Sikkim Public Service Commission

Main Written Examination for the Post of Assistant Programmer

Main Paper

Paper - II

Time Allowed : 3 Hrs. | Maximum Marks : 300

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before answering the questions : -

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. Please note that it is the candidate's responsibility to fill in the Roll Number and Test Booklet Serial Number carefully and without any omission or discrepancy at the appropriate places in the **OMR ANSWER SHEET.**

3. **Use only Black Ball Point Pen to fill the OMR sheet**

4. Do not write anything else on the OMR Answer Sheet except the required information.

5. **This Test Booklet contains 3 Sections. Section A is of Multiple choice Question i.e. 100 items to be marked in OMR Sheet. Section B is Short Answer type Questions. Section C is Long Answer/ Essay type Questions, which has to be written in Seperate Answer Sheet provided.**

6. **All items from Q.1 to Q. 100 carries 2 marks each.**

7. Before you proceed to mark in the Answer Sheet (OMR), you have to fill in some particulars in the Answer Sheet (OMR) as per given instructions.

8. After you have completed filling in all your responses on the Answer Sheet (OMR) and the examination has concluded, you should hand over the Answer Sheet (OMR) and the Seperate conventional Answer sheet to the Invigilator only . You are permitted to take away with you the Test Booklet.

9. **Marking Scheme**

   There will be negative marking for wrong answers marked by a candidate in the objective type question papers.

   (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one-third of the marks assigned to that question will be deducted as penalty.

   (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to the question.

   (iii) If a question is left blank. i.e., no answer is given by the candidate, there will be no penalty for that question.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

Part-A

(100x2=200 Marks)

1. When you add a software stack, such as an operating system and applications to the service, the model shifts to _____ model.
   A. SaaS
   B. PaaS
   C. IaaS
   D. All of the above

2. All cloud computing applications suffer from the inherent _____ that is intrinsic in their WAN connectivity.
   A. propagation
   B. latency
   C. noise
   D. All of the above

3. Which of the following is related to service provided by Cloud?
   A. Sourcing
   B. Ownership
   C. Reliability
   D. AaaS

4. Which of the following cloud concept is related to pooling and sharing of resources?
   A. Polymorphism
   B. Abstraction
   C. Virtualization
   D. None of the above

5. Point out the wrong statement:
   A. Abstraction enables the key benefit of cloud computing: shared, ubiquitous access
   B. Virtualization assigns a logical name for a physical resource and then provides a pointer to that physical resource when a request is made
   C. All cloud computing applications combine their resources into pools that can be assigned on demand to users
   D. All of the above

6. The technology used to distribute service requests to resources is referred to as :
   A. load performing
   B. load scheduling
   C. load balancing
   D. All of the above

7. Point out the correct statement :
   A. A client can request access to a cloud service from any location
   B. A cloud has multiple application instances and directs requests to an instance based on conditions
   C. Computers can be partitioned into a set of virtual machines with each machine being assigned a workload
   D. All of the above

8. Which of the following is another name for system virtual machine?
   A. hardware virtual machine
   B. software virtual machine
   C. real machine
   D. None of the above

9. Point out the correct statement :
   A. A virtual machine is a computer that is walled off from the physical computer that the virtual machine is running on
   B. Virtual machines provide the capability of running multiple machine instances, each with their own operating system
   C. The downside of virtual machine technologies is that having resources indirectly addressed means there is some level of overhead
   D. All of the above

10. Which of the following is Type 1 Hypervisor?
   A. Wind River Simics
   B. Virtual Server 2005 R2
   C. KVM
   D. LynxSecure

11. TCP/IP is a:
   A. Network Hardware
   B. Network Software
   C. Protocol
   D. None of these

12. OSI stands for:
    A. Open System Interface
    B. Out System Interface
    C. Open System Interconnection
    D. Out System Interconnection.

13. TCP/IP mainly used for:
    A. File Transfer
    B. Email
    C. Remote Login Service
    D. All of these

14. Default port for HTTP:
    A. 23
    B. 80
    C. 21
    D. 25

15. In which layer of OSI model IP is available:
    A. Layer 1
    B. Layer 2
    C. Layer 3
    D. Layer 4

16. Which protocol is used to report error message:
    A. TCP
    B. IP
    C. ICMP
    D. SMTP

17. In a TCP header source and destination header contains:
    A. 8 Bits
    B. 16 Bits
    C. 32 Bits
    D. 128 Bits

18. Which agency assign IPs:
    A. IEEE
    B. ANSI
    C. ICANN
    D. BSNL

19. Which class of IP is used in smaller organizations?
    A. Class A
    B. Class B
    C. Class C
    D. Class D

20. Who provide us internet:
    A. TCP
    B. ISP
    C. FTP
    D. HTTP

21. Which of the following object is not an ASP component?
    A. LinkCounter
    B. Counter
    C. AdRotator
    D. File Access

22. Difference between Response.Write() andResponse.Output.Write().
    A. Response.Output.Write() allows you to buffer output
    B. Response.Output.Write() allows you to write formatted output
    C. Response.Output.Write() allows you to flush output
    D. Response.Output.Write() allows you to stream output

23. Default scripting language in ASP.
    A. EcmaScript
    B. VBScript
    C. PERL
    D. JavaScript

24. Which object can help you maintain data across users?
    A. Application object
    B. Session object
    C. Response object
    D. Server object

25. Which of the following control is used to validate that two fields are equal?
    A. RegularExpressionValidator
    B. CompareValidator
    C. equals() method
    D. RequiredFieldValidator

26. Which of the following is the way to monitor the web application?
    A. MMC Event viewers
    B. Performance logs
    C. Alerts Snap-ins
    D. ALL

27. What is the base class from which all Web forms inherit?
    A. Master Page
    B. Page Class
    C. Session Class
    D. None of the Above

28. Visual Basic responds to events using which of the following?
    A. a code procedure
    B. an event procedure
    C. a form procedure
    D. a property

29. What property of controls tells the order they receive the focus when the tab key is pressed during run time?
    A. Focus order
    B. Focus number
    C. Tab index
    D. Control order

30. What is the correct statement when declaring and assigning the value of 100 to an Integer variable called numPeople
    A. Dim numPeople =
    B. Dim numPeople = Int(100)
    C. numPeople = 100
    D. Dim numPeople As Integer = 100

31. Using public key cryptography, X adds a digital signature \sigma to message M, encrypts < M, \sigma >, and sends it to Y, where it is decrypted. Which one of the following sequences of keys is used for the operations?
    A. Encryption: X's private key followed by Y's private key; Decryption: X's public key followed by Y's public key
    B. Encryption: X's private key followed by Y's public key; Decryption: X's public key followed by Y's private key
    C. Encryption: X's public key followed by Y's private key; Decryption: Y's public key followed by X's private key
    D. Encryption: X's private key followed by Y's public key; Decryption: Y's private key followed by X's public key

32. Which of the following are used to generate a message digest by the network security protocols?
    (P) RSA
    (Q) SHA-1
    (R) DES
    (S) MD5

    A. P and R only
    B. Q and R only
    C. Q and S only
    D. R and S only

33. A sender is employing public key cryptography to send a secret message to a receiver. Which one of the following statements is TRUE?
    A. Sender encrypts using receiver's public key
    B. Sender encrypts using his own public key`
    C. Receiver decrypts using sender's public key
    D. Receiver decrypts using his own public key

34. The minimum positive integer p such that 3P modulo 17 = 1 is
    A. 5
    B. 8
    C. 12
    D. 16

35. An attacker sits between the sender and receiver and captures the information and retransmits to the receiver after some time without altering the information. This attack is called as _____.
    A. Denial of service attack
    B. Masquarade attack
    C. Simple attack
    D. Complex attack

36. An attacker sits between customer and Banker, and captures the information from the customer and retransmits to the banker by altering the information. This attack is called as _____ _.
    A. Masquerade Attack
    B. Replay Attack
    C. Passive Attack
    D. Denial of Service Attack

37. Which of the following encryption algorithms is based on the Fiestal structure?
    A. Advanced Encryption Standard
    B. RSA public key cryptographic algorithm
    C. Data Encryption Standard
    D. RC4

38. Advanced Encryption Standard (AES) is based on
    A. Asymmetric key algorithm
    B. Symmetric key algorithm
    C. Public key algorithm
    D. Key exchange

39. A message "COMPUTERNETWORK" encrypted (ignore quotes) using columnar transposition cipher with a key "LAYER". The encrypted message is :
    A. CTTOEWMROPNRUEK
    B. MROUEKCTTPNROEW
    C. OEWPNRCTTUEKMRO
    D. UEKPNRMROOEWCTT

40. Hashed message is signed by a sender using
    A. his public key
    B. his private key
    C. receiver's public key
    D. receiver's private key

41.What is the output of this C code?

```
#include <stdio.h>
void main()
{
    int a = 3;
    int b = ++a + a++ + --a;
    printf("Value of b is %d", b);
}
```

A. Value of x is 12
B. Value of x is 13
C. Value of x is 10
D. Undefined behaviour

42.The precedence of arithmetic operators is (from highest to lowest)

A. %, *, /, +, –
B. %, +, /, *, –
C. +, -, %, *, /
D. %, +, -, *, /

43.Which of the following is not an arithmetic operation?

A. a *= 10;
B. a /= 10;
C. a != 10;
D. a %= 10;

44.The output of the code below is

```
#include <stdio.h>
int x;
void main()
{
    if (x)
    printf("hi");
    else
    printf("how are u");
}
```

A. hi
B. how are you
C. compile time error
D. none of the above

45. What is the scope of an external variable?
    A. Whole source file in which it is defined
    B. From the point of declaration to the end of the file in which it is defined
    C. Any source file in a program
    D. From the point of declaration to the end of the file being compiled

46. What is the scope of a function?
    A. Whole source file in which it is defined
    B. From the point of declaration to the end of the file in which it is defined
    C. Any source file in a program
    D. From the point of declaration to the end of the file being compiled

47. Which of the following are themselves a collection of different data types?
    A. string
    B. structures
    C. char
    D. all of the above

48. User-defined data type can be derived by_____
    A. struct
    B. enum
    C. typedef
    D. all of the above

49. Which operator connects the structure name to its member name?
    A. –
    B. <-
    C. .
    D. Both <- and .

50. Which of the following cannot be a structure member?
    A. Another structure
    B. Function
    C. Array
    D. None of the above

51. The value obtained in the function is given back to main by using _____ keyword?
    A. return
    B. static
    C. new
    D. volatile

52. Which of the following return-type cannot be used for a function in C?
    A. char *
    B. struct
    C. void
    D. none of the above

53. Which of the following operation is illegal in structures?
    A. Typecasting of structure
    B. Pointer to a variable of same structure
    C. Dynamic allocation of memory for structure
    D. All of the above

54. Presence of code like "s.t.b = 10" indicate.
    A. Syntax Error
    B. structure
    C. double data type
    D. An ordinary variable name

55. Which of the following are C preprocessors?
    A. #ifdef
    B. #define
    C. #endif
    D. all of the above

56. Which among the following algorithm designing techniques always does not guarantees the optimal solution.
    A. Dynamic programming
    B. Divide and conquer
    C. Greedy technique
    D. None of the above

57. Which of the sorting techniques is best suited when the array is sorted or almost sorted?
    A. Insertion sort
    B. Selection sort
    C. Quick sort
    D. Heap sort

58. The worst case complexity of the quick sort is
    A. O(n)
    B. O(n2)
    C. O(nlogn)
    D. None of the above

59. Which among the following is an Np hard problem
    A. Sorting
    B. Searching
    C. Turing Halting Problem
    D. Finding Minimum Spanning tree

60. There are four Algorithms A1,A2,A3,A4 with complexity of the order of Log(n),Log(Logn),nLog(n) ,n/log(n).Which of these algorithms is the best?
    A. A1
    B. A2
    C. A3
    D. A4

61. What is the number of swaps required to sort n elements using selection sort, in the worst case?
    A. T(n)
    B. T (n log n)
    C. T (n2)
    D. n2 log n

62. Quick sort uses
    A. Backtracking approach
    B. Divide and conquer
    C. Heuristic Search
    D. Greedy approach

63. For merging two sorted lists of sizes m and n into a sorted list of size m+n, the number of swaps required are
    A. m
    B. n
    C. m+n
    D. logm+ logn

64.A sorting technique is called stable if
   A. it takes O(n2) time
   B. if it uses backtracking paradigm
   C. it maintains the relative order of occurrence of non –distinct elements
   D. it takes 0(n) Space

65.What is the worst case complexity of sorting n numbers using randomized quick sort.
   A. O(n)
   B. O(nlogn)
   C. O(n2)
   D. O(2n)

66.Which one is true about Relational Databases?
   A. A column can store values of different data types.
   B. A table consists of columns and rows.
   C. Rows In the same table can have a different set of columns
   D. Rows are also known as fields of the table.

67.False about keys in the relational model?
   A. Primary keys are defined by a subset of attributes of a relation
   B. Primary keys uniquely identify each tuple of the relation.
   C. Primary keys define the relationship between two tables.
   D. A relation can have multiple foreign keys.

68.Which of the following is true about columns?
   A. Each column consists of one or more records
   B. Columns are where the individual pieces of information are stored for each record
   C. Columns must be designated a specific data type
   D. Columns are also known as records

69.Which of the following SQL statements can be used to remove data from table "users":
   A. REMOVE TABLE users
   B. DROP TABLE users
   C. DELETE TABLE users
   D. ALTER TABLE users

70. Which of the following statements can be used to increase the marks of all students in science subject by 10%:
    A. UPDATE student WHERE subject = 'science' SET marks = marks * 1.1
    B. UPDATE student SET marks = (marks * 1.1)
    C. UPDATE student SET marks = marks * 1.1 WHERE subject = 'science'
    D. UPDATE marks = marks * 1.1 ON TABLE student WHERE subject = 'science'

71. Which of the following is not true for Views:
    A. provide a logical ordering of the rows of a table
    B. can be used to enforce the uniqueness of records stored in a table.
    C. provide a fast, efficient method for locating specific rows of data in very large tables.
    D. can force a table to not use clustering storage

72. Which is a valid wildcard character in a LIKE clause of a SELECT statement?
    A. %
    B. *
    C. ?
    D. \

73. Which of the following best define what a transaction is?
    A. A sequence of one or more SQL operations grouped together, also known as a single unit of work.
    B. A set of independent operations that can be executed in parallel.
    C. A data isolation level that can help prevent deadlocks by allowing reads on previously committed data.
    D. An object of a database.

74. Which Data Model was created with the focus of providing better data independence?
    A. Relational
    B. Hierarchical
    C. Semantic
    D. Network

75. Which one is optional and do not have to be specified when creating a table?
    A. Table name
    B. Column name
    C. Default constraint
    D. Column data type

76. Which CANNOT be used to restrict specific values from being inserted into a column in a particular table?
    A. Index
    B. Check constraint
    C. Referential constraint
    D. Default constraint

77. Which of the following properties is related to the fact that a committed transaction guarantees that all of the operations are completed and in a roll backed transaction the effect of all operations are reverted?
    A. Consistency
    B. Atomicity
    C. Isolation
    D. Durability

78. Which of the following statements CANNOT be issued against indexes?
    A. CREATE
    B. ALTER
    C. DROP
    D. All of the above can be issued against indexes.

79. Which of the following statements is correct?
    A. All JOIN operators can be expressed as a combination of SELECT statements and cartesian products
    B. The Cartesian product of 2 sets will never have duplicate rows
    C. INNER JOIN and OUTER JOIN of 2 tables will always be different
    D. Adding GROUP BY to a SELECT statement will always return less rows than the same SELECT statement without the GROUP BY clause.

80. Which of the following is NOT true about data?
    A. Data is useful and has meaning associated to it.
    B. Data can be quantitative or qualitative.
    C. Data describes a variable or set of variables.
    D. Essentially data can be thought of as the result of observations based on things like measurements and statistics.

81. Which of the following operating system does not implement the multitasking truly?
    A. Windows 98
    B. Windows NT
    C. Windows XP
    D. MS DOS

82. The Banker's algorithm is used
    A. to rectify deadlock
    B. to detect deadlock
    C. to prevent deadlock
    D. to solve deadlock

83. A page fault occurs when
    A. the Deadlock happens
    B. the Segmentation starts
    C. the page is found in the memory
    D. the page is not found in the memory

84. The primary purpose of an operating system is:
    A. To make the most efficient use of the computer hardware
    B. To allow people to use the computer,
    C. To keep systems programmers employed
    D. To make computers easier to use

85. To access the services of operating system, the interface is provided by the:
    A. system calls
    B. API
    C. library
    D. assembly instructions

86. Which module gives control of the CPU to the process selected by the short-term scheduler?
    A. dispatcher
    B. interrupt
    C. scheduler
    D. none of the above

87. The processes that are residing in main memory and are ready and waiting to execute are kept on a list called:
   A. job queue
   B. ready queue
   C. execution queue
   D. process queue

88. The interval from the time of submission of a process to the time of completion is termed as:
   A. waiting time
   B. turnaround time
   C. response time
   D. throughput

89. In priority scheduling algorithm:
   A. CPU is allocated to the process with highest priority
   B. CPU is allocated to the process with lowest priority
   C. equal priority processes cannot be scheduled
   D. none of the above

90. Time quantum is defined in:
   A. shortest job scheduling algorithm
   B. round robin scheduling algorithm
   C. priority scheduling algorithm
   D. multilevel queue scheduling algorithm

91. In Unix, Which system call creates the new process?
   A. fork
   B. create
   C. new
   D. none of the above

92. Semaphore is a/an _____ to solve the critical section problem.
   A. hardware for a system
   B. special program for a system
   C. integer variable
   D. None of these

93. What is interprocess communication?
    A. communication within the process
    B. communication between two processes
    C. communication between two threads of same process
    D. none of the above

94. In FIFO page replacement algorithm, when a page must be replaced:
    A. oldest page is chosen
    B. newest page is chosen
    C. random page is chosen
    D. none of the above

95. RAID level _____ is also known as block interleaved parity organisation and uses block level striping and keeps a parity block on a seperate disk.
    A. 1
    B. 2
    C. 3
    D. 4

96. Which one of the following is the address generated by CPU?
    A. physical address
    B. absolute address
    C. logical address
    D. none of the above

97. The Process Control Block is :
    A. Process type variable
    B. Data Structure
    C. a secondary storage section
    D. a block in memory

98. At a particular time of computation the value of a counting semaphore is 7.Then 20 P operations and 15 V operations were completed on this semaphore. The resulting value of the semaphore is :
    A. 42
    B. 2
    C. 7
    D. 12

99. For non-sharable resources like a printer, mutual exclusion :
   A. must exist
   B. must not exist
   C. may exist
   D. None of these

100. With relocation and limit registers, each logical address must be _____ the limit register.
   A. less than
   B. equal to
   C. greater than
   D. None of these

Part-B

(10x5=50 Marks)

Instruction: Attempt any ten questions from the following. Answer should be short descriptive. Each question carries 05 marks.

1. What do you mean by RDBMS?
2. What are the different subsets of SQL?
3. Define the layered structure of an operating system.
4. Name the various directory structures.
5. What is the explanation for the dangling pointer in C?
6. What is the explanation for cyclic nature of data types in C?
7. What is modular programming?
8. What is HTTPs and what port does it use?
9. What is Data Encapsulation?
10. How many types of modes are used in data transferring through networks?
11. What are the different layers that define cloud architecture?
12. Mention platforms which are used for large-scale cloud computing?
13. What is the difference between printf, sprintf and fprintf?
14. What is ACID property in a database?

Part-C

(2x25=50 Marks)

Instruction: Attempt any two questions from the following. Answer should be long and descriptive. Each question carries 25 marks.

1. What are four principles of OOP, How is aggregation different than Composition?
2. Write a C program to find sum of positive integers without using any operator. Only use of printf() is allowed. No other library function can be used
3. Write a trigger to update Emp table such that, If an updation is done in Dep table then salary of all employees of that department should be incremented by some amount (updation), assuming Table name are Dept and Emp.
4. Explain multitasking, multithreading and multiprocessing