MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF INFORMATICS OFFICER UNDER INFORMATION & COMMUNICATION TECHNOLOGY DEPARTMENT, GOVERNMENT OF MIZORAM. NOVEMBER, 2024

TECHNICAL PAPER - I

Time Allowed : 2 hours   Full Marks : 200

All questions carry equal marks of 2 each.
Attempt all questions.

1. In which of the following, the operand field contains the operand itself?
   - (a) Immediate addressing
   - (b) Direct addressing
   - (c) Indexed addressing
   - (d) Register addressing

2. When the operand field contains the address of the operand, then it is called –
   - (a) Immediate addressing
   - (b) Direct addressing
   - (c) Indexed addressing
   - (d) Register addressing

3. A packet-switching network –
   - (a) is free
   - (b) can reduce the cost of using an information utility
   - (c) allows communications channel to be shared among more than one user
   - (d) both (b) & (c)

4. WPA2 is more secure then WPA because of its use of –
   - (a) Temporal Key Integrity Protocol (TKIP) encryption
   - (b) Counter Mode Cipher Block Chaining Message Authentication Code
   - (c) Symmetric Key Encryption
   - (d) Shorter length password

5. In this layer, Hamming Distance is used for error correcting codes.
   - (a) Physical Layer
   - (b) Data Link Layer
   - (c) Network Layer
   - (d) The Transport Layer

6. The number of hosts that can be handled by IPv6 is approximately –
   - (a) 3.6×10^8
   - (b) 2.8×10^{12}
   - (c) 9.7×10^{18}
   - (d) 3.4×10^{38}

7. IPv4 address having subnet mask 255.255.224.0 can support _____ hosts.
   - (a) 8190
   - (b) 8192
   - (c) 9056
   - (d) 1024

8. How many class A,B and C networks Ids can exists?
   - (a) 2,113,658
   - (b) 16,382
   - (c) 126
   - (d) 128

9. Which of the following TCP/IP protocol is used for file transfer with minimal capability and minimal overhead?
   - (a) RARP
   - (b) FTP
   - (c) TFTP
   - (d) TELNET

10. Which OSPF command can you use to view the OSPF routing table on a Cisco router?

    (a) show ospf route

    (b) show ip route ospf

    (c) show ip ospf

    (d) show ip ospf database

11. Which Wi-Fi standard introduced the 5 GHz band to improve wireless network performance?

    (a) 802.11ac

    (b) 802.11b

    (c) 802.11g

    (d) 802.11n

12. What is the role of a Designated Port in Spanning Tree Protocol?

    (a) To prevent network loops

    (b) To forward traffic towards and from the root bridge

    (c) To calculate the shortest path to the root bridge

    (d) To handle network address translation

13. Which of the following access control methods is probabilistic?

    (a) polling

    (b) contention

    (c) token passing

    (d) sliding window

14. What is the primary purpose of Network Address Translation (NAT)?

    (a) To increase network speed

    (b) To encrypt data transmitted over the network

    (c) To provide a secure connection between two remote networks

    (d) To allow multiple devices on a private network to share a single public IP address

15. The IP address which is never routed outside the host computer is –

    (a) 192.168.0.1

    (b) 169.178.0.1

    (c) 10.0.0.1

    (d) 127.0.0.1

16. Virtual LAN is implemented in which layer?

    (a) Physical layer

    (b) Datalink layer

    (c) Network layer

    (d) Session layer

17. How does EIGRP ensure that routing information is synchronized across routers?

    (a) By using periodic updates

    (b) By sending updates only when there is a topology change

    (c) By using the Reliable Transport Protocol (RTP)

    (d) By manually configuring synchronization settings

18. Start and stop bits are used in serial communication for –

    (a) Error detection

    (b) Error correction

    (c) Synchronization

    (d) Slowing down the communication

19. In network security, what is a "honeypot"?

    (a) A secure area for storing sensitive data

    (b) A software that updates security patches

    (c) A network segment designed to attract and trap malicious activity

    (d) A tool for encrypting network traffic

20. As layer 2 is for _____, layer 3 is for _____.

    (a) Routing, end-to-end connection

    (b) Security, Switching

    (c) Switching, Routing

    (d) Switching, Data correction

21. Which of the following is theoretically viable, but not viable for practical implementation?
    (a) Iterative Model
    (b) Spiral Model
    (c) RAD Model
    (d) Waterfall Model

22. Which of the following is NOT typically a role in a Scrum team?
    (a) Scrum Master
    (b) Product Owner
    (c) Tester
    (d) Development Team

23. Which of the following software development models emphasizes creating a prototype early in the development process to refine requirements?
    (a) Agile
    (b) Waterfall
    (c) Incremental Model
    (d) Prototyping Model

24. Which SDLC methodology prioritizes customer collaboration over contract negotiation and responsiveness to change over following a plan?
    (a) Agile Methodology
    (b) Waterfall Methodology
    (c) V-Model
    (d) Spiral Model

25. A software development approach wherein the development process focusses more on the user feedback rather than following a strict plan is –
    (a) Iterative Model
    (b) Spiral Model
    (c) Object-Oriented Development
    (d) Rapid Application Development

26. Which of the following is a tool used for managing software version?
    (a) Bitstreamer
    (b) Gitter
    (c) Bitbucket
    (d) Vertrack

27. Software designing wherein the blueprints of entities are made and re-use those designs for more specific designs etc happening in –
    (a) Object Oriented Design Model
    (b) Rapid Application Development
    (c) Agile Development
    (d) Iterative Modelling

28. In order to achieve modularity, which of the following is desirable?
    (a) High cohesion and low coupling
    (b) Low cohesion and high coupling
    (c) Low cohesion and low coupling
    (d) High cohesion and high coupling

29. _____ risk is a type of risk that is estimated from the past experience regarding staff turnover, productivity, regularity and dedication etc.
    (a) Technical
    (b) Predictable
    (c) Business
    (d) Process

30. The diagram used to depict how the actual users play their roles in the software system is called –
    (a) Use-case diagram
    (b) Activity diagram
    (c) Flowchart
    (d) E-R diagram

31. Which of the following is a drawback of using the RAD (Rapid Application Development) model?
    (a) It is not suitable for time-critical projects.
    (b) It requires extensive upfront planning.
    (c) It has limited emphasis on user feedback.
    (d) It may lead to scope creep due to frequent changes in requirements.

32. In UML, what does the solid line with a closed arrowhead represent?
    (a) Association
    (b) Aggregation
    (c) Inheritance (Generalization)
    (d) Composition

33. What is the main goal of applying the Open/Closed Principle in software design?
    (a) To ensure that the code can be modified easily.
    (b) To minimize code reuse across the application.
    (c) To prevent the need for interfaces and abstract classes.
    (d) To make the system flexible to accommodate future changes without altering existing code.

34. Which of the following best describes "composition" in object-oriented design?
    (a) A strong form of aggregation where the lifetime of the contained object depends on the container.
    (b) A weak association where objects can exist independently.
    (c) A form of inheritance that allows objects to be combined.
    (d) An interface implementation pattern.

35. Which process in Configuration Management deals with controlling and documenting changes to system components?
    (a) Change Control
    (b) Version Control
    (c) Incident Management
    (d) Problem Management

36. In Configuration Management, what does the acronym "CI/CD" stand for?
    (a) Configuration Identification/Continuous Deployment
    (b) Continuous Integration/Continuous Deployment
    (c) Configuration Integrity/Change Delivery
    (d) Configuration Inspection/Code Delivery

37. The process of changing or optimizing the software codes at the coding level without changing the external functionality is called –
    (a) Software reengineering
    (b) Software revision
    (c) Software refactoring
    (d) Software update

38. Web-based systems have advantage over installed type applications in –
    (a) Functional accessibility
    (b) Performance
    (c) Security
    (d) Update anomaly avoidance

39. _____ diagram shows how the different design objects are defined and their relationships defined is called –
    (a) Object Oriented Design
    (b) Entity-Relationship
    (c) Process Flow
    (d) UML

40. Unified Modelling Language is normally meant for –
    (a) Capturing the physical database design level
    (b) Visualizing the overall view of system and sub-systems
    (c) Defining the flow of data within and outside the system and sub-systems
    (d) Representing how users interact with the system functionalities

41. A web server software from Microsoft that runs on windows platform is –
    (a) WAMPP
    (b) IIS
    (c) Apache
    (d) WinServ

42. As _____ is for Java, _____ is for .net.
    (a) Bytecode, Intermediate code
    (b) Source code, XML
    (c) Bytecode, XML
    (d) XML, CSV

43. Which of the following is Microsoft technology that helps developers build interactive, workflow engines and a rehostable designer to implement long-running processes?
    (a) Windows Workflow Foundation
    (b) Microsoft Workflow Engine
    (c) Microsoft Process Workflow
    (d) Windows Server System

44. .NET framework is basically –
    (a) Operating System
    (b) Application Software
    (c) Language
    (d) Platform

45. A set of technologies based on the integration of query capabilities directly into the C# language is –
    (a) Language-Integrated Query (LINQ)
    (b) Microsoft Structured Query Language (Microsoft SQL)
    (c) Unified Modelling Language (UML)
    (d) Extensible Markup Language (XML)

46. What is Windows Communication Foundation?
    (a) Framework for building service-oriented applications
    (b) Framework for building web applications
    (c) Framework for building database applications
    (d) Framework for building secured network

47. A free and open-source user interface framework for Windows-based desktop applications is –
    (a) Windows Presentation Foundation
    (b) Windows Desktop AppDev
    (c) Microsoft Store
    (d) Microsoft Azure

48. Which of the following components of the .NET framework provide an extensible set of classes that can be used by any .NET compliant programming language?
    (a) .NET class libraries
    (b) Common Language Executables
    (c) Common Class Library
    (d) .NET Lib

49. How can you manage connection pooling in ADO.NET?
    (a) By configuring connection pooling settings in the connection string
    (b) By manually creating and destroying connections
    (c) By using a DataAdapter
    (d) By implementing custom connection classes

50. In ASP.NET MVC, what is the purpose of the ViewModel?
    (a) To handle the logic of the view
    (b) To serve as a data transfer object between the controller and the view
    (c) To manage the state of the model
    (d) To provide methods for data access

51. What is the role of the Garbage Collector in .NET?
    (a) To manage application security
    (b) To handle file I/O operations
    (c) To automatically reclaim memory occupied by unused objects
    (d) To compile intermediate language code into machine code

52. Which ASP.NET AJAX control is used to periodically update content on the page without user interaction?
    (a) UpdatePanel
    (b) ScriptManager
    (c) AsyncPostBackTrigger
    (d) Timer

53. What does the xmlns attribute define in an XML document?

    (a) The version of XML being used

    (b) The encoding used in the XML document

    (c) The namespace for XML elements and attributes

    (d) The schema for XML validation

54. What is the main difference between WPF and Silverlight regarding control templates?

    (a) WPF supports control templates but Silverlight does not.

    (b) Silverlight uses XAML for control templates, while WPF uses C#.

    (c) Silverlight has a limited set of controls and therefore fewer control templates.

    (d) WPF and Silverlight use identical control templates with no differences.

55. In WPF, what does the ICommand interface represent?

    (a) A command that can be executed, usually from a button or menu item

    (b) A method that performs data binding

    (c) An interface for handling mouse and keyboard events

    (d) A class that handles the layout of UI elements

56. Java programs that runs on Java-enabled servers that handles requests like the servers do is called –

    (a) Applets   (b) Servlets

    (c) Threads   (d) Ajax

57. A software tool that allows Java-based programs to interact with databases is –

    (a) ODBC   (b) JDBC

    (c) Java Connect   (d) JSQL

58. In order to create basic runtime environment, application development and foundation for other Java applications, _____ is sufficient.

    (a) J2EE   (b) Core Java

    (c) Javascript   (d) Java Servlet

59. Why can't java be considered by some people that it is not a pure Object-Oriented language?

    (a) It contains primitive data-types   (b) It contains main() function

    (c) Multiple inheritance is not supported   (d) All data and function must belong to a class

60. The intermediate code generated by Java compiler which is platform independent is called –

    (a) Intermediate code   (b) Assembly code

    (c) Bytecode   (d) Codeword

61. A client-side scripting language to manage users' interface interactively is –

    (a) Servlet   (b) Javascript

    (c) HTML   (d) XHTML

62. Which of the followings best describe Java Native Interface?

    (a) An interface for Java programs to connect to databases

    (b) An interface that allows Java programs to connect to other native applications and libraries

    (c) A Java system call that is used for executing commands across different types of operating systems

    (d) A Java library that is mainly used for real-time monitoring of websites

63. Multiple inheritance in Java can be implemented using –

    (a) Interface   (b) Class

    (c) Using 'extends' keyword   (d) Applets

64. What is true about threading?

    (a) run() method calls start() method and runs the code

    (b) run() method creates new thread

    (c) run() method can be called directly without start() method being called

    (d) start() method creates new thread and calls code written in run() method

65. What does the finalize() method do in Java?

    (a) It is called when an object is created.

    (b) It is used to explicitly release resources.

    (c) It is called when an object is no longer reachable.

    (d) It is used to declare a method that cannot be overridden.

66. Which method is used to explicitly terminate a thread in Java?

    (a) terminate()   (b) abort()

    (c) stop()   (d) interrupt()

67. In JDBC, what is the purpose of the ResultSetMetaData interface?

    (a) It provides metadata about the columns in a ResultSet.

    (b) It provides metadata about the database connection.

    (c) It stores the data of the ResultSet.

    (d) It manages the transaction settings for a query.

68. How can you send a redirect response to the client from a servlet?

    (a) response.forward()   (b) request.redirect()

    (c) response.sendRedirect()   (d) requestDispatcher.forward()

69. Which object in JSP is NOT implicitly available?

    (a) session   (b) config

    (c) application   (d) cookie

70. Which annotation is used to define an EJB component class as a Stateless Session Bean?

    (a) @Stateful   (b) @Stateless

    (c) @EJB   (d) @Singleton

71. By creating foreign key constraint, the followings are usually considered during design -

    (a) Delete and update cascading

    (b) Size of database and growth estimation

    (c) Skill and competency of database administrators

    (d) Whether web-based or application-based

72. Which of the following is a kind of stored procedure that is executed as a side-effect of some operations on the data?

    (a) Commit   (b) Function

    (c) Alert   (d) Trigger

73. A data storage system that stores highly structured data and that works with data from one or more systems and sources including historical data is best called –

    (a) Databank   (b) Data warehouse

    (c) Data lake   (d) Database

74. The term given to the minimal number of attributes to define a record is called –

    (a) Super key   (b) Primary key

    (c) Minimal key   (d) Candidate key

75. Super key in the DBMS is –
   (a) Any set of attributes that can functionally define the record
   (b) Any set of attributes that is a subset of all attribute set
   (c) A single attribute that is unique and can address a record
   (d) A password or encryption key that can unlock any encryption

76. _____ design focusses on the data itself, whereas _____ design focusses more on data type, how it is stored and accessed
   (a) ER-diagram, SQL
   (b) MySQL, Oracle
   (c) Physical, logical
   (d) Primary, secondary

77. Normalization of database usually achieves –
   i. Data integrity
   ii. Reduced redundancy
   iii. Data readability
   iv. Data security
   (a) i and iii
   (b) ii and iii
   (c) i, ii and iii
   (d) i, iii and iv

78. When decomposed tables are joined, which of the following will preserve non-match tuples only on the left table, but not on the right table?
   (a) Inner join
   (b) Left outer join
   (c) Right outer join
   (d) Natural join

79. Data about relations such as schema of relation is maintained by the relational database system, it is termed as –
   (a) Catalog
   (b) Views
   (c) Metadata
   (d) Dictionary

80. _____ is for altering the database design, whereas _____ is for manipulating the data.
   (a) DDL, DML
   (b) XML, DDL
   (c) SQL, HTML
   (d) Stored Procedure, Function

81. Which of the following best describes a "multi-valued attribute" in an ER model?
   (a) An attribute that uniquely identifies each entity in the entity set.
   (b) An attribute that depends on multiple other attributes.
   (c) An attribute that is inherited from another entity set.
   (d) An attribute that can have multiple values for a single entity instance.

82. Which SQL clause ensures that the deletion of a row from a parent table also deletes all corresponding rows in the child table that reference it?
   (a) CASCADE
   (b) TRIGGER
   (c) DELETE CHILD
   (d) ON DELETE CASCADE

83. In BIS, which of the following is a primary challenge when integrating multiple data sources into a unified database for analysis?
   (a) Ensuring real-time transaction processing across all data sources.
   (b) Resolving data inconsistencies and conflicts from different systems.
   (c) Creating user-friendly reports from the integrated data.
   (d) Reducing the overall size of the combined data warehouse.

84. Which of the following is a key responsibility of the Database Administrator (DBA) in a database environment?

    (a) Designing the physical schema of the database

    (b) Writing end-user application code

    (c) Managing network traffic between clients and servers

    (d) Developing database-driven web applications

85. Which of the following best describes the concept of a derived attribute in logical database design?

    (a) An attribute that serves as a foreign key in a relationship.

    (b) An attribute that is shared across multiple entities in an ER model.

    (c) An attribute that is used to enforce uniqueness in a table.

    (d) An attribute that is calculated from other attributes in the database.

86. Software testing involving the existence of possible error when extreme range of input is given is called –

    (a) Extreme testing   (b) Verification testing

    (c) Boundary value analysis   (d) Selective testing

87. Which of the following(s) is/are involved in software testing?

        i. Fix the security loopholes

        ii. Find the possible error in the software

        iii. Check whether customers' requirements are met

        iv. Debugging

    (a) i and ii only   (b) ii and iii only

    (c) ii and iv only   (d) i, ii, iii and iv

88. Which software testing is for testing whether individual units or modules are working together as per required or not?

    (a) Unit testing   (b) Acceptance testing

    (c) Integration testing   (d) Accumulation testing

89. Which software testing tool does a simple job of enforcing standards in a uniform way of many programs?

    (a) Static Analyzer only   (b) Code Inspector only

    (c) Standard Enforcer only   (d) Both Code Inspector & Standard Enforcer

90. Which of the following issue/issues must be addressed if a successful software testing strategy is to be implemented?

        i. Use effective formal technical reviews as a filter prior to testing

        ii. Develop a testing plan that emphasizes "rapid cycle testing"

        iii. State testing objectives explicitly

    (a) i only   (b) ii only

    (c) ii and iii only   (d) i, ii and iii

91. To check the cyclomatic complexity, _____ is employed.

    (a) Black box testing   (b) White box testing

    (c) Integration testing   (d) Fault-based testing

92. What is the primary purpose of regression testing?

    (a) To test the performance of the software.

    (b) To test the software's compatibility with different environments.

    (c) To identify security vulnerabilities in the application.

    (d) To verify that new code changes do not negatively affect existing functionality.

93. Which of the following is a key phase in the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) process?

(a) Design

(b) Develop

(c) Measure

(d) Deploy

94. Which of the following is an essential practice in Software Quality Assurance to ensure that software meets predefined standards and requirements?

(a) Code reviews

(b) Load testing

(c) Exploratory testing

(d) Mutation testing

95. What is the primary objective of the Capability Maturity Model Integration (CMMI)?

(a) To improve organizational processes and enhance quality through a structured maturity model.

(b) To offer guidelines for hardware development and maintenance.

(c) To provide a framework for software cost estimation.

(d) To develop project management skills for team leaders.

96. In the context of automated testing, what is a "test script"?

(a) A manual test case written in a scripting language.

(b) A set of predefined steps that are executed by an automation tool to verify a specific functionality.

(c) A document outlining test objectives.

(d) A code review guideline for testing.

97. Which of the following metrics is used to measure the reliability of software?

(a) Mean Time to Repair (MTTR)

(b) Mean Time to Failure (MTTF)

(c) Code Complexity

(d) Function Point Analysis

98. Which metric is used to measure the complexity of a software module based on its control flow graph?

(a) Halstead Metrics

(b) Lines of Code (LOC)

(c) Cyclomatic Complexity

(d) Function Points

99. The objective of the _____ is to design tests that is likely to uncover the possible bugs (if exists) within the system.

(a) Fault-based testing

(b) Security testing

(c) Integration testing

(d) Use-case testing

100. Testing with respect to user needs, requirements, and business processes conducted to determine whether a system satisfies the acceptance criteria and to enable the user, customers or other authorized entity to determine whether to accept the system is formally called –

(a) Functional testing

(b) White box testing

(c) Module testing

(d) Acceptance testing

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