) DOCP
 - (D) XMP

5. What kind of edge connector is used for M.2 SATA SSDs?
 - (A) F key
 - (B) C key
 - (C) C+F key
 - (D) B+M key

6. The certification used to rate the energy efficiency of computer power supplies?
 - (A) VESA
 - (B) 80 plus
 - (C) ROHS
 - (D) CE

7. Which of the following is a system requirement for providing security against the firmware attacks?
 - (A) TPM
 - (B) DIMM
 - (C) SIMM
 - (D) ETM

8. Which cache replacement policy keeps track of the page usage in the last clock interval?
- (A) LRU (B) NRU
(C) NFU (D) LFU
9. What is the least dense, and fastest type of cell technology used in flash modules for SSDs?
- (A) SLC (B) MLC
(C) TLC (D) QLC
10. What is Intelligent Platform Management Interface?
- (A) A parallel interface used to diagnose system errors
(B) A serial video output port for servers
(C) An interface that allows remote management and monitoring of servers
(D) A protocol used for quicker memory access
11. Which of the following sorting algorithms is stable?
- P . Merge sort
Q . Quicksort
R . Heapsort
S . Insertion sort
- (A) P Only (B) P and Q
(C) P and R (D) P and S
12. A hash table implemented using an array contains 10 buckets and uses linear probing to resolve collisions. The key values are integers, and the hash function used is $\text{key} \% 10$. If the values 100, 23, 45, 2, 13, 33 are inserted in the table, in what location would the key value 33 be inserted?
- (A) 3 (B) 4
(C) 5 (D) 6
13. For a Binary Search Tree, the result of postorder traversal is: 2, 1, 4, 3, 6, 8, 7, 5. The label of the node which is farthest from the root is
- (A) 2 (B) 4
(C) 5 (D) 8
14. Which of the following statements about symbols table and two-pass assembler is true?
- (A) A symbol table is generated in the first pass
(B) A symbol table is generated in the second pass
(C) Only single-pass assemblers require a symbol table
(D) Only compilers require a symbol table and not assemblers

15. How many tokens will be generated by the lexical analyzer of a C compiler for the following statement?
- $$x = x * (a + b) - 5;$$
- (A) 6 (B) 11
(C) 12 (D) 5
16. Which of the following C library functions will not invoke a system call when executed from a process in a UNIX/Linux operating system?
- P . exit
Q . malloc
R . strlen
- (A) All of the above (B) R only
(C) Q and R (D) P and R
17. What does the term “Compaction” in Operating Systems refers to?
- (A) A technique for arranging processes in ready state for execution
(B) A technique for dealing with external fragmentation problem in memory
(C) A technique for dealing with internal fragmentation problem in memory
(D) A technique for reducing the size of memory pages
18. What is the maximum file size limit for the FAT32 file system?
- (A) 2 GB (B) 4 GB
(C) 16 GB (D) 32 GB
19. What is the difference between a hard link and a symbolic link with respect to a file?
- (A) A hard link is a pointer to a file, while a symbolic link is a copy of a file
(B) A hard link can be created for directories, while a symbolic link cannot be created for directories
(C) A hard link can only point to files on the same volume, while a symbolic link can point to files on any volume
(D) All of the above
20. Which platform allows for the development of cross-platform mobile applications?
- (A) AndroidX (B) RubyCross
(C) React Native (D) Swift

21. SQL query for finding the Cartesian product of relations R and S :
- (A) Select all column from R, S
 - (B) Select * from R, S
 - (C) Select all columns from R natural join B
 - (D) Select * from R full outer join S
22. _____ is the minimal super key.
- (A) Primary key
 - (B) Candidate key
 - (C) Super key
 - (D) Foreign key
23. Which one is not a DDL Command?
- (A) UPDATE
 - (B) CREATE
 - (C) ALTER
 - (D) DROP
24. Which statement is true for the key of a relation?
- (A) One or more attributes form a key
 - (B) A unique ID assigned to each row can be a key
 - (C) Both (A) and (B)
 - (D) None of the above
25. Which of the following is a concurrency problem?
- (A) Temporary update problem
 - (B) Lost update problem
 - (C) None of the above
 - (D) Both (A) and (B)
26. Dirty Read problem also known as
- (A) W-R Conflict
 - (B) W-W Conflict
 - (C) R-R Conflict
 - (D) None of the above
27. If a schedule S can be transformed into a schedule S' by a series of swaps of non-conflicting instructions, then S and S' are
- (A) Conflict equivalent
 - (B) Non conflict equivalent
 - (C) Equal
 - (D) Isolation equivalent

28. Which one is not a recovery technique?
- (A) Deferred Update (B) Immediate update
(C) Two Phase commit (D) Caching
29. Check points Serve as
- (A) Partitions (B) Bookmarks
(C) Books (D) Pages
30. Which feature is not belonging to NOSQL?
- (A) Highly Distributable (B) Schema Agnostic
(C) ACID transaction support (D) Non relational
31. For the kind of glass used in optic fibers, which formula calculates the attenuation of light through fiber in decibels?
- (A) $10 \log_{10} \frac{\text{received power}}{\text{transmitted power}}$ (B) $100 \log_2 \frac{\text{transmitted power}}{\text{received power}}$
(C) $10 \log_{10} \frac{\text{transmitted power}}{\text{received power}}$ (D) $2 \log_{10} \frac{\text{transmitted power}}{\text{received power}}$
32. A 1000- bit block of data is to be transmitted between two computers. Determine the ratio of the propagation delay to the transmission delay, a, for 12 km of coaxial cable and the transmission rate is 10 Mbps. (Assume that the velocity of propagation of an electrical signal within a cable is $2 \times 10^8 \text{ ms}^{-1}$)
- (A) 5×10^{-2} (B) 6×10^{-2}
(C) 6×10^{-5} (D) 6×10^{-1}
33. What is 'VSAT' in Wireless satellite technology?
- (A) Virtual Satellite Technology
(B) Very Small Access Terminal
(C) Very Small Aperture Terminal
(D) Very Smart Astro Technology
34. Which generation of network is supposed to enable streaming multimedia, HDTV content, Digital Video Broadcasting and ultra-broadband in Internet access?
- (A) 5G (B) 4G
(C) 3G (D) 2G

35. Which frame is used in IEEE 802.11 standard to determine whether the station knows the secret key of the authentication scheme being used?
- (A) Challenge frame (B) Super frames
(C) Beacon frames (D) None of the above
36. How many channels do Bluetooth radio layer consists of?
- (A) 89 channels (B) 79 channels
(C) 99 channels (D) None of the above
37. Which of the following statements is / are correct about Bluetooth technology?
- (i) Bluetooth network configuration called a piconet, consists of a master device and up to 7 slave devices.
(ii) Only the master can start to transmit in even-numbered slots and slave can start to transmit in an odd-numbered slots.
(iii) A slave device can be parked; All parked slaves have a 16-bit Parked Member Address (PMA).
(iv) Bluetooth operates in an unlicensed radio band at 2.45 GHz in a Time Division Multiplexing manner.
- (A) Only (ii) and (iii)
(B) Only (i) and (iv)
(C) All of the above (i), (ii), (iii) and (iv)
(D) Only (i) and (iii)
38. The Global Positioning system (24 GPS) is an example for which orbit satellite?
- (A) Geostationary satellite (B) Low-Earth Orbit satellite
(C) Medium-Earth Orbit satellite (D) None of the above
39. In multimode stepped index fiber, the dispersion can be reduced by using :
- (A) A core material that has a constant refractive index
(B) A core material that has a variable refractive index
(C) A cladding material that has a constant refractive index
(D) A cladding material that has a variable refractive index

40. To increase the capacity of 5G base stations, they need to consider the factors such as a large number of base stations, more spectrum and an increased spectral efficiency per cell; meaning it has the principle of massive MIMO. The MIMO stands for
- (A) Massive In Massive Out (B) Many Input Many Output
(C) Multiple In Multiple Out (D) Multiple Input Multiple Output
41. Poor performance of a machine learning model on both training and testing data indicates which of the following?
- (A) Overfitting (B) Variance
(C) Underfitting (D) Regularization
42. Which of the following is not true about Gradient Descent technique in machine learning?
- (A) It is used when there is no analytical solution
(B) It is used to reach the maximum of the cost function
(C) It is used when the hypothesis space contains continuously parameterized hypotheses
(D) It is an iterative optimization algorithm
43. Which of the following is a statistical measure of the effectiveness of an attribute in classifying the training data?
- (A) Entropy (B) Information Gain
(C) Gini index (D) ID3
44. Which of the following are true about Principal Component Analysis (PCA)?
- (i) PCA minimizes the sum of squares of projection errors
(ii) It is an unsupervised method
(iii) It is a feature extraction method
(iv) PCA works when the data lies in a linear subspace
- (A) (i), (ii) and (iii) (B) (i), (iii) and (iv)
(C) (ii) and (iii) (D) (i), (ii), (iii) and (iv)
45. Find the odd one out :
- (A) Agglomerative (B) k-Means
(C) Apriori (D) DBSCAN

46. What is the activation function represented by this equation : $f(x) = \max(0, x)$
- (A) ReLu (B) Sigmoid
(C) Gaussian (D) Softmax
47. What is the purpose of pooling layer in CNN?
- (A) Generate a feature map (B) Filter the image
(C) Extract features (D) Downsample the feature map
48. What is a residual in linear regression?
- (A) The vertical distance between data points
(B) The difference between the actual y values and the predicted y values
(C) The square root of the slope
(D) The difference between the actual y values and the mean of y .
49. What is Tensor in Tensor Flow?
- (A) Hierarchical data structure (B) Series
(C) Multi dimensional array (D) Template model
50. Who among the following created the large language model PaLM2?
- (A) Google (B) OpenAI
(C) Microsoft (D) Meta
51. _____ is not a primary purpose of MIME in email communication.
- (A) Enabling the use of multimedia content in emails
(B) Facilitating the exchange of non-text data in emails.
(C) Ensuring the confidentiality of email messages
(D) Standardizing the encoding of email messages
52. The streaming protocol designed for real-time communication and commonly used for video conferencing and VoIP applications :
- (A) SIP (B) HTTP
(C) RTSP (D) HLS

53. _____ is the port number associated with SSH.
- (A) 20 (B) 22
(C) 21 (D) 23
54. The purpose of bind operation in LDAP is to :
- (A) To add a new entry to the directory
(B) To initiate a TLS/SSL connection
(C) To modify directory schema
(D) To authenticate a client to the directory server
55. For an organization that has been allocated the IP address range 12.0.0.0/8 and intends to establish 100 subnets, what subnet mask is required for this division?
- (A) 255.0.0.0 (B) 255.100.0.0
(C) 255.254.0.0 (D) 255.240.0.0
56. Which wireless communication protocol is commonly employed for short-distance communication in IoT devices?
- (A) 4G LTE (B) LoRaWAN
(C) LDAP (D) ZigBee
57. The primary purpose of supernetting in IP addressing is to :
- (A) Increase the number of available IP addresses
(B) Simplify routing by aggregating multiple smaller subnets into a larger one
(C) Improve network security by hiding subnets
(D) Enable multicast communication
58. The primary function of a network repeater is to :
- (A) Amplify and regenerate network signals
(B) Connect two different types of networks
(C) Provide security for a network
(D) Filter and control network traffic
59. What does the term “CIDR” stand for
- (A) Classful Internet Domain Routing
(B) Classless Inter-Domain Routing
(C) Complex Internet Domain Routing
(D) Current Internet Domain Resolution

60. The WAN technology that is known for its use of a permanent, dedicated connection, typically offering consistent bandwidth and low latency
- (A) DHCP
 - (B) VPN
 - (C) Leased Line
 - (D) MPLS
61. Which HTML tag is used to create a hyperlink?
- (A) <url>
 - (B) <link>
 - (C) <href>
 - (D) <a>
62. What is the purpose of the <iframe> element in HTML?
- (A) To display a video
 - (B) To create a clickable button
 - (C) To embed content from another website
 - (D) To define a table
63. What is the purpose of the 'box-model' in CSS?
- (A) To define the overall layout of the webpage
 - (B) To create 3D shapes in CSS
 - (C) To describe the structure of a document
 - (D) To describe how elements are displayed and spaced within a document
64. Which CSS property is used to make text appear in uppercase letters?
- (A) 'transform: uppercase;'
 - (B) 'text-transform: uppercase;'
 - (C) 'text-case: uppercase;'
 - (D) 'uppercase: true;'
65. Which built-in method is used to display a dialog box with a specified message and an "OK" button in JavaScript?
- (A) alert()
 - (B) prompt()
 - (C) confirm()
 - (D) display()
66. How can one include an external JavaScript file in an HTML document?
- (A) Using the '<style>' tag
 - (B) Using the '<script>' tag with the 'src' attribute
 - (C) Using the '<link>' tag
 - (D) Using the '<external>' tag

67. What is the primary use of JSON?
- (A) To define HTML structure
 - (B) To create dynamic web pages
 - (C) To exchange data between a server and a client
 - (D) To add interactivity to a webpage
68. Which of the following is a well-formed XML document?
- (A) `<book>Title = "XML Basics" >Learning XML</book>`
 - (B) `<book><Title>XML Basics </Title>Learning XML</book>`
 - (C) `<book><Title>XMLBasics</Title><Author>John Doe</Author></book>`
 - (D) `<book><Title = "XML Basics" >Learning XML</Title></book>`
69. Which HTTP method is idempotent, meaning that multiple identical requests have the same effect as a single request?
- (A) GET
 - (B) POST
 - (C) PUT
 - (D) DELETE
70. What status code does a web server typically respond with when a requested resource is not found?
- (A) 200 OK
 - (B) 302 Found
 - (C) 404 Not Found
 - (D) 500 Internal Server Error
71. Which network security principle focuses on ensuring that each user is granted only the permissions and access needed to perform their job functions?
- (A) Least privilege
 - (B) Defense in depth
 - (C) Redundancy
 - (D) Encryption
72. In risk analysis, which of the following factors is considered in the assessment phase?
- (A) Vulnerabilities and threats
 - (B) Security policies and procedures
 - (C) Network topology and architecture
 - (D) Incident response plan

73. Which type of firewall operates at the application layer of the OSI model, making filtering decisions based on the content of the traffic?
- (A) Packet filtering firewall
 - (B) Stateful firewall
 - (C) Application layer firewall
 - (D) Proxy firewall
74. Why is Unified Threat Management (UTM) considered a comprehensive security solution for modern networks?
- (A) Because UTM devices integrate various security features like firewall, antivirus, intrusion detection, VPN, and more into a single device, simplifying management and improving security posture
 - (B) Because UTM devices have faster processing capabilities than other firewall types, allowing them to handle higher traffic loads
 - (C) Because UTM devices offer specialized protection for specific applications, making them highly targeted and effective against advanced threats
 - (D) Because UTM devices are standalone security appliances that do not require regular updates or maintenance
75. What is a limitation of signature-based Intrusion Detection Systems (IDS)?
- (A) They can detect zero-day attacks effectively
 - (B) They may generate a high number of false positives
 - (C) They are less resource-intensive compared to anomaly-based IDS
 - (D) They are not suitable for detecting known attack patterns
76. In a site-to-site VPN, what is the purpose of the tunneling protocol?
- (A) To encrypt the data for secure transmission
 - (B) To establish a secure connection between the VPN clients
 - (C) To manage key exchange between VPN devices
 - (D) To authenticate users accessing the VPN
77. When conducting a forensic investigation, which step is typically performed first?
- (A) Collection of evidence
 - (B) Preservation of evidence
 - (C) Analysis of evidence
 - (D) Identification of potential digital evidence sources

78. Why is regular patch management crucial in server hardening?
- (A) To increase system complexity
 - (B) To fix vulnerabilities and bugs
 - (C) To lower security awareness
 - (D) To decrease system stability
79. How does an application layer firewall differ from a packet filtering firewall in terms of functionality and security?
- (A) Application layer firewalls operate at a higher layer of the OSI model and analyze traffic content, while packet filtering firewalls operate at lower layers and filter based on headers
 - (B) Application layer firewalls primarily filter based on packet headers, while packet filtering firewalls inspect packet contents for security decisions
 - (C) Application layer firewalls provide faster performance compared to packet filtering firewalls due to their specialized hardware
 - (D) Application layer firewalls are less secure than packet filtering firewalls due to their limited access control capabilities
80. Which of the following is a key feature of an effective endpoint security solution?
- (A) Centralized management and monitoring
 - (B) Biometric authentication only
 - (C) External device blocking without exceptions
 - (D) Limited scalability for small organizations
81. Which of the following is not an essential characteristic defined by the NIST model of cloud computing?
- (A) Measured Usage
 - (B) Resiliency
 - (C) Ubiquitous Access
 - (D) Elasticity
82. A multi-tenant environment is not supported by :
- (A) On-premises private cloud
 - (B) Off-premises private cloud
 - (C) Public cloud
 - (D) Both (A) and (B)
83. How does Application Service Provider (ASP) differ from Software-as-a-Service (SaaS)?
- (A) ASP supports multi-tenancy
 - (B) Customization is easier in ASP
 - (C) Applications are not scalable in ASP
 - (D) Both (A) and (B)

84. The _____ model provides all hardware components in virtual mode, such as a virtual processor, virtual storage, virtual switches, etc.
- (A) IaaS (B) PaaS
(C) SaaS (D) Desktop-as-a-Service
85. The hypervisor used in the bare metal approach for machine virtualization is called
- (A) Type 1 hypervisor (B) Type 2 hypervisor
(C) Hosted hypervisor (D) Both (B) and (C)
86. Which one of the following virtualization techniques provides a high level of security?
- (A) Hardware-Assisted Virtualization
(B) Full Virtualization
(C) Para-Virtualization
(D) OS-Assisted Virtualization
87. The guest operating system plays an important role in which of the following virtualization techniques?
- (A) Hardware-Assisted Virtualization (B) Full Virtualization
(C) Para-Virtualization (D) Native Virtualization
88. Which of the following is not a Database-as-a-Service (DBaaS) offered by Amazon Web Services (AWS)?
- (A) SimpleDB (B) Amazon RDS
(C) DocumentDB (D) DynamoDB
89. Identify the correct pair of big data analytics tools.
- (i) HDInsight (1) Amazon Web Services
(ii) BigQuery (2) Microsoft Azure
(iii) Elastic Map Reduce (3) Google Cloud
- (A) (i)-(1), (ii)-(2), (iii)-(3)
(B) (i)-(3), (ii)-(1), (iii)-(2)
(C) (i)-(3), (ii)-(2), (iii)-(1)
(D) (i)-(2), (ii)-(3), (iii)-(1)

90. Identify the correct service offerings on Google Cloud.

- | | |
|------------|---------------------------|
| (i) IaaS | (1) Google App Engine |
| (ii) PaaS | (2) Google Drive |
| (iii) SaaS | (3) Google Compute Engine |
- (A) (i)-(1), (ii)-(3), (iii)-(2)
(B) (i)-(3), (ii)-(1), (iii)-(2)
(C) (i)-(3), (ii)-(2), (iii)-(1)
(D) (i)-(2), (ii)-(3), (iii)-(1)

91. AEPS is the abbreviation of

- (A) Advanced Enterprise Payment Solution
(B) Aadhaar Encrypted Paid Service
(C) Advanced Encrypted Payment Service
(D) Aadhaar Enabled Payment Service

92. Which among the following is not a mobile wallet?

- | | |
|-------------|-----------------|
| (A) BHIM | (B) Google Pay |
| (C) PhonePe | (D) Credit Card |

93. What is e-RUPI?

- (A) Contactless, cashless voucher-based mode of payment without card, digital payments app, or internet banking access
(B) Contactless, cashless digital payment app works with internet banking access
(C) Credit Card
(D) Internet banking

94. Which among the following is not true about Hard Fork in Ethereum?

- (A) A hard fork is creating new rules to improve the existing protocol
(B) All Ethereum clients need not upgrade during hard work
(C) A hard fork which makes previously invalid blocks/transactions valid, or vice-versa
(D) A hard fork is not backwards compatible

95. What is Bitcoin Mining?
- (A) Validating the bitcoin transactions over the Bitcoin network
 - (B) Collecting bitcoin transactions over the Bitcoin network
 - (C) Adding bitcoin to your account over the Bitcoin network
 - (D) Accessing bitcoin transactions over the Bitcoin network
96. The primary objective of e-governance is
- (A) To advertise the government policies
 - (B) To bring public services closer home to citizens
 - (C) To give extra governance knowledge to citizens
 - (D) To support business to grow in the country
97. What is MSDG?
- (A) Mobile Service Data Gateway
 - (B) Mobile Service Development Gateway
 - (C) Mobile Service Delivery Gateway
 - (D) Mobile Satellite Development Gateway
98. Which among the following is not true about Apache Hadoop?
- (A) Open source software
 - (B) Supports distributed computing
 - (C) Supports centralized computing
 - (D) Reliable and Scalable
99. Which of the following is the duty of Spark RDD?
- (A) Takes RDD as input and produces one or more RDD as output
 - (B) The ways to send result from executors to the driver
 - (C) Creates one or many new RDDs
 - (D) All of the above
100. Which one is the purpose of the map function in MapReduce?
- (A) To describe the input data
 - (B) To split the input data
 - (C) To summarize the input data
 - (D) To convert input data key-value pairs
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SPACE FOR ROUGH WORK

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