BWO

PROVISIONAL ANSWER KEY

Name of the post	**ICT Officer, Class-2, (VARIOUS MUNICIPALITIES)**
Advertisement No.	**36/2026-27**
Preliminary Test Held On	**31-10-2026**
Que. No	**001-200**
Publish Date	**04-11-2026**
Last Date to Send Suggestion (s)	**12-11-2026 (Till 04:00 PM)**

THE LINK FOR ONLINE OBJECTION SYSTEM WILL START FROM 05-11-2026; 11:00 AM ONWARDS

Instructions / સૂચના

Candidate must ensure compliance to the instructions mentioned below, else objections shall not be considered: -

(1) Candidates have to pay fees of Rs.100/- for each objection. The fees can be paid from the link given herewith.

(2) The Candidate will be able to submit objection only after payment of the fees. The generation of the receipt will only be considered as final submission.

(3) The Candidate must retain the receipt of the payment of the fees. The fees, once paid, will not be refunded under any circumstances.

(4) All the objections should be submitted through **ONLINE OBJECTION SUBMISSION SYSTEM** only. Physical or submission through any other means will not be considered.

(5) All objections are to be submitted with reference to the Master Question Paper published with provisional answer key, published herewith on the website / online objection submission system. Objections should be sent referring to the Question No. & options of the Master Question Paper. Objections regarding question nos. and options other than provisional answer key (Master Question Paper) shall not be considered.

(6) Objections and answers suggested by the candidate should be in compliance with the responses given by him in his answer sheet. Objections shall not be considered, in case, if responses given in the answer sheet /response sheet and submitted objections are differed.

(7) Supportive document to the objection must be uploaded, without which objection will not be considered.

(8) Objections must be supported by authentic references or documentary evidence. Objections based solely on Al, GPT, or similar tools without supporting evidence shall not be considered. For calculation-based, mathematical, statistical, or reasoning questions, candidates shall provide the relevant calculation, methodology, or logical basis in support of the objection.

ઉમેદવારે નીચેની સૂચનાઓનું પાલન કરવાની તકેદારી રાખવી, અન્યથા વાંધા-સૂચન અંગે કરેલ રજૂઆતો ધ્યાને લેવાશે નહીં

(1) ઉમેદવારે દરેક વાંધા દીઠ રૂપિયા ૧૦૦/-ફી ભરવાની રહેશે. જે ફી આ સાથે આપેલ લીંક ઉપરથી ભરી શકાશે.

(2) ફી ભર્યા બાદ જ વાંધો સબમીટ થઈ શકશે. ફી ભર્યાની આખરી પહોંચ જ આખરી સબમીશન ગણાશે.

(3) ફી ભર્યાની પહોંચ ઉમેદવારે સાચવી રાખવાની રહેશે. એક વાર ભરેલ ફી કોઈ પણ પરિસ્થિતિમાં પરત આપવામાં આવશે નહિ.

(4) વાંધા ફક્ત **ઓનલાઈન ઓબ્જેકશન સબમીશન સીસ્ટમ** દ્વારા જ સબમીટ કરવાના રહેશે. રૂબરૂ, ટપાલ અથવા ઈ-મેઈલ કે અન્ય કોઈ રીતે આયોગને મોકલવામાં આવેલ વાંધા ધ્યાને લેવામાં આવશે નહીં, જેની ખાસ નોંધ લેવી.

(5) ઉમેદવારે પોતાને પરીક્ષામાં મળેલ પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્નક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતાં, તમામ વાંધા-સૂચનો વેબસાઈટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કી(માસ્ટર પ્રશ્નપત્ર) ના પ્રશ્નક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા. માસ્ટર પ્રશ્નપત્રમાં નિર્દિષ્ટ પ્રશ્ન અને વિકલ્પ સિવાયના વાંધા ધ્યાને લેવામાં આવશે નહીં.

(6) ઉમેદવારે પ્રશ્નના વિકલ્પ પર વાંધો રજૂ કરેલ છે અને વિકલ્પ રૂપે જે જવાબ સૂચવેલ છે એ જવાબ ઉમેદવારે પોતાની ઉત્તરવહીમાં આપેલ હોવો જોઈએ. ઉમેદવારે સૂચવેલ જવાવ અને ઉત્તરવહીનો જવાબ ભિન્ન હશે તો ઉમેદવારે રજૂ કરેલ વાંધા ધ્યાને લેવાશે નહીં.

(7) વાંધા માટે સંદર્ભ જોડવો આવશ્યક છે, જેના વિના વાંધો ધ્યાને લેવામાં આવશે નહીં.

(8) વાંધો પ્રમાણભૂત અને અધિકૃત સંદર્ભો અથવા દસ્તાવેજી પુરાવાથી સમર્થિત હોવો આવશ્યક છે. માત્ર AI, GPT અથવા સમાન સાધનો દ્વારા જનરેટ કરાયેલ અને આધારભૂત પુરાવા વિનાના વાંધાઓની વિચારણા કરવામાં આવશે નહીં. ગણતરી આધારિત, ગાણિતિક, આંકડાશાસ્ત્રીય અથવા તાર્કિક પ્રશ્નોના કિસ્સામાં ઉમેદવારે સબંધિત ગણતરી, પદ્ધતિ અથવા તાર્કિક આધાર રજૂ કરવાનો રહેશે.

Website link for online objection submission system: https://www.formonline.co.in/GPSC_TRACK/SearchPage.aspx

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1. **In Ethernet addressing, consider the destination MAC address 4A:30:10:21:10:1A. Based on the Least Significant Bit (LSB) of the first byte, determine whether the address is unicast or multicast.**

   (A) This is a multicast address because the least significant bit of the first byte is 1.

   (B) This is a multicast address because the first byte is an even number.

   (C) This is a unicast address because the least significant bit of the first byte is 1.

   (D) This is a unicast address because the least significant bit of the first byte is 0.

2. **In an operating system that enforces privileged execution modes, which of the following operations requires kernel-mode privileges and cannot ordinarily be performed directly by a user-mode process?**

   (A) Initiating a system reboot that restarts the operating system and reinitializes hardware resources.

   (B) Reading the Processor Status Word (PSW), which contains information about the processor's current execution state and condition codes.

   (C) Performing a write-cycle operation to transfer data to a specified storage or memory location.

   (D) Executing a music player application to reproduce audio through the system's multimedia resources.

3. **Which of the following operations can activate a database DML trigger?**

   (A) SELECT only **(B) INSERT, DELETE, UPDATE**

   (C) CREATE and DROP **(D) COMMIT and ROLLBACK**

4. **With reference to the objectives of Gujarat's Science, Technology and Innovation Policy, which of the following combinations most accurately characterises the policy's strategic orientation towards scientific advancement, technological capacity-building and innovation-led economic development?**

   I. Encouraging research-oriented initiatives and the development of an innovation-driven ecosystem.

   II. Strengthening the contribution of scientific knowledge and technological advancements to sustainable socio-economic development.

   III. Restricting private-sector participation in research and innovation to preserve exclusive governmental control.

   IV. Replacing established educational systems with technology-based institutional structures as the principal mechanism for scientific advancement.

   Select the correct answer using the codes given below:

   (A) Statements I and III only **(B) Statements I and II only**

   (C) Statements II and IV only **(D) Statements I, III and IV only**

5. Consider the following statements concerning the OSI Data Link and Physical layers:

With reference to the seven-layer Open Systems Interconnection (OSI) reference model, the data link and physical layers perform distinct yet complementary functions in facilitating communication across a network medium.

Which of the following statements most accurately differentiates their respective responsibilities in the transmission of protocol data units?

Statement I: The Data Link layer organizes transmitted data into frames and facilitates node-to-node delivery over a directly connected link.

Statement II: The Physical layer defines the mechanisms for transmitting and representing raw bits through electrical, optical or radio signals.

(A) Statement I is incorrect, whereas Statement II is correct.

(B) Statement I is correct, whereas Statement II is incorrect.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

6. Which of the following represents the principal operational advantage of implementing multiprogramming within an operating system environment?

(A) Reduction in the overall financial cost associated with computer system acquisition and maintenance.

(B) Improvement in thermal dissipation through the use of heat-sink mechanisms.

(C) Reduction in the amount of cache memory required for executing concurrent programs.

(D) Enhancement of processor utilization by allowing the CPU to execute another process while the current process is waiting for an I/O operation.

7. Which of the following constitutes a significant limitation of the index-sequential file organization technique with respect to data retrieval efficiency and file maintenance as the volume of stored records increases?

(A) It lacks the capability to facilitate direct or random access to individual records.

(B) Its operational performance progressively deteriorates as the overall file size and the volume of stored records increase.

(C) It is inherently incapable of accommodating record deletion operations within the file structure.

(D) It necessitates the implementation of a hashing mechanism for locating and retrieving records.

8. Which law provides the legal framework for cyber activities in India?

(A) RTI Act, 2005

(B) Companies Act, 2013

(C) Information Technology Act, 2000

(D) Data Protection Act, 2023

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9. In layered network architecture, which OSI layer is specifically responsible for ensuring reliable end-to-end communication between application processes running on different hosts?

(A) Transport Layer, which provides process-to-process communication and may ensure reliable data transmission.

(B) Network Layer, which determines logical addressing and routes packets across interconnected networks.

(C) Session Layer, which establishes, manages and terminates communication sessions between applications.

(D) Data Link Layer, which facilitates frame transmission and error detection over a directly connected network link.

10. What is the average turnaround time obtained using the Shortest Remaining Time (SRT) scheduling algorithm, as per following process table?

Process	Arrival Time	Processing Time
A	0.000	3
B	1.001	6
C	4.001	4
D	6.001	2

(A) 100 (B) 312.5 (C) 6.75 (D) 6.25

11. Which of the following indexing structures is capable of maintaining efficient data retrieval and index organization under conditions involving frequent record insertion and deletion operations?

(A) Hash-based index structure

(B) Bitmap-based index structure

(C) B+ Tree index structure

(D) Dense index structure

12. Within the overarching framework of the Digital India programme, which of the following statements most accurately delineates the functional scope of the Governance (G) component with respect to administrative modernisation, digital public infrastructure and citizen-centric service delivery?

I. Leveraging Information and Communication Technology (ICT) to facilitate the electronic delivery of government services to citizens.

II. Enhancing administrative accessibility, operational efficiency and service-delivery mechanisms through digitally enabled governance systems.

III. Primarily promoting online commercial transactions and e-commerce platforms as the principal instruments of public administration.

IV. Restricting digital transformation initiatives to private-sector automation and social media-based public outreach.

Select the correct answer using the codes given below:

(A) Statements I and III only
(B) Statements I and II only
(C) Statements II and IV only
(D) Statements I, III and IV only

13. During data transmission across communication channels susceptible to noise, interference and signal distortion, error-control mechanisms are employed to detect corrupted data and facilitate reliable message delivery. With reference to the principles of error detection, error correction and retransmission, which of the following statements correctly describes the applicable techniques?

(A) Redundant bits, introduced through suitable coding schemes enable the receiver to detect transmission errors and depending on the coding capability, correct certain errors without requiring retransmission.

(B) Retransmission-based error-control mechanisms allow the receiver to request the sender to resend corrupted or lost data when an error is detected or an acknowledgment is not received within the prescribed time interval.

(C) Block coding techniques are unsuitable for error-control applications because the addition of redundant bits cannot assist in identifying or correcting errors introduced during transmission.

(D) Both Statement A and Statement B are correct, as redundancy-based coding can support error detection and correction, while retransmission mechanisms can facilitate reliable data delivery.

14. Why are non-preemptive scheduling algorithms generally unsuitable for interactive systems?

(A) Poor response time
(B) No algorithm
(C) User choice
(D) Multiprogramming

15. In a hash-based file organization system, the occurrence of bucket overflow is primarily attributable to which of the following conditions affecting the distribution and allocation of records among the available hash buckets?

(A) Excessively large record sizes that increase the storage requirements of individual data entries.

(B) An inadequate number of allocated hash buckets or a non-uniform distribution of records resulting from skewed data.

(C) The execution of sequential access operations for retrieving records in their stored order.

(D) The presence of multiple keys within the data records used for indexing and retrieval.

16. Which example best represents the Government-to-Citizen (G2C) model?
    (A) Online tendering
    (B) Government procurement
    (C) Inter-departmental exchange
    (D) Online application for a birth certificate by a citizen

17. Which of the following options correctly summarizes the advantages of using cyclic codes for error detection in data communication systems?
    (A) Easy hardware and software implementation
    (B) Detects single and double-bit errors
    (C) Detects burst errors
    (D) All of the above

18. Which of the following CPU scheduling algorithms tends to favour processes with substantial CPU execution requirements by allowing them to retain the processor until they terminate or voluntarily enter a waiting state?
    (A) Shortest Job First (SJF), which prioritizes processes based on their estimated CPU burst duration
    (B) First-Come, First-Served (FCFS), which allocates processor time according to the chronological order of process arrival
    (C) Round Robin, which distributes processor time among processes using fixed time slices in a cyclic order
    (D) Multilevel Queue Scheduling, which classifies processes into separate queues according to predefined scheduling criteria

19. Which of the following file organization techniques facilitates direct access to individual records by applying a hash function to the search key in order to determine the corresponding storage location?
    (A) Sequential file organization, in which records are maintained and accessed according to a predefined sequence.
    (B) Indexed-sequential file organization, which combines sequential record storage with an auxiliary indexing mechanism for data retrieval.
    (C) Hashing-based file organization, in which a hash function maps search-key values to specific storage addresses or buckets.
    (D) Heap file organization, in which records are stored without any predefined ordering based on their key values.

20. In the context of digital public procurement and electronically-mediated commercial transactions, which business interaction model is primarily facilitated by the Government e-Marketplace (GeM) portal through the provision of an integrated platform for

government organisations to procure goods and services from registered sellers and service providers under prescribed procurement procedures?

(A) C2G (Citizen-to-Government) (B) B2G (Business-to-Government)

(C) C2C (Consumer-to-Consumer) (D) B2B (Business-to-Business)

21. From the standpoint of modern cryptographic systems, which statement correctly characterizes the key structure used in asymmetric key cryptography?

(A) The cryptographic mechanism utilizes two distinct public keys to perform encryption and decryption operations.

(B) The cryptographic mechanism employs a mathematically related pair consisting of one public key and one private key.

(C) The cryptographic mechanism relies on two independent private keys for all encryption and decryption operations.

(D) The cryptographic mechanism operates without requiring any cryptographic keys for securing information.

22. The process arrives in a system at the rate of 10 process/minute and the average service time for each job is 3 seconds. What will be the system load?

(A) 1 (B) 1.5 (C) 0.5 (D) 2

23. In the context of relational database query processing and join operation algorithms, the merge join technique is commonly designated by which of the following alternative terminologies?

(A) Nested-loop join algorithm, which evaluates tuple combinations through iterative comparison of records from the participating relations.

(B) Hash join algorithm, which employs a hash-based partitioning or lookup mechanism to identify matching tuples across relations.

(C) Sort-merge join algorithm, which utilizes the sorted ordering of join attributes to efficiently identify and combine corresponding tuples from the participating relations.

(D) Index join algorithm, which exploits an available index structure to locate matching records across the relations involved in the join operation.

24. Collaborative APIs under Digital India are primarily used for

(A) Replacing websites

(B) Secure data sharing between applications and departments

(C) Increasing paperwork

(D) Eliminating cloud services

25. Internet-scale network management relies on a standardized framework. Which combination of protocols and components is used to perform this management effectively?

(A) No standardized protocols or management information structures are required for effective network administration.

(B) Simple Network Management Protocol (SNMP), Structure of Management Information (SMI) and Management Information Base (MIB).

(C) Simple Network Management Protocol (SNMP) alone, without any supporting information models or management databases.

(D) Network management protocols and their associated information structures remain hidden and are not required for operational monitoring.

26. Which of the following programming-language constructs in operating systems provides a synchronization mechanism that regulates concurrent access to shared resources and ensures that critical sections are accessed in a controlled manner?

(A) Pointer, which stores the memory address of a variable or data object.

(B) Queue, which organizes elements according to a defined insertion and removal policy.

(C) Bounded Buffer, which provides a fixed-capacity storage structure for coordinating producer and consumer processes.

(D) Monitor, which encapsulates shared data and synchronization procedures to enforce controlled access to critical sections.

27. Which of the following characteristics does NOT constitute one of the four fundamental ACID properties that govern transaction processing and ensure the reliability and integrity of operations within a database management system?

(A) Atomicity, which ensures that a transaction is executed entirely or not executed at all, thereby preventing partial transaction completion.

(B) Consistency, which guarantees that a transaction preserves predefined integrity constraints and transitions the database from one valid state to another.

(C) Isolation, which ensures that concurrently executing transactions do not interfere with one another in a manner that compromises data correctness.

(D) Replication, which involves maintaining multiple copies of data across different storage locations or database instances to enhance availability and fault tolerance.

28. With reference to the application of Electronic Data Interchange (EDI) in digital business operations and inter-organisational information systems, which of the following statements most accurately characterises its principal functionality and operational significance?

I. Facilitating the computer-to-computer transmission of standardised, structured business documents between independent organisations.

II. Enabling the automated exchange of transaction-related records, such as purchase orders, invoices and dispatch notifications, in predefined electronic formats.

III. Primarily providing an interactive communication environment for social networking and informal interpersonal exchanges.

IV. Functioning exclusively as an electronic payment mechanism for transferring monetary value between participating entities.

Select the correct answer using the codes given below:

(A) Statements I and III only
(B) Statements I and II only
(C) Statements II and IV only
(D) Statements I, III and IV only

29. What is the primary function of a caching proxy server in a client-server architecture?

(A) To store copies of previously requested responses and serve them from the cache when the same content is requested again.
(B) To increase the processing load on the original server for every repeated request.
(C) To guarantee reduced response time for every client request, including requests for content not present in the cache.
(D) To replace the client and the original server with a virtual computer.

30. Which of the following strategies can be employed in operating systems to prevent deadlock by ensuring that at least one of the necessary conditions for deadlock occurrence is eliminated?

(A) Eliminating the mutual-exclusion condition by permitting shared access to resources wherever technically feasible.
(B) Prohibiting the hold-and-wait condition by requiring processes to request all necessary resources before execution or release currently held resources before requesting additional ones.
(C) Eliminating the circular-wait condition by imposing a predefined ordering on resource allocation requests.
(D) All of the above-mentioned strategies.

31. Within the framework of concurrency control in a database management system, what aspect of transaction execution is formally governed by a locking protocol to ensure coordinated access to shared data resources and maintain transactional correctness?

(A) The methodology by which data records are physically organized and persistently stored within the database storage system.
(B) The conditions and sequence of operations under which a transaction is permitted to acquire locks on, or release locks from specific data items during its execution.
(C) The procedures and structural mechanisms employed to construct and maintain index structures for facilitating efficient data retrieval.
(D) The techniques and optimization strategies used by the query processor to determine an efficient execution plan for database queries.

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32. Enterprise Resource Planning (ERP) systems are primarily designed to

(A) Manage social media

(B) Integrate organizational processes

(C) Provide entertainment

(D) Conduct elections

33. Which of the following statements correctly describes the role of HTTP in internet communication?

(A) Uses port number 435

(B) It is not frequently used

(C) Used to access data on the World Wide Web

(D) None of the above

34. If one simple paging system has a 2^{24} bytes of physical memory, 256 pages of logical address space and page size of 2^{10} bytes, then how many entries are in the page table?

(A) 256 entries

(B) 512 entries

(C) Insufficient data

(D) 1M entries

35. In distributed database transaction management, the conventional two-phase commit (2PC) protocol may leave participating processes in a blocked state when the coordinator fails before the final transaction decision is communicated. Which of the following protocols introduces an additional phase to mitigate this blocking problem and improve transaction termination under failure conditions?

(A) Two-phase locking protocol, which regulates concurrent access to data items through the controlled acquisition and release of locks.

(B) Timestamp-based concurrency control protocol, which determines the permissible execution order of transactions using their assigned timestamps.

(C) Three-phase commit protocol, which incorporates an additional pre-commit phase to reduce the likelihood of indefinite blocking during coordinator failures.

(D) Validation-based concurrency control protocol, which determines whether a transaction can be committed by verifying its read and write sets before final execution.

36. Constituent Relationship Management (CRM) systems in e-Governance focus on

(A) Political campaigns

(B) Citizen service delivery and grievance redressal

(C) Scheme advertisements

(D) Attendance tracking

37. To support repeated authentication and session management in web applications, what does the server typically send to the client?

(A) Cookies, which store client-side data or session identifiers that can be returned to the server in subsequent requests.

(B) Bitcoin, which is a decentralized digital currency primarily used for peer-to-peer financial transactions.

(C) Walsh functions, which are mathematical functions used in signal processing and digital communication systems.

(D) None of the aforementioned mechanisms.

38. Which statement regarding address translation in paging and segmentation is NOT correct?

(A) In segmentation, the segment offset is added to the segment base address.

(B) In paging, the page number is used to locate the frame, and the offset is retained.

(C) Paging always provides faster address translation than segmentation.

(D) In segmentation, the segment base address is added to the offset to obtain the physical address.

39. NoSQL database management systems emerged primarily to address the limitations of conventional relational database architectures in environments characterized by evolving data structures, substantial data volumes and rapidly changing scalability requirements. Which of the following data-management scenarios most appropriately represents their principal intended application?

(A) Managing relatively small datasets with predefined schemas and stable structural characteristics.

(B) Storing and processing highly normalized relational data organized through formally defined tables and relationships.

(C) Managing rapidly expanding datasets with flexible or evolving data models, heterogeneous structures and requirements for scalable data storage and processing.

(D) Processing exclusively numerical datasets whose records consist only of quantitative values and fixed data types.

40. COBIT-5 framework is associated with

(A) Coding standards

(B) IT governance and management best practices

(C) Cybercrime investigation

(D) Payment systems

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41. Which of the following security services are collectively ensured through the application of cryptographic techniques in secure communication systems?

(A) Confidentiality, integrity and data-origin authentication to protect information against unauthorized disclosure and modification.

(B) Non-repudiation mechanisms that provide evidence to prevent a communicating party from credibly denying a performed action.

(C) Entity authentication techniques that verify the identity of a communicating user, device or system.

(D) All of the above mentioned security services.

42. Consider a computer system with 128 MB of physical memory and a 32-bit virtual address space. If the page size is 2 KB and each page-table entry occupies 2 bytes, then what is the size of the page table?

(A) 1 MB (B) 2 MB (C) 3 MB (D) 4 MB

43. NoSQL database management systems are designed to accommodate diverse data representations and evolving application requirements, often without enforcing the rigid tabular structures associated with traditional relational database models. Which of the following characteristics most accurately reflects this architectural flexibility?

(A) The mandatory enforcement of a predefined, fixed schema that requires every record to conform to an identical structural definition.

(B) The capability to accommodate records containing variable fields and differing structural attributes within the same data collection, depending on the underlying NoSQL data model.

(C) The compulsory enforcement of relational integrity constraints and predefined relationships among tables in accordance with conventional relational database principles.

(D) The exclusive organization and storage of all data within a strictly tabular structure consisting of rows and columns.

44. In the context of technology-enabled territorial development and decentralised public-service delivery, which of the following combinations most accurately reflects the principal objectives of Smart Cities and Smart Villages initiatives?

I. Integrating Information and Communication Technology (ICT) into urban and rural infrastructure to improve the efficiency, accessibility and responsiveness of essential public services.

II. Promoting environmentally sustainable development through improved resource utilisation, infrastructure planning and technology-assisted service management.

III. Prioritising real estate price appreciation as the principal performance indicator for assessing the success of smart-development initiatives.

IV. Replacing existing resident populations and eliminating institutional governance structures to facilitate technology-driven spatial transformation.

Select the correct answer using the codes given below:

(A) Statements I and III only
(B) Statements I and II only
(C) Statements II and IV only
(D) Statements I, III and IV only

45. Which cryptographic method is the simplest form of a self-invertible cipher where encryption and decryption use the same operation?

(A) XOR Cipher, which uses the exclusive-OR operation to transform data and reverse the transformation using the same key.
(B) RSA, an asymmetric cryptographic algorithm that employs mathematically related public and private keys.
(C) Diffie–Hellman, a key-agreement protocol used to establish a shared secret over an insecure communication channel.
(D) None of the aforementioned cryptographic techniques.

46. In a computer system running a fixed workload, how does upgrading to a processor with a higher execution speed generally affect CPU utilization, assuming that the workload and other system components remain unchanged?

(A) It increases overall system utilization by enabling the processor to complete a greater number of computational tasks within a given time interval.
(B) It reduces overall system utilization because the processor completes its assigned tasks more rapidly and may remain idle while awaiting other operations.
(C) It produces no measurable effect on system utilization, regardless of changes in processor execution speed.
(D) It directly reduces the amount of virtual memory required by the operating system, irrespective of application workload.

47. Traditional relational databases became increasingly challenging to scale in web-scale applications primarily because of which factor?

(A) Limited query languages
(B) Rapid increase in data volume
(C) Poor security
(D) Lack of indexing

48. Which is NOT a Digital India payment mode?

(A) Unified Payment Interface
(B) Aadhaar Enabled Payment System
(C) Cheque
(D) Mobile wallets

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49. Which of the following does NOT represent a required property or criterion of a cryptographic hash function?

(A) Weak collision resistance, which concerns the difficulty of finding an alternative input that produces the same hash value as a specified input.

(B) Strong collision resistance, which requires finding of any two distinct inputs producing an identical hash value to be computationally infeasible.

(C) One-wayness, which makes it computationally infeasible to reconstruct an input from its corresponding hash value.

(D) Repudiation, which refers to the ability of a party to deny an action or transaction and is not a fundamental security property of a cryptographic hash function.

50. Which fundamental data structure is employed by the Clock page replacement algorithm to organize memory frames and facilitate the systematic selection of pages for replacement?

(A) A non-realizable structure that cannot be implemented in a practical operating system

(B) First-In, First-Out (FIFO) ordering, in which pages are selected strictly according to their arrival sequence

(C) An asynchronous structure that permits operations to proceed independently without a fixed sequence

(D) A circular linked list, which allows the algorithm to traverse memory frames repeatedly while examining reference bits to identify a suitable page for replacement

51. Which characteristic is most commonly associated with NoSQL databases in terms of data modelling and structure?

(A) Fixed number of columns
(B) Schema rigidity
(C) Schema flexibility
(D) Mandatory joins

52. Within the framework of Gujarat's digital governance infrastructure, which of the following functionalities most accurately characterises the role of the Digital Gujarat Portal in facilitating Government-to-Citizen (G2C) interactions through the electronic delivery of public services, online applications and citizen-oriented administrative processes?

(A) Facilitating structured information exchange and coordination among government departments through interdepartmental communication and administrative data-sharing mechanisms.

(B) Enabling citizens to access government services through a digital platform, including online application submission, access to eligible schemes and the electronic processing of citizen-oriented administrative requests.

(C) Primarily supporting government procurement activities and institutional purchasing processes involving commercial suppliers and business entities.

(D) Establishing an electronic marketplace primarily intended to facilitate commercial transactions between buyers and sellers in the private sector.

53. Which of the following fundamental technological mechanisms is required to create and validate digital signatures, thereby establishing the authenticity of the signer and the integrity of electronically transmitted information?

(A) Conventional pen-and-paper procedures for manually signing and documenting physical records.

(B) Public-key cryptographic infrastructure employing mathematically related private and public keys for signature generation and verification.

(C) Optical scanning technology for converting physical documents into machine-readable digital formats.

(D) Transmission Control Protocol (TCP), which provides reliable and ordered data delivery between networked devices.

54. Which of the following is NOT a recognized fetch policy in virtual memory management?

(A) Demand fetch
(B) Anticipatory fetch
(C) Page replacement
(D) All of the above

55. NoSQL database systems are particularly well suited for applications that demand which of the following requirements?

(A) Strict normalization
(B) Complex joins
(C) High scalability and flexibility
(D) Single-user access

56. With reference to technology-enabled rural transformation and decentralised administrative modernisation in Gujarat, what constitutes the primary developmental objective of the Smart Village initiative in terms of strengthening local governance, improving public-service delivery and enhancing the accessibility of digitally enabled facilities for rural communities?

(A) Prioritising the expansion of urban infrastructure and metropolitan facilities, with limited emphasis on the technological and administrative requirements of rural settlements.

(B) Integrating Information and Communication Technology (ICT) into rural administrative processes to improve governance efficiency, facilitate public-service delivery and enhance access to essential services for village communities.

(C) Discontinuing established village-level administrative institutions and transferring all local governance responsibilities to centralised urban authorities.

(D) Restricting rural development interventions primarily to the distribution of financial subsidies, without systematically incorporating digital infrastructure or technology-enabled administrative services.

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57. Within the seven-layer Open Systems Interconnection (OSI) reference model, at which protocol layer does Internet Protocol Security (IPsec) primarily operates to provide authentication, data integrity and confidentiality for IP-based communications?

(A) Session and Data Link Layers, which support communication-session management and local frame delivery.

(B) Data Link Layer, which governs node-to-node frame transmission over a directly connected network medium.

(C) Network Layer, which provides security mechanisms for IP packets during transmission across interconnected networks.

(D) Session and Presentation Layers, which manage application communication sessions and data representation formats.

58. Which of the following statements correctly describes demand paging?

(A) A page is loaded into memory only when it is needed.

(B) All pages of a process are loaded into memory before execution begins.

(C) Pages are loaded only when the process terminates.

(D) Pages are never loaded from secondary storage.

59. Which of the following is a commonly associated characteristic of NoSQL systems compared with traditional relational SQL systems?

(A) SQL supports indexing, whereas NoSQL does not.

(B) NoSQL databases commonly support flexible schemas.

(C) SQL supports transactions, whereas NoSQL does not.

(D) NoSQL databases cannot store structured data.

60. Which directorate is responsible for framing IT/ITeS policies and supporting e-Governance initiatives in Gujarat?

(A) Home Department

(B) Directorate of ICT and e-Governance (DIT)

(C) Revenue Department

(D) Industries Commissionerate

61. Which operator is used to access the value at a pointer's address?

(A) & (B) * (C) -> (D) .

62. Given the following page-reference string, how many page faults will occur if three page frames are available and the FIFO (First-In, First-Out) page-replacement algorithm is used?

Page-reference string:

0, 1, 4, 2, 0, 2, 6, 5, 1, 2, 2, 1, 3, 6, 2

(A) 11 (B) 20 (C) 0 (D) 13

63. In NoSQL databases, how are records typically structured with respect to their fields?

(A) Identical fields only (B) Different numbers of fields

(C) Only numeric attributes (D) Only string attributes

64. With reference to contemporary computing architectures and resource-provisioning models, which of the following technologies is characterised by the network-based, on-demand provisioning of a shared pool of configurable computing resources, including processing capacity, storage infrastructure, networks and software services, with the ability to rapidly scale resource allocation in response to user requirements?

I. It facilitates access to computing resources without necessarily requiring users to own or maintain the underlying physical infrastructure.

II. It enables the dynamic allocation and release of resources, often through self-service provisioning and usage-based management mechanisms.

III. It exclusively relies on the aggregation of geographically-distributed computers to solve a single computational problem through coordinated processing.

IV. It necessarily requires every computing resource to be permanently installed and managed within the end user's local premises.

Select the correct answer using the codes given below:

(A) Statements I and III only (B) Statements I and II only

(C) Statements II and IV only (D) Statements I, III and IV only

65. What does PGP stand for and what is its primary role in secure electronic communication?

(A) Pretty Good Privacy for email authenticity and confidentiality.

(B) Private General Privacy for email authenticity.

(C) Private General Privacy for email access.

(D) Pretty Good Privacy for notifications.

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66. Which of the following options most accurately describes the primary responsibility of an operating system within a computer system's overall architecture?

(A) To develop, compile and execute programming instructions for creating application software

(B) To coordinate and allocate hardware and software resources, manage system processes, and provide an interface between applications and computer hardware

(C) To facilitate the creation, editing, formatting and storage of digital documents

(D) To enable users to access websites and online services through internet browsing applications

67. The flexibility offered by NoSQL databases is especially beneficial when dealing with which type of data?

(A) Static data

(B) Slowly changing data

(C) Evolving data models

(D) Only read-only data

68. Big Data is commonly characterized by which of the following?

(A) Speed, accuracy, flexibility

(B) Volume, variety, velocity

(C) Storage, security, scalability

(D) Size, speed, structure

69. Which of the following option(s) correctly define(s) the functional scope and behavior of a Packet Filter Firewall?

(A) Functions at network and transport layer

(B) Uses filtering tables

(C) Changes physical address

(D) Only (A) and (B) are correct

70. What does RAID stand for in storage system terminology?

(A) Reliable Array of Intelligent Disks

(B) Redundant Array of Independent Disks

(C) Reliable Array of Inexpensive Disks

(D) Redundant Array of Intelligent Disks

71. The widespread adoption of NoSQL databases became prominent mainly after the growth of which computing paradigm?

(A) Desktop application computing, characterized by software systems predominantly executed on individual personal computers with comparatively localized data-management requirements.

(B) Mobile and web application computing, characterized by large-scale user interactions, dynamically generated data, distributed architectures, and rapidly evolving application requirements.

(C) Mainframe computing, characterized by centralized processing architectures designed to support large-scale transaction processing and enterprise data management.

(D) Embedded systems computing, characterized by specialized computing devices designed to perform dedicated functions within resource-constrained hardware environments.

72. IoT primarily focuses on

(A) Connecting computers

(B) Social networking

(C) Interconnecting physical devices with sensors and connectivity

(D) High-speed transmission only

73. Within a Public Key Infrastructure (PKI), what is the primary function of a Certificate Authority (CA)?

(A) Binds public key to an entity and issues certificate

(B) Submits applications internationally

(C) Converts encrypted data

(D) No role in security

74. In which type of computing system is busy-waiting generally considered unsuitable because repeated condition checking can waste processor time and unnecessarily consume battery power?

(A) Dedicated systems designed to perform specific and continuously assigned operational tasks.

(B) Personal Computers (PCs) used for general-purpose computing and interactive applications.

(C) Workstation servers responsible for handling multiple processes and concurrent service requests.

(D) Laptop computers designed for portable computing with limited battery power and energy resources.

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75. Within the domain of cyber security and information security risk management, a threat represents a potential source of harm that may exploit system weaknesses and compromise the confidentiality, integrity or availability of information assets. Which of the following definitions most accurately characterizes the term "threat" in this context?

(A) An inherent vulnerability or weakness in an information system, security architecture or operational process that may be exploited under particular circumstances.

(B) A potential cause of an unwanted or harmful security incident that may result in damage to information assets, disruption of system operations or compromise of organizational security.

(C) A technical security control, protective mechanism or safeguard implemented to prevent, detect or mitigate unauthorized access and other security risks.

(D) An act or condition involving non-compliance with applicable statutory provisions, regulatory requirements or legally enforceable obligations.

76. Which is the major application area of Artificial Intelligence?

(A) Manual data entry

(B) Word processing

(C) Expert systems and machine learning

(D) File compression

77. In the context of computer networks and graph-based optimization, which of the following best describes the primary function of Dijkstra's Algorithm?

(A) Identifies the route experiencing the highest network congestion.

(B) Determines the shortest path between a source node and other nodes in a graph.

(C) Automatically generates and maintains network routing tables.

(D) Detects and manages network congestion during data transmission.

78. Which of the following categories of malicious software depends on attaching itself to a legitimate host file or executable program in order to replicate and spread to other systems?

(A) Trapdoors, which provide concealed mechanisms for bypassing normal authentication or security controls.

(B) Logic bombs, which execute malicious actions when a predefined condition or event is triggered.

(C) Viruses, which insert their code into host files or programs and propagate when the infected host is executed or distributed.

(D) All of the above-mentioned categories of malware.

79. Within the framework of information security risk assessment, a vulnerability refers to a deficiency in the design, implementation, configuration or operational procedures of an information system that may increase its susceptibility to security compromise. Which of the following statements most accurately represents this concept?

(A) An ongoing or actively executed cyber attack involving deliberate attempts to gain unauthorized access, disrupt system operations, or compromise information assets.

(B) A deficiency in ethical reasoning or professional judgment that results in inappropriate decision-making or non-compliance with established ethical principles.

(C) A weakness or deficiency within an information system, application, network or security control that can potentially be exploited by a threat to compromise system security.

(D) A legally established control mechanism consisting of statutory provisions, regulatory requirements or enforceable rules intended to govern organizational activities and ensure compliance.

80. Virtualization enables

(A) Increased hardware cost

(B) Multiple OS on one physical machine

(C) Reduced bandwidth

(D) Removal of databases

81. Which of the following statements represents a valid software engineering objective rather than a software development myth at the developer level?

(A) Source code should be delivered only at the end of the project, regardless of the development process.

(B) Software success depends exclusively on code quality, irrespective of requirements and user needs.

(C) Software quality can be assessed only after the software has been executed.

(D) Developing reliable software is an important objective of software engineering.

82. In the UNIX operating system, what is the primary purpose of invoking the fork() system call during process management?

(A) To divide a process's address space into distinct logical memory segments for organized allocation and protection.

(B) To terminate an existing child process and release the resources associated with its execution.

(C) To de-allocate memory regions and reclaim storage previously assigned to a process.

(D) To create a new child process by duplicating the calling process, establishing a separate process identity for subsequent execution.

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83. Cyber-attacks are generally successful because they exploit which of the following factors?

(A) Ethical principles governing system use

(B) Levels of user awareness

(C) Existing vulnerabilities in systems or applications

(D) National and international legal frameworks

84. Which expression is logically equivalent to $\neg (p \rightarrow q)$?

(A) $\neg p \wedge q$ (B) $p \wedge \neg q$ (C) $\neg p \vee \neg q$ (D) $p \vee q$

85. Which of the following statements correctly describes the relationship between faults, errors and failures in software engineering?

(A) A software fault is a defect in the software that may cause an incorrect internal state (error), which may result in an observable failure.

(B) A software error can occur only when a deadlock condition exists.

(C) A software failure is the defect in the source code that causes incorrect behaviour.

(D) A software fault, an error and a failure all refer to exactly the same phenomenon.

86. Which structures are used internally to represent processes in UNIX systems?

(A) u-area and proc (B) m-area and proc

(C) u-area and block (D) None of the above

87. The implementation of data security mechanisms is a fundamental component of information security governance. Which of the following represents their primary objective in preserving the confidentiality, integrity and availability (CIA) of organizational information assets?

(A) To promote the responsible and ethically justified sharing of information among authorized individuals and organizational stakeholders.

(B) To ensure adherence to applicable statutory provisions, regulatory frameworks and legally mandated data protection requirements.

(C) To protect data and information systems against unauthorized access, unauthorized modification, disclosure and disruption of availability.

(D) To formally establish ownership rights, accountability and legal control over digital information assets and their associated resources.

88. What is the correct negation of $\forall x \exists y P(x, y)$?

(A) $\exists x \forall y \neg P(x, y)$ (B) $\forall x \exists y \neg P(x, y)$ (C) $\exists x \exists y \neg P(x, y)$ (D) $\forall x \forall y \neg P(x, y)$

89. Which statement describes a valid feature or advantage of software testing techniques?

(A) Static testing finds hidden errors. (B) Static testing avoids review.

(C) Dynamic testing is faster. (D) No document checking.

90. Which of the following terms does NOT correspond to a recognized category of thread implementation or thread abstraction that is commonly associated with UNIX-based operating systems?

(A) Kernel-level threads, which are managed and scheduled directly by the operating system kernel

(B) User-level threads, which are managed by a user-space thread library without requiring direct kernel management for every thread operation

(C) Lightweight processes or threads, which provide an execution abstraction with reduced overhead compared with conventional processes

(D) Superlight threads, which are not a standard, generally recognized category of UNIX thread implementation

91. Within the framework of information governance and data protection, data privacy primarily addresses the principles and practices governing the collection, processing, storage, use and disclosure of personally identifiable information. Which of the following aspects most accurately represents the fundamental concern of data privacy?

(A) The mathematical design and implementation of encryption algorithms intended to transform readable information into a protected representation that prevents unauthorized interpretation.

(B) An individual's right and ability to exercise appropriate control over the collection, use, processing, sharing and disclosure of their personal information.

(C) The implementation of technical safeguards and security protocols to protect communication networks against unauthorized access, interception and malicious activities.

(D) The systematic identification and assessment of software weaknesses that may be exploited to compromise the security, functionality or integrity of information systems.

92. Within formal mathematical reasoning and deductive proof construction, which of the following proof techniques establishes the validity of a proposition by initially presuming the negation of the desired conclusion and subsequently demonstrating that this assumption leads to a logical inconsistency or contradiction with an established premise?

(A) Direct proof, in which the conclusion is derived through a sequence of logically valid deductions beginning with the given premises or established mathematical facts.

(B) Mathematical induction, in which a proposition is established for an initial case and its validity is extended to subsequent cases through an inductive implication.

(C) Proof by contrapositive, in which the logically equivalent contrapositive of an implication is demonstrated by proving that the negation of the consequent implies the negation of the antecedent.

(D) Proof by contradiction, in which the negation of the proposition to be established is temporarily assumed and shown to produce a logical inconsistency, thereby supporting the truth of the original proposition.

93. Which of the following does NOT represent a recognized attribute or characteristic associated with the reliability of a software system?

(A) Maturity of the software under specified operational conditions.

(B) Utilization of cloud computing infrastructure for software deployment.

(C) Recoverability of the system following a failure.

(D) Fault tolerance in the presence of software or system errors.

94. Which component/s is/are the fundamental UNIX file structures?

(A) I-node

(B) File descriptor

(C) Both (A) and (B)

(D) None of the above

95. Data protection policies are primarily designed to achieve which goal?

(A) Improve the speed of data processing.

(B) Prevent the misuse and unauthorized exploitation of personal data.

(C) Completely eliminate cybercrime.

(D) Promote mass surveillance activities.

96. In the formal methodology of mathematical induction, particularly when establishing the validity of a proposition (P(n)) over the positive integers, what is the precise logical function of the inductive hypothesis within the deductive structure of the proof?

I. It assumes the proposition (P(k)) to be true for an arbitrary but fixed integer (k) within the specified domain.

II. It provides the logical premise from which the truth of (P(k+1)) is subsequently established.

III. It independently verifies the initial proposition (P(1)), thereby completing the base-case verification without further reasoning.

IV. It constitutes the final conclusion of the theorem before the inductive implication has been demonstrated.

Select the correct answer using the codes given below:

(A) Statements I and III only

(B) Statements I and II only

(C) Statements II and IV only

(D) Statements I, III and IV only

97. If the Mean Time to Failure (MTTF) of a system is 5 years, and mean time to repair is 1 hour, then determine the value of MTTF in hours.

(A) 5

(B) 43800

(C) 21900

(D) Infinite

98. What is the name of the paging daemon used in UNIX operating systems?

(A) PAGEDAEMON

(B) Virtual memory

(C) Multithreading

(D) Compiler

99. Ethical hacking constitutes a legitimate cyber security assessment practice when security testing activities are conducted within an established legal and professional framework. Which of the following conditions is essential for ensuring that such activities are considered authorized and ethically permissible?

(A) The assessment is conducted anonymously, without disclosing the identity of the individual or team performing the security testing.

(B) The assessment involves an infringement of privacy rights or confidentiality obligations, provided that such actions are claimed to serve the broader public interest.

(C) The assessment is performed with appropriate authorization and informed consent from the relevant system owner or other duly authorized entity.

(D) The assessment is exclusively directed towards government-owned information systems, irrespective of whether explicit permission has been obtained from the responsible authorities.

100. A function (f) from (A) to (B) is said to be one-to-one (injective), if

(A) Every element of (B) has a pre-image in (A).

(B) Distinct elements of (A) map to distinct elements of (B).

(C) Every element of (A) maps to every element of (B).

(D) (f(A) = A).

101. A software project consists of 30% of its function points implemented in HTML and the remaining 70% implemented in SQL. Each function point implemented in HTML requires 43 lines of source code, while each function point implemented in SQL requires 31 lines of source code. If the project contains 30.914 function points, approximately how many lines of source code will be required?

(A) 1069.62 (B) 1000 (C) 989.56 (D) 1050

102. Which of the following computational techniques is primarily employed to discover meaningful patterns, hidden relationships and previously unknown insights from large volumes of structured or unstructured data?

(A) Data duplication, which involves creating multiple copies of existing data for backup, availability or redundancy purposes.

(B) Relational Database Management System (RDBMS), which organizes and manages structured data using tables and relational operations.

(C) Data mining, which applies statistical, mathematical and machine-learning techniques to identify patterns and extract actionable knowledge from large datasets.

(D) Data Structures and Algorithms (DSA), which provide fundamental methods for organizing data and designing computationally efficient procedures.

103. A Denial-of-Service (DoS) attack involves the deliberate exhaustion or disruption of computational resources, network bandwidth or service capacity, thereby preventing legitimate users from accessing information systems or network-based services. In accordance with the fundamental principles of information security, which core security property is primarily compromised by such an attack?

(A) Confidentiality, which ensures that sensitive information is accessible exclusively to authorized individuals, processes or entities.

(B) Integrity, which ensures the accuracy, consistency and completeness of information and protects it against unauthorized modification or destruction.

(C) Availability, which ensures that information, computing resources and associated services remain accessible to authorized users whenever required.

(D) Authentication, which establishes and verifies the identity of users, devices or processes before granting access to protected resources.

104. In discrete mathematics and set-theoretic relational analysis, which of the following combinations of fundamental properties must simultaneously be satisfied by a binary relation defined on a set for it to qualify as an equivalence relation, thereby establishing a mathematically consistent framework for partitioning the set into mutually disjoint equivalence classes?

(A) Reflexivity, whereby every element of the underlying set is related to itself.

(B) Symmetry, whereby the existence of a relation from one element to another necessarily implies the existence of the reverse relation.

(C) Transitivity, whereby a relation between successive pairs of elements entails a relation between the first and the last elements.

(D) All of the above, since reflexivity, symmetry and transitivity must hold concurrently for a relation to satisfy the formal definition of an equivalence relation.

105. Which of the following categories of software-related assets can be systematically reused to enhance development productivity and overall software quality?

(A) Reusable source code components and corresponding test data repositories.

(B) Established software architectural frameworks and design structures.

(C) Documented process knowledge, development methodologies, and procedural practices.

(D) All of the aforementioned software engineering assets.

106. Which of the following information-management architectures is specifically designed to consolidate data from multiple heterogeneous sources into a centralized repository optimized for analytical queries, business intelligence and decision-support reporting?

(A) Data warehouse, which integrates and organizes historical data from diverse sources to support analytical processing and reporting.

(B) Server, which provides computing resources, applications or services to client systems over a network.

(C) Solid-State Drive (SSD), which uses flash memory technology to provide persistent digital data storage.

(D) Secondary memory, which provides non-volatile storage for retaining programs and data beyond the system's immediate processing requirements.

107. Public wi-fi hotspots pose serious ethical and security risks mainly due to which reason?

(A) Limited network bandwidth

(B) High operational costs

(C) Increased risk of unauthorized data interception

(D) Restricted user access

108. If an algorithm has time complexity $T(n) = 3n^2 + 5n + 7$, then what will be its asymptotic order?

(A) O(n) (B) O(n log n) (C) $O(n^2)$ (D) $O(2^n)$

109. Which of the following statements most accurately differentiates software verification from software validation in the context of software engineering practices?

(A) Verification primarily involves dynamic execution-based testing, whereas validation relies exclusively on static analysis.

(B) Verification primarily employs static techniques to assess conformance to specifications, whereas validation evaluates whether the software satisfies user needs.

(C) Verification and validation both exclusively depend on dynamic execution techniques to establish software correctness.

(D) Verification and validation are interchangeable concepts that perform identical functions throughout the software development lifecycle.

110. Which of the following issues and computational considerations are commonly encountered when designing and implementing data-mining processes on large-scale datasets?

(A) Noisy, incomplete or inconsistent data that can adversely affect the accuracy and reliability of discovered patterns.

(B) Scalability constraints associated with processing increasingly large datasets while maintaining acceptable computational performance.

(C) Parallel data-mining requirements involving the distribution of computational tasks across multiple processors or computing nodes.

(D) All of the above-mentioned challenges and considerations.

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111. Why is the use of botnets considered ethically problematic?

(A) Enhances task automation.

(B) Utilizes compromised devices without the owners' consent.

(C) Increases overall computing efficiency.

(D) Supports large-scale cloud services.

112. Given $a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$, which statement is/are correct?

(A) $a + c \equiv b + d \pmod{n}$ (B) $ac \equiv bd \pmod{n}$

(C) Both (A) and (B) are correct (D) Neither (A) nor (B) is correct

113. Which of the following techniques is most commonly employed to systematically examine and evaluate a Software Requirements Specification (SRS) for correctness, completeness, and consistency?

(A) Structured walkthroughs and formal inspection procedures.

(B) Development of preliminary prototypes to demonstrate proposed system functionality.

(C) Execution of software test cases to assess system behaviour and performance.

(D) None of the aforementioned techniques.

114. Which of the following operations does NOT constitute a conventional data-cleaning technique that is used to handle missing values, inconsistencies and inaccuracies in datasets during the data preprocessing stage?

(A) Ignoring or deleting tuples that contain missing or invalid attribute values when appropriate

(B) Replacing missing numerical attribute values with the mean calculated from the available observations

(C) Estimating and substituting probable values for missing entries using suitable statistical or predictive methods

(D) Implementing Object-Oriented Programming (OOP) or adopting a Not Only SQL (NoSQL) database architecture for application development and data storage

115. IT security risk management aims to balance the cost of security controls against which of the following?

(A) Cost efficiency and system performance

(B) Ethical standards and legal compliance

(C) Reduction of security risks and the operational impact of implementing security controls

(D) Hardware capability and software functionality

116. In combinatorics and finite-set cardinality analysis, which of the following best describes the principal purpose of the inclusion–exclusion principle when determining the number of elements belonging to the union of two or more overlapping sets, particularly when their individual cardinalities and intersection sizes are known?

(A) To determine the total number of distinct arrangements obtainable from a collection of objects under specified ordering constraints and permutation rules.

(B) To calculate the cardinality of a union of overlapping sets by systematically correcting duplicated contributions arising from intersections, thereby ensuring that each distinct element is counted accurately.

(C) To derive closed-form solutions for recurrence relations by transforming recursive expressions into explicit mathematical formulations.

(D) To construct graph structures by defining vertices and edges according to specified adjacency, connectivity and relational constraints.

117. In the context of system design and distributed computing, which of the following best characterizes scalability in terms of adapting system resources to variations in workload demand?

(A) The ability to increase or decrease system capacity through horizontal scaling, commonly referred to as scaling out and scaling in.

(B) The exclusive capability to expand system capacity by adding additional computing nodes or instances.

(C) The implementation of database partitioning techniques to distribute data storage and query-processing workloads.

(D) The use of Application Programming Interfaces (APIs) to facilitate communication and data exchange between software components.

118. Which data preprocessing technique reduces random noise by grouping data values into intervals and replacing them with representative values, such as bin means or medians?

(A) Data normalization

(B) Binning-based smoothing

(C) Random deletion of records or attribute values

(D) Data integration

119. Computer Emergency Response Teams (CERTs) serve as specialized cyber security coordination entities responsible for addressing incidents involving information security breaches, system vulnerabilities and emerging cyber threats. Which of the following functions most accurately characterizes their principal operational responsibility within the cyber security ecosystem?

(A) Enforcing statutory cybercrime provisions and exercising legal authority to investigate and prosecute violations of applicable cyber laws.

(B) Coordinating cyber security incident response activities, facilitating the exchange of threat intelligence, and supporting the identification, analysis, containment and mitigation of security threats.

(C) Designing, developing and commercializing software products intended primarily for general-purpose computing and enterprise application requirements.

(D) Delivering general cyber security awareness programmes and educational initiatives to improve the understanding of digital safety practices among diverse user groups.

120. A connected graph has an Euler circuit, if

(A) All vertices have even degree
(B) Two vertices are odd
(C) Graph is complete
(D) Graph is acyclic

121. Within the conventional Waterfall Software Development Life Cycle (SDLC), at which point in the sequential development process is the formal software testing phase initiated?

(A) Immediately following the completion of requirements analysis and specification.

(B) Upon completion of the system and software design phase.

(C) Once the initial implementation and coding activities have commenced.

(D) After the integration of individually developed software modules has been completed.

122. Suppose the minimum and maximum values of the attribute income are ₹12,000 and ₹98,000, respectively. Using min-max normalization, what is the normalized value of an income of ₹73,576 when mapped to the range [0.0, 1.0]?

(A) 0.6 (B) 0.716 (C) 0.3 (D) 1.432

123. National Cyber Security policies mainly emphasize which objective for protecting a country's information infrastructure and cyberspace?

(A) Protecting critical information infrastructure and promoting a secure, resilient cyberspace

(B) Expansion of commercial IT markets

(C) Regulation of social media platforms

(D) Standardization of computer hardware

124. With reference to the implementation of expression-processing algorithms and the evaluation of arithmetic expressions represented in Reverse Polish Notation (RPN),

which of the following data structures is most appropriate for maintaining operands and intermediate computational results while ensuring that operators are applied in accordance with the required order of execution?

I. The structure must support Last-In, First-Out (LIFO) access to operands during sequential expression scanning.

II. For a binary operator, the most recently encountered operands can be retrieved, processed and replaced by the resulting intermediate value.

III. The structure must necessarily preserve First-In, First-Out (FIFO) ordering to ensure that the earliest inserted operand is processed first.

IV. The evaluation process fundamentally requires a hierarchical parent-child representation of operators and operands before any computation can occur.

Select the correct answer using the codes given below:

(A) Statements I and III only
(B) Statements I and II only
(C) Statements II and IV only
(D) Statements I, III and IV only

125. Which of the following is NOT categorized as a software development process model?

(A) Waterfall
(B) Iterative
(C) Configuration management
(D) Component-based analysis

126. What is the main purpose of data cube aggregation?

(A) Data reduction
(B) Duplication
(C) Modulation
(D) Networking

127. Cyber laws establish the legal framework governing activities conducted through digital platforms, computer networks and electronic communication systems, including the rights, duties, liabilities and regulatory obligations of individuals and organizations operating in cyberspace. Which of the following aspects most accurately represents their primary scope and purpose?

(A) The formulation of ethical guidelines and recommended codes of conduct governing digital interactions, without necessarily establishing legally enforceable requirements.

(B) The specification of moral responsibilities and socially acceptable behavioural expectations applicable to individuals using digital technologies and online communication platforms.

(C) The establishment of legally enforceable accountability, rights, duties, liabilities and compliance obligations governing activities, transactions and interactions conducted within cyberspace.

(D) The specification of technical standards, communication protocols and network configuration requirements necessary to ensure interoperability and reliable data transmission across digital systems.

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128. Worst-case complexity of binary search on a sorted array of size n is _____.

(A) O(n) (B) O(log n) (C) O(n log n) (D) O(1)

129. Which of the following is a disadvantage associated with wireless communication systems?

(A) Mobility
(B) Ease of installation
(C) Disaster recovery
(D) Radio interference

130. Which of the following operations does NOT form part of the standard Online Analytical Processing (OLAP) functionality used for multidimensional data analysis and interactive querying?

(A) Slice and dice operations, which enable the selection and examination of specific subsets of multidimensional data.
(B) Cache coherence mechanisms, which maintain consistency among multiple cached copies of shared data in computing systems.
(C) Pivot operations, which reorient the dimensions of a multidimensional data view to support alternative analytical perspectives.
(D) Roll-up operations, which aggregate detailed data into higher-level summaries within a dimensional hierarchy.

131. Under effective IT governance frameworks, cyber security responsibility lies with whom?

(A) Technical staff alone
(B) Government agencies exclusively
(C) Multiple stakeholders, including organizations and individuals
(D) Internet service providers only

132. In the context of Binary Search Tree (BST) data structures, which traversal methodology systematically visits the nodes in an order that produces the stored keys in monotonically non-decreasing sequence, assuming the tree satisfies the conventional BST ordering property?

(A) Preorder traversal, in which each node is processed before recursively visiting its left and right subtrees.
(B) Postorder traversal, in which the left and right subtrees are processed before their respective parent nodes.
(C) Inorder traversal, in which the left subtree is visited first, followed by the root node and subsequently the right subtree.
(D) Level-order traversal, in which nodes are processed breadth-first according to their depth, beginning with the root node.

133. Which of the following switching mechanisms is primarily employed by the General Packet Radio Service (GPRS) to facilitate the transmission of data across mobile communication networks?

(A) Circuit-switched transmission, in which a dedicated communication channel is established for the duration of a connection.

(B) Packet-switched transmission, in which data is divided into discrete packets and transmitted over shared network resources.

(C) Electrically-switched transmission, in which data transfer is controlled through electrical switching mechanisms.

(D) Mechanically-switched transmission, in which physical switching mechanisms establish the communication path.

134. What are the major issues associated with the snowflake schema?

(A) Difficulty in browsing and navigating data

(B) Increased number of joins between tables

(C) Reduced query performance due to complex joins

(D) All of the above

135. Which cloud data center characteristic enables efficient sharing of resources among multiple independent users?

(A) Geographic distribution of data centers

(B) Multitenancy

(C) High availability mechanisms

(D) Load balancing techniques

136. A full binary tree with 'n' internal nodes has how many leaves?

(A) n (B) $n - 1$ (C) $n + 1$ (D) $2n$

137. A mobile subscriber travels at a uniform speed of 60 km/h in a cellular system operating at a carrier frequency of 900 MHz. Using the standard approximation for the average time between fades, what is the expected time between fades?

(A) 10 ms (B) 20 ms (C) 40 ms (D) 80 ms

138. Which of the following statements accurately characterizes the fundamental properties and practical applications of a Markov chain as a stochastic modelling technique?

(A) It models transitions between states based on the immediately preceding state, subject to the Markov property that the future state is conditionally independent of the more distant past given the current state.

(B) It constitutes a probabilistic mathematical model that represents state transitions using specified transition probabilities.

(C) It is applied in biological research to model processes such as genetic variation, population dynamics and molecular sequence analysis.

(D) All of the above-mentioned statements.

139. Object storage in cloud environments differs from block storage primarily because it

(A) Stores data strictly in fixed-size blocks

(B) Requires a traditional file system for access

(C) Stores data along with metadata and a unique identifier

(D) Is restricted to use with virtual machines only

140. With reference to the analysis of comparison-based sorting algorithms and the preservation of relative ordering among elements possessing equivalent key values, which of the following algorithms guarantees stability under its conventional implementation, such that the original relative sequence of equal-key elements remains unchanged after the sorting operation?

I. The algorithm recursively partitions the input sequence into smaller subproblems and subsequently combines the sorted partitions while preserving the relative ordering of equal-key elements.

II. The algorithm can achieve a worst-case time complexity of (O(n\log n)) while maintaining the relative order of elements with identical keys.

III. The algorithm necessarily performs in-place partitioning around a pivot and therefore guarantees stability for all input distributions.

IV. The algorithm repeatedly selects an extremal element from the unsorted portion and places it in its final position, inherently preserving the relative order of all equal-key elements.

Select the correct answer using the codes given below:

(A) Statements I and III only

(B) Statements I and II only

(C) Statements II and IV only

(D) Statements I, III and IV only

141. Consider a single high power transmitter that can support 40 voice channels over an area of 140 km^2 with available spectrum. If this area is equally divided into seven (7) cells, each supported by lower power transmitter so that each cell supports 30% of channels, determine total number of voice channels available in cellular system.

(A) 80 (B) 84 (C) 40 (D) 168

142. Which characteristic of genetic algorithms allows multiple candidate solutions in a population to be evaluated simultaneously, potentially reducing computation time?

(A) Parallelizability, which enables simultaneous evaluation of multiple candidate solutions within a population.

(B) Serial execution, which requires candidate solutions to be processed strictly sequentially.

(C) Computational honesty, which guarantees that the algorithm always finds the globally optimal solution.

(D) Scalability, which allows the algorithm to accommodate variations in problem size and computational requirements.

143. High data availability in cloud-based systems is commonly achieved through which mechanism?

(A) Strong encryption mechanisms

(B) Vertical scaling of resources

(C) Replication of data across multiple availability zones

(D) Advanced data compression techniques

144. Which of the following is the Average-case complexity for Quick Sort?

(A) $O(n^2)$ (B) O(n log n) (C) O(log n) (D) O(n)

145. In GSM network planning, which geometric shape most closely approximates a circular cell?

(A) Polygon (B) Rectangle (C) Hexagon (D) Semi-circle

146. Which algorithm is used to generate frequent item sets in data mining?

(A) Apriori (B) Dijkstra (C) Hanoi (D) Ostrich

147. Which cloud-based service category primarily manages data throughout its lifecycle, including storage, backup, retention, recovery and eventual deletion or disposition?

(A) Data abstraction, which provides a simplified logical representation of data and hides underlying storage complexity.

(B) Data orchestration, which coordinates data movement, transformation and processing workflows across systems.

(C) Data management services, which manage data storage, backup, retention, restoration, recovery and lifecycle disposition.

(D) Network virtualization, which creates and manages logically isolated network resources.

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148. Which of the following structure supports recursion?
(A) Queue (B) Stack (C) Heap (D) Graph

149. In 800 MHz band cellular system, Duplex separation is specified as _____ MHz.
(A) 2.4 (B) 200 (C) 90 (D) 45

150. Which of the following is NOT an example of data mining?
(A) Spatial mining (B) Coal mining
(C) Multimedia mining (D) Web mining

151. Consider the following statements regarding the cloud infrastructure stack:
Statement I: Physical hardware provides the fundamental computational, storage and networking resources required to operate a cloud environment.
Statement II: Virtual machines, middleware platforms and application services depend directly or indirectly on the underlying physical infrastructure.
Which of the following is correct?
(A) Statement I is incorrect, whereas Statement II is correct.
(B) Statement I is correct, whereas Statement II is incorrect.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

152. Maximum edges in a simple undirected graph with 'n' vertices is
(A) n^2 (B) $n(n-1)$ (C) $n(n-1)/2$ (D) $2n$

153. Which of the following can directly cause a call drop when a mobile station moves from one cell to another in a cellular network?
(A) Co-channel interference (B) External noise
(C) Hand-off failure (D) Channel assignment

154. Outer join operations were introduced primarily to handle which database issue?
(A) Duplicate tuples (B) Missing information
(C) Redundant attributes (D) Functional dependencies

155. Consider the following statements regarding the functionality of a hypervisor:
Statement I: A hypervisor abstracts physical computing resources and allocates them to virtual machine instances.
Statement II: A hypervisor enables multiple operating systems to run concurrently on the same physical hardware, subject to resource availability and virtualization support.
Which of the following is correct?
(A) Statement I is incorrect, whereas Statement II is correct.

(B) Statement I is correct, whereas Statement II is incorrect.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

156. In the context of weighted graph theory and the design of greedy optimisation algorithms, which of the following algorithms is specifically designed to determine the minimum-cost paths from a designated source vertex to all other reachable vertices in a weighted graph, subject to the constraint that every edge weight is non-negative?

I. The algorithm iteratively selects the unprocessed vertex with the smallest tentative distance from the source and relaxes the outgoing edges to update neighbouring distance estimates.

II. Under the standard implementation using an appropriate priority queue, the algorithm can achieve a time complexity of (O((V+E)\log V)) for a graph containing (V) vertices and (E) edges.

III. The algorithm constructs a minimum spanning tree by repeatedly selecting the least-weight edge connecting two previously disconnected components.

IV. The algorithm computes shortest paths between every pair of vertices through successive intermediate vertices, rather than restricting its objective to a designated source vertex.

Select the correct answer using the codes given below:

(A) Statements I and III only

(B) Statements I and II only

(C) Statements II and IV only

(D) Statements I, III and IV only

157. In digital wireless communication systems, when a reduction in perceived voice quality is considered acceptable, what is the most likely impact on the overall radio channel capacity?

(A) It remains constant, irrespective of the voice quality requirements.

(B) It decreases due to the reduced quality of the transmitted voice signal.

(C) It increases, allowing more simultaneous voice calls to be accommodated within the available radio spectrum.

(D) It becomes zero, resulting in the complete cessation of radio communication.

158. A relation that is not physically stored but presented as a virtual table is known as

(A) Table (B) Index (C) View (D) Schema

M

159. Consider the following statements concerning cloud pipelines:

Statement I: Cloud pipelines can automate application build, testing, deployment and release processes.

Statement II: Cloud pipelines can coordinate data ingestion, transformation and processing tasks across scalable cloud resources.

Which of the following is correct?

(A) Statement I is incorrect, whereas Statement II is correct.

(B) Statement I is correct, whereas Statement II is incorrect.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

160. Collision resolution using chaining involves

(A) Rehashing

(B) Open addressing

(C) Linked lists at each index

(D) Binary search

161. In the Global System for Mobile Communications (GSM), what is the primary purpose of the Temporary Mobile Subscriber Identity (TMSI) within the network's subscriber identification and privacy mechanisms?

(A) To provide a temporary subscriber identity in place of the International Mobile Subscriber Identity (IMSI) during routine network communications.

(B) To conceal an individual's Aadhaar identification number through a standardized identity-masking mechanism.

(C) To assign a temporary telephone number for establishing voice calls independently of the subscriber's permanent identity.

(D) None of the aforementioned functions.

162. Which SQL command is used to create a virtual table based on the result of a query, allowing users to access selected data from one or more underlying tables?

(A) CREATE TABLE

(B) CREATE INDEX

(C) CREATE VIEW

(D) ALTER VIEW

163. Consider the following statements about cloud deployment models:

Statement I: A private cloud provides infrastructure dedicated to a single organization.

Statement II: A public cloud typically provides shared infrastructure to multiple customers.

Which of the following is correct?

(A) Statement I is incorrect, whereas Statement II is correct.

(B) Statement I is correct, whereas Statement II is incorrect.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

164. Which statement about main() in C is TRUE?

(A) Program ends where main is defined

(B) Two main() functions are illegal

(C) Main() not mandatory

(D) Indicates large program

165. Which of the following characteristics does NOT constitute an inherent advantage of Code Division Multiple Access (CDMA) technology in wireless communication systems?

(A) Enhanced communication privacy through the use of spreading codes.

(B) Improved resistance to multipath propagation and associated signal fading.

(C) The near-far effect, in which signals from nearby transmitters can interfere with the reception of weaker signals from distant transmitters.

(D) Frequency diversity, which enables improved signal reliability under varying propagation conditions.

166. According to the SQL standard, when does a transaction begin when explicit transaction-control statements are not used?

(A) When COMMIT is executed

(B) When ROLLBACK is executed

(C) When an SQL statement is executed

(D) When a connection is closed

167. Consider the following statements about hybrid cloud deployment:

Statement I: A hybrid cloud enables organizations to retain sensitive workloads in private infrastructure.

Statement II: A hybrid cloud allows organizations to utilize public cloud resources for scalable computing requirements.

Which of the following is correct?

(A) Statement I is incorrect, whereas Statement II is correct.

(B) Statement I is correct, whereas Statement II is incorrect.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

168. Which is the correct macro definition?

(A) #define X = 3.5

(B) #Define X 3.5

(C) #define X 3.5

(D) #include X 3.5

M

169. In Code Division Multiple Access (CDMA) communication systems, which digital modulation technique is typically employed to transmit signals over the reverse link, from the mobile station to the base station?

(A) Binary Phase Shift Keying (BPSK)

(B) Quadrature Phase Shift Keying (QPSK)

(C) Offset Quadrature Phase Shift Keying (OQPSK)

(D) Orthogonal Frequency Division Multiplexing (OFDM)

170. Which SQL transaction control command is used to make all changes performed during the current transaction permanent in the database?

(A) SAVEPOINT

(B) ROLLBACK

(C) COMMIT WORK

(D) CHECKPOINT

171. Consider the following statements about cloud computing:

Statement I: Elastic scalability enables resources to expand or contract according to demand.

Statement II: Data redundancy primarily ensures that computing capacity automatically adjusts to workload fluctuations.

Which of the following is correct?

(A) Statement I is incorrect, whereas Statement II is correct.

(B) Statement I is correct, whereas Statement II is incorrect.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

172. For a numeric conversion using scanf() without a specified field width, input reading normally stops when

(A) A whitespace or a character that cannot be part of the number is encountered.

(B) A fixed maximum number of characters is always read.

(C) Both (A) and (B) are always correct.

(D) Neither (A) nor (B) is correct.

173. Which of the following characteristics, technical specifications, and operational mechanisms are associated with Wideband Code Division Multiple Access (WCDMA) technology used in third-generation (3G) mobile communication systems?

(A) Soft handover capability, which enables a mobile station to communicate with multiple base stations during a transition.

(B) A nominal carrier bandwidth of 5 MHz for wideband signal transmission.

(C) Quadrature Phase Shift Keying (QPSK) as a modulation scheme used for data transmission.

(D) All of the above-mentioned characteristics and specifications.

174. Which SQL data types are used to represent date and time values?

(A) CHAR, VARCHAR, TEXT
(B) DATE, TIME, TIMESTAMP
(C) INT, FLOAT, DOUBLE
(D) YEAR, MONTH, DAY

175. Consider the following statements about government initiatives in India:

Statement I: Digital India promotes the digitization of government records and the delivery of digitally enabled public services.

Statement II: Make in India is primarily designed to establish digital governance infrastructure and digitize public records.

Which of the following is correct?

(A) Statement I is incorrect, whereas Statement II is correct.
(B) Statement I is correct, whereas Statement II is incorrect.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

176. What is the output of the following C program?

```
#include <stdio.h>
int main()
{
  float Y = 98.7654;
  printf("%7.2f\n", Y);
  printf("%e\n", Y);
  return 0;
}
```

(A) 98.76 and 9.87654
(B) 98.77 and 9.876540e+01
(C) 98.7654 and 9.8e+01
(D) Compilation error

177. Calculate the time required to transmit 20 KB of data over a 2 Mbps communication link in IEEE 802.11 WLAN.

(A) 80 ms (B) 40 ms (C) 20 ms (D) 1 second

178. What does ODBC stand for in the context of database connectivity?

(A) Open Database Communication
(B) Open Data Backup Connectivity
(C) Open Database Connectivity
(D) Open Data Control

M

179. In C, what happens when an identifier declared in an inner block has the same name as an identifier declared in an enclosing block?

(A) The inner declaration always generates a compilation error.

(B) The inner identifier is automatically elevated to global scope.

(C) The inner declaration shadows the outer identifier, making the outer identifier inaccessible by its unqualified name within the inner block.

(D) The inner declaration automatically changes the value stored in the outer identifier.

180. A do-while statement must end with

(A) Colon (B) Comma (C) Semicolon (D) Period

181. Which of the following software components serves as an intermediary layer between application-level programs and the underlying operating system, facilitating communication and the integration of software services?

(A) Middleware, which provides common services and communication interfaces between applications and system software.

(B) Session Layer, which manages the establishment, maintenance and termination of logical communication sessions.

(C) Synchronous Optical Network (SONET), which defines standards for high-speed optical-fiber data transmission.

(D) Kernel, which manages core operating system functions, including process scheduling, memory allocation and hardware interaction.

182. In the Entity–Relationship (ER) model used for conceptual database design, which of the following best defines a relationship between entities within the modeled domain?

(A) A collection of descriptive attributes that specify the properties or characteristics of an entity

(B) An association or logical connection among two or more entities that represents how they are related to one another

(C) A weak entity whose identification depends on its association with an owner entity and an identifying relationship

(D) A primary key that uniquely identifies each record within a relational database table

183. The GI Cloud initiative (MeghRaj), launched by the Government of India, primarily aims to strengthen digital governance by leveraging scalable, shared and cost-efficient cloud computing resources. Which of the following objectives most accurately represents its principal focus?

(A) Facilitating electronic payment systems and interoperable digital financial transactions across government and commercial platforms.

(B) Strengthening cyber security frameworks through threat detection, vulnerability assessment and protection of government information assets.

(C) Establishing and expanding cloud infrastructure to support the efficient hosting, deployment and delivery of government applications and e-governance services.

(D) Promoting software exports and enhancing the international competitiveness of India's information technology industry.

184. With reference to the classification of fundamental algorithmic procedures used in data organisation and the ordering of elements within a collection, which of the following options does not represent a recognised sorting algorithm, but instead denotes a software-related term associated with a different area of computing?

I. Bubble sort repeatedly compares adjacent elements and exchanges their positions when they violate the specified ordering criterion.

II. Selection sort systematically identifies the minimum or maximum element in the unsorted portion and places it in its appropriate position.

III. Applet denotes a conventional comparison-based sorting procedure designed to arrange a sequence of data elements in ascending or descending order.

IV. Insertion sort constructs a sorted portion incrementally by inserting each successive element into its appropriate position among previously processed elements.

Select the correct answer using the codes given below:

(A) Statement I only
(B) Statement II only
(C) Statement III only
(D) Statement IV only

185. Which of the following options identifies the data-service mechanisms associated with General Packet Radio Service (GPRS) operating modes in mobile communication networks?

(A) Application-oriented data services and tunnelling mechanisms for packet-data transmission.

(B) Ghost services, which involve concealed or virtualized communication processes.

(C) Front-end and back-end service architectures used to separate user interfaces from server-side processing.

(D) Rivest–Shamir–Adleman (RSA) cryptographic mechanisms used for public-key encryption and digital signatures.

186. In the context of database performance evaluation, which of the following measurements most accurately defines throughput as an indicator of a database system's processing capacity?

(A) The total elapsed time required to execute and complete an individual database transaction.

(B) The duration required for a storage device to locate and retrieve data from a specified disk location.

(C) The number of database queries or transactions successfully processed and completed within a specified unit of time.

(D) The percentage of time the central processing unit remains actively engaged in executing computational tasks.

187. The e-Kranti initiative, implemented under the Digital India programme, emphasizes the transformation of public administration through technology-enabled governance mechanisms. Which of the following areas most accurately represents its principal operational focus?

(A) Promoting domestic electronics manufacturing capabilities, semiconductor development and the expansion of indigenous electronic hardware production.

(B) Implementing e-governance reforms and improving the accessibility, efficiency and transparency of public service delivery through digitally enabled platforms.

(C) Expanding rural electrification infrastructure to improve electricity access, distribution reliability and energy availability in underserved regions.

(D) Digitizing defence operations through technology integration, military information systems and modernization of defence-related administrative processes.

188. In the C programming language, which of the following statements about function-related errors is correct?

(A) A mismatch between a function declaration and its definition can violate C language constraints and require a diagnostic.

(B) Supplying a number of arguments inconsistent with a function's parameter requirements can violate C language constraints and require a diagnostic.

(C) Both (A) and (B) describe situations that can require a compiler diagnostic, although they are not necessarily syntax errors.

(D) An incorrect argument order always causes a syntax error, regardless of the argument types.

189. Which of the following components does NOT belong to the standard set of entities constituting the architecture of a Global System for Mobile Communications (GSM) network?

(A) Mobile Station (MS), which enables user access to mobile communication services.

(B) Network Subsystem (NSS), which manages call routing, mobility and subscriber-related functions.

(C) Home Location Register (HLR), which maintains subscriber information and location-related records.

(D) Closed-Circuit Television (CCTV), which is primarily used for video surveillance and security monitoring.

190. In database system performance analysis, which of the following definitions most accurately describes response time for an individual transaction or query?

(A) The average duration required for a disk read/write head to locate the desired data track before transferring information

(B) The total elapsed time between the initiation of a database transaction and its completion, including the processing and waiting time involved

(C) The time interval separating the successful commitment of two consecutive database transactions

(D) The time required to acquire the necessary locks on data items before a transaction can proceed with its operations

191. Which is the major focus of Gujarat IT/ITeS Policy 2022-27?

(A) Restricting foreign companies

(B) Promoting innovation, startups and IT infrastructure

(C) Closing IT parks

(D) Reducing employment

192. Given char str[7] = "GOOD"; which memory representation is correct?

(A) G | O | O | D | \0 | \0 | \0

(B) G | O | O | D

(C) G | \0 | O | \0 | O | \0 | D

(D) G | O | O | D | G | O | O

193. Which of the following statements most comprehensively describes the fundamental concept of mobile computing in the context of modern wireless and distributed computing environments?

(A) Performing computational tasks while maintaining the ability to move between different physical locations

(B) Accessing computing resources, applications and information services irrespective of the user's current location

(C) Enabling ubiquitous access to computing services through interconnected devices and communication networks

(D) All of the above-mentioned concepts and capabilities

M

194. Boyce-Codd Normal Form (BCNF) removes redundancy based on which dependency?

(A) Multivalued dependencies
(B) Join dependencies
(C) Functional dependencies
(D) Inclusion dependencies

195. Gujarat Informatics Limited (GIL), operating under the Government of Gujarat, primarily performs which institutional function in the development and implementation of information technology initiatives and electronic governance across the state?

(A) An independent private-sector organization specializing in professional IT training, technical certification and workforce skill development.
(B) The designated nodal agency responsible for coordinating IT initiatives, facilitating e-governance implementation and supporting technology-enabled public service delivery in Gujarat.
(C) A statutory telecommunications regulatory authority responsible for supervising telecom operators, allocating communication resources and enforcing industry regulations.
(D) A specialized law-enforcement unit responsible for investigating cybercrime, conducting digital forensic examinations and prosecuting cyber-related offences.

196. Which is NOT a string handling function?

(A) strcat()
(B) strcmp()
(C) strlen()
(D) varchar()

197. During a save operation, which mechanism does the kernel use to temporarily suspend input?

(A) TRAP
(B) Thread
(C) Deadlock
(D) Pointer

198. Under what circumstances are database triggers automatically executed by a Database Management System (DBMS) during data manipulation or other specified database operations?

(A) When a new database view is defined and created to represent a virtual table based on a query.
(B) When an integrity constraint is declared to enforce predefined rules governing data validity and consistency.
(C) When a predefined database event occurs and any associated triggering conditions are satisfied, causing the corresponding trigger action to execute automatically.
(D) When an existing database index is accessed during query processing to locate and retrieve records efficiently.

199. Which organization provides technical assistance for implementing Information and Communication Technology (ICT) initiatives and e-governance projects in Gujarat?

(A) Directorate of ICT and e-Governance, responsible for supporting state-level digital governance initiatives.

(B) MeitY, responsible for formulating national policies on electronics and information technology.

(C) NITI Aayog, responsible for strategic policy development and cooperative federal planning.

(D) UIDAI, responsible for administering Aadhaar-based identity authentication services.

200. The <stdio.h> header file is required for

(A) Math functions

(B) String handling

(C) Standard input/output functions

(D) Memory allocation

SPACE FOR ROUGH WORK