079/2024

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. How do CAM differ from other memory components?

(A) Storage (B) Search

(C) Read (D) Update

2. Which is the fastest memory component present in a computer system?

(A) Main Memory (B) Cache Memory

(C) Scratepad Memory (D) Virtual Memory

3. The register which is connected to external bus :

(A) PC (B) IR

(C) MAR (D) Rn

4. From which microprocessors onwards the pipelining concept is implemented?

(A) 8080 (B) 8085

(C) 80186 (D) 8086

5. If the cache memory is divided into 1024 cache lines. What will be the width of the address bit to fetch a word from the cache line if the size of the cache line is 8 bytes in a byte addressable memory organization?

(A) 10 bit (B) 13 bit

(C) 3 bit (D) 12 bit

6. Data entered to decoder circuit from which register :

(A) MDR (B) IR

(C) Rn (D) ALU

7. The register which hold the address of control memory in micro-programmed control :

(A) MAR (B) CAR

(C) Micro-program sequencer (D) PC

8. What is the width of the address bus in a 8086 processor?

(A) 16 bit (B) 8 bit

(C) 20 bit (D) None of the above

9. Express 8192 in K units:

(A) 8×10^3 K (B) 8 K

(C) 16 K (D) None of the above

10. Binary equivalent of the octal number 13.54 is :

(A) 1011.1110 (B) 1011.1011

(C) 1101.1110 (D) None of the above

11. Next address generator is present in which control memory organization?

(A) Micro-Programmed Control (B) PLA Control

(C) Sequence Register and Decoder (D) All the above

12. Which is the uni directional bus?

(A) Address bus (B) Data bus

(C) Control bus (D) Both (A) and (C)

13. The word 'BEAUTIFUL' is stored in a memory location with a starting of 1500 in little endian notation. If the processor is a 16 bit and it wants to fetch a word from the memory 1502, what is the word?

(A) BE (B) LU

(C) AU (D) FI

14. 8086 is a CISC Processor :

(A) Yes (B) No

(C) Neither Yes nor No (D) None

15. Register which is hold the stating address information of a segment in segmented memory organization :

(A) Index register (B) Off_set register

(C) Segment register (D) Pointer register

16. Which of the following is also known as half adder?

(A) EXCLUSIVE OR (B) EXCLUSIVE AND

(C) NAND circuit (D) INCLUSIVE OR

17. From which processor onwards the segmented memory concept implemented :

(A) 8088 (B) 8085

(C) 80286 (D) 8086

18. Time taken for the execution of M instruction with N stages in a pipelined system is :

(A) $M \times N$ (B) M + N

(C) N+(M–1) (D) (N+1)+M

19. RISC stands for :

(A) Reuse Instructions Set Computing (B) Reduced Instruction Set Computing

(C) Reusable Instruction Set Computing (D) Reduced Instruction Set Computer

20. Which pointer can produce carbon copy of printed data?

(A) Thermal printer (B) Dot matrix

(C) Laser printer (D) None of the above

21. In order to transfer huge amount of data which data transfer scheme is suitable :

(A) Program driven (B) Interrupt Driven

(C) DMA (D) Synchronous

22. Solve the equation for $X : X_{10} = 11001000_2$:

(A) 200 (B) 251

(C) 300 (D) 150

23. Which of the following is a Universal Gate?

(A) AND (B) OR

(C) NAND (D) EX–OR

24. A positive AND gate is also a negative :

(A) NAND gate (B) NOR gate

(C) OR gate (D) AND gate

25. _____ is the fastest logic family, it's used in high speed applications.

(A) DCL (B) TTL

(C) ECL (D) MOS

26. Which of the following is NOT a valid deadlock prevention scheme?

(A) Release all resources before requesting a new resource

(B) Number the resources uniquely and never request a lower numbered resource than the last one requested.

(C) Never request a resource after releasing any resource

(D) Request that all required resources be allocated before execution

27. Consider the following statements about process state transitions for a system using pre-emptive scheduling :

I. A running process can move to ready state.

II. A ready process can move to running state.

III. A blocked process can move to running state.

IV. A blocked process can move to ready state.

Which of the above statements are TRUE?

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

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

28. In the context of operating systems, which of the following statements is/are correct with respect to paging?

I. Paging helps solve the issue of external fragmentation

II. Page size has no impact on internal fragmentation

III. Paging incurs memory overheads

IV. Multi-level paging is necessary to support pages of different sizes

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

(C) I and III only (D) III and IV only

29. Consider six memory partitions of size 200 KB, 400 KB, 600 KB, 500 KB, 300 KB, and 250 KB, where KB refers to kilobyte. These partitions need to be allotted to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. If the best fit algorithm is used, which partitions are NOT allotted to any process?

(A) 200 KB and 300 KB
(B) 200 KB and 250 KB
(C) 250 KB and 300 KB
(D) 300 KB and 400 KB

30. A process executes the code:

```
fork ( );
fork ( );
fork ( );
```

The total number of child processes created is

(A) 3
(B) 4
(C) 7
(D) 8

31. A common issue that needs to be avoided while using binary semaphores:

(A) stack overflow
(B) buffer overflow
(C) infinite loops
(D) deadlock

32. Which of the following stage triggers the CPU switch from user program to interrupt processing?

(A) I/O request
(B) transfer done
(C) interrupt signalled
(D) interrupt handled

33. In the context of fork ( ), what does the term "orphan process" refer to?

(A) A process that has terminated but still occupies space in the process table
(B) A process that has been killed by the parent process
(C) A child process whose parent has terminated
(D) A process that has no parent processes

34. Which of the following instructions should be privileged?

(A) Issue a trap instruction
(B) Set value of timer
(C) Read the clock
(D) Switch from user to kernel mode

35. Which of the following statement is true?

(A) Physical address is generated by Memory Management Unit (MMU)

(B) Logical address refer to an actual existing address in memory

(C) Physical address is generated by CPU

(D) Physical address refers to an abstract address

36. Which of the following statement is false about critical section problems?

(A) Semaphore is used to solve critical section problem

(B) Dekker's algorithm can handle more than two processes efficiently

(C) Progress is a necessary condition for solving critical section problem

(D) Binary semaphores (mutexes) can be used to ensure mutual exclusion

37. In a timeshare operating system, when the time slot assigned to a process is completed, the process switches from the current state to?

(A) Suspended state (B) Terminated state

(C) Ready state (D) Blocked state

38. Which of the following scheduling reduces process flow time?

(A) FCFS (B) LIFO

(C) SJF (D) All of these

39. If a page number is not found in the translation lookaside buffer, then it is known as :

(A) Translation Lookaside Buffer miss (B) Buffer miss

(C) Translation Lookaside Buffer hit (D) All of the mentioned

40. A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given 'n' processes to be scheduled on one processor, how many different schedules are possible in terms of 'n' :

(A) $n+1$ (B) $n(n-1)$

(C) $n!$ (D) $n(n+1)$

41. An object that groups operations that are all used by some superior level of control, or operations that all use some junior–level set of operations, is a kind of :

(A) Entity abstraction
(B) Action abstraction
(C) Virtual Machine abstraction
(D) Coincidental abstraction

42. Which of the following statements are correct about Class in JAVA programming?

I. You can put the two classes into one file, but only one class in the file can be a public class.

II. The public class must have the same name as the file name.

III. Each class in the source code is compiled into a .exe file.

(A) I and II
(B) I and III
(C) I, II and III
(D) II and III

43. In lazy initialization, object reference can be initialized :

(A) at the point the objects are defined
(B) in the constructor for that class
(C) right before you actually need to use that object
(D) using instance initialization

44. Abstract classes can be used to:

(A) instantiate objects
(B) create object reference
(C) initialize objects
(D) copy objects

45. Variables can be declared inside interface declaration. Following are the statements regarding the variables in an interface in JAVA :

I. They are static.

II. They cannot be changed by the implementing class.

III. Variables are implicitly public.

Which of the statements are true?

(A) I and II
(B) II and III
(C) I and III
(D) I, II and III

46. Exception is a subclass of :

(A) Throwable class
(B) Error class
(C) IO class
(D) ClassCast Exception

47. The use of Thread.yield() inside run () is :

(A) synchronize the thread
(B) switch to another task
(C) abort the thread execution
(D) determines if the currently running thread has permission to modify this thread

48. Version control or version management is a task of :

(A) Project Management Process
(B) Inspection Process
(C) Software configuration Management Process
(D) Requirement Change Management Process

49. Scenario in a Use-Case diagram is :

(A) A system which uses the system being built for achieving some goal
(B) For whom a use-case is initiated
(C) A set of actions that are performed to achieve a goal under some specified conditions
(D) Describe the interaction if nothing fails and all steps are successfully completed

50. To determine the initial effort Ei in person-months, the equation used is of the type $Ei = a^* (KLOC)^b$. The value of the constants 'a' and 'b' depends on the project type and KLOC is the measure of size. IN COCOMO, projects are categorized into three types- organic, semi detached and embedded. The value of constants 'a' and 'b' for embedded systems are :

(A) (3.2, 1.05)
(B) (2.8, 1.20)
(C) (3.4, 1.15)
(D) (2.6, 1.01)

51. The inflow refers to input sources and outflow refers to output destinations. The module design complexity (in term of the total amount of data flowing in and out of the module and the module size) Dc is defined as :

(A) $Dc = size * (inflow * outflow)^2$
(B) $Dc = size * (inflow + outflow)^2$
(C) $Dc = size * (inflow - outflow)^2$
(D) $Dc = size * (inflow + outflow)$

52. The McCabe Cyclomatic number for a given set of code is :

```
0.  {
1.      i = 1;
2.      while (i <= n) {
3.          j = 1;
4.          while (j <= i) {
5.              if (A[i] < A[j])
6.                  swap (A[i], A[j]);
7.              j = j+1;   }
8.      i = i+1;  }
9.  }
```

(A) 4 (B) 5

(C) 3 (D) 6

53. There is a set of code :

```
char*foo(int s)
{
    char*output;
    if (s>0)
    output = (char*)malloc(size);
    if(s= =1)
    return NULL;
    return (output);
}
```

This is an example of

(A) Freeing an already freed resource (B) Memory leaks error

(C) NULL dereferencing (D) Lack of unique addresses

54. Test Oracle is a mechanism used to :

(A) Instrument the program with probes

(B) Analyze the results of the probe data

(C) Create test cases by making simple changes in programs

(D) Check the correctness of the output of the program for the test case

55. The Jelinski-Maranda model is known reliability model. The reference procedure for Jelinski-Maranda model is called

(A) Maximum likelihood estimation

(B) Hazard rate estimation

(C) Uncertainty rate estimation

(D) Fault removal rate estimation

56. Which data structure is having the feature "First In Last Out" ?

(A) stack

(B) queue

(C) tree

(D) graph

57. How many items will be there in a circular queue implemented using array (of maximum size 7) with front = 5 and rear = 2?

(A) 3

(B) 2

(C) 5

(D) Empty

58. What is the postfix representation of the expression P+Q*M–N ?

(A) PQMN+*–

(B) PQM*+N–

(C) PQ+M*N–

(D) None

59. Write the inorder traversal of a binary search tree whose preorder traversal is 8, 4, 3, 6, 10, 9, 15 :

(A) 3,4,6,8,9,10,15 (B) 3,6,4,9, 15, 10,8

(C) 15, 10, 9, 8, 6, 4, 3 (D) None

60. Which data structure is used for performing the Breadth First Search in a graph?

(A) stack (B) queue

(C) binary search tree (D) none

61. What is the number of leaf nodes in a full binary tree, if number of internal nodes is N?

(A) 2N (B) 2N+1

(C) 2^N–1 (D) N+1

62. If a node having two children is to be deleted from binary search tree then it will be replaced by its :

(A) Preorder successor (B) Inorder successor

(C) Postorder predecessor (D) None of these

63. How many edges will be there in a complete graph with 7 nodes?

(A) 49 (B) 28

(C) 21 (D) 42

64. In case of linked list, which of the following is true?

(A) only random access (B) only sequential access

(C) both sequential and random access (D) none

65. Which data structure is used for implementing recursion?

(A) stack (B) queue

(C) binary tree (D) none

66. Consider the two relations :

Branch:

branch-name	branch-city	assets
Brighton	Brooklyn	7100000
Downtown	Brooklyn	9000000
Mianus	Horseneck	400000
North Town	Rye	3700000
Perryridge	Horseneck	1700000
Pownal	Bennington	300000
Redwood	Palo Alto	2100000
Round Hill	Horseneck	8000000

Account:

account-number	branch-name	balance
A-101	Downtown	500
A-102	Perryridge	400
A-201	Brighton	900
A-215	Mianus	700
A-217	Brighton	750
A-222	Redwood	700
A-305	Round Hill	350

How many tuples do $\sigma_{branch.branch-name="Pownal"}$ (branch $\times$ Account) V $\sigma_{branch.branch-name="Northtown"}$ (branch $\times$ Account) have?

(A) 12 (B) 7

(C) 14 (D) 0

67. Consider an ER diagram with 3 entity sets A, B and C and two relationship sets X and Y where, A & B are strong entity sets and C is a weak entity set. X is a one to many binary relationship from A to B and the participation is total in many side. Y is an identifying relationship set between B and C. The attributes for A are {A1, A2, A3}, B are {B1, B2}, C are {C1, C2}. Which of the following is a correct attribute set for one of the tables while converting to minimum number of tables?

(A) {B1, B2, A1} (B) {A1, B1, C1, C2}

(C) {A1, A2, A3, B1} (D) {A1, B1}

68. Which of the following is false with respect to weak entity sets?

(A) Weak entity set do not have key attributes of their own

(B) The strong entity set which the weak entity set depends upon is identifying entity set

(C) The relationship set between weak entity set and strong entity set is identifying entity set

(D) The relationship set between weak entity set and strong entity set is identifying relationship set

69. Consider the two relations :

Loan

Loan-number	branch-name	balance
L-11	Round Hill	900
L-14	Downtown	1500
L-15	Perryridge	1500
L-16	Perryridge	1300
L-17	Downtown	1000
L-23	Redwood	2000
L-93	Mianus	500

Lending:

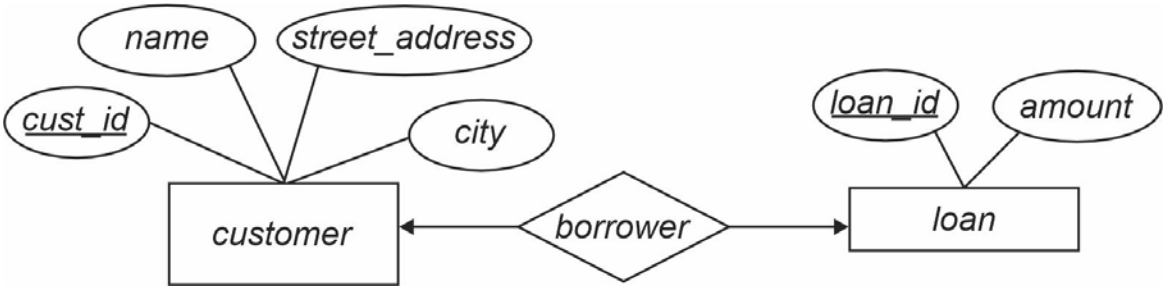
Branch-name	branch-city	assets	customer-name	loan-number	amount
Downtown	Brooklyn	9000000	Jones	L-17	1000
Redwood	Palo Alto	2100000	Smith	L-23	2000
Perryridge	Horseneck	1700000	Hayes	L-15	1500
Downtown	Brooklyn	9000000	Jackson	L-14	1500
Mianus	Horseneck	400000	Jones	L-93	500
Round Hill	Horseneck	8000000	Turner	L-11	900
Pownal	Bennington	300000	Williams	L-29	1200
North Town	Rye	3700000	Hayes	L-16	1300
Downtown	Brooklyn	9000000	Johnson	L-18	2000
Perryridge	Horseneck	1700000	Glenn	L-25	2500
Brighton	Brooklyn	7100000	Brooks	L-10	2200

How many tuples do Lending Full outer Join loan have?

(A) 5 (B) 7

(C) 9 (D) 12

70. Consider the following ER diagram: Identify where a new attribute Access date that describes the date on which the loan has been accessed recently, could be placed without null values?



(A) Only Loan entity set
(B) Only Customer entity set
(C) Borrower Relationship set or Customer entity set
(D) Borrower Relationship set or loan entity set

71. Consider the following transactions which are executed concurrently :

T1 : lock-X(B) ;	T2 : lock-S(A) ;
read (B);	read (A);
B:=B-50;	lock-S(B);
write (B);	read (B);
lock-X(A);	display (A+B)
read (A);	unlock (A);
A:=A+50;	unlock (B);
write (A):	
unlock (B);	
unlock (A);	

This concurrent schedule is

(A) Conflict serializable
(B) Recoverable
(C) Cascadeless
(D) None of the above

72. Which of the following is not the functions of Query processor in database system architecture?

(A) Interprets DDL statements and records definitions in data dictionary
(B) Manages allocation of space on disk, data structures used to represent information
(C) Translates DML into several alternate evaluation plans
(D) Execute low level instructions generated by DML compiler

73. The relation schema R has attributes name A, B, C, D and E. If R has the following functional dependencies, then find the most appropriate normal form?

ABC –> E

DB –> E

CD –> A

(A) 1NF (B) 2NF

(C) 3NF (D) 4NF

74. For the relational schema R (A, B, C), and the functional dependencies A –>B, B –>C, find the number of nontrivial functional dependencies :

(A) 1 (B) 2

(C) 3 (D) 4

75. What does numeric (4, 2) allows to store in SQL?

(A) 44.44 (B) 4444.44

(C) 444.44 (D) 4444.4

76. The Accounts Department in a University has 10 employees, and each has a desktop computer to run the financial software. All 10 desktop computers are connected to a single printer to optimize operational expenses. What type of network would you recommend to this department?

(A) SAN (B) LAN

(C) WAN (D) MAN

77. What is one of the key differences between features of ISO/OSI and TCP/IP network models?

(A) Describe logical ways of networking and the processing of information using a layered approach.

(B) More number of layers in OSI model makes better troubleshooting and improving network performance more straightforward.

(C) Uses the concept of encapsulation, in which data is packaged into a series of headers and trailers that contain information about the data being transmitted and how it should be handled by the receiver node.

(D) Framework is designed to encompass various network communication methods with naming the protocols used in each layer.

78. In a sliding window protocol, the receiver window ———— in size when new frames are received and the receiver window ———— in size when the acknowledgments are sent.

(1) increases

(2) decreases

(3) remains the same

(A) 1 and 2 respectively (B) 2 and 1 respectively

(C) 3 and 3 respectively (D) 2 and 2 respectively

79. Automatic Repeat Request (ARQ) protocols and piggybacking are used for improving ———— and ———— respectively.

(1) Link utilization
(2) Error detection
(3) Error control
(4) Connection establishment

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

80. Which of the following delays are faced when a sender host sends data to a receiver host through the internet when using packet switching?

(1) path establishment
(2) transmission
(3) propagation
(4) queuing
(5) processing

(A) 1, 2, 3 and 4 (B) 1, 3, 4 and 5
(C) 2, 3, 4 and 5 (D) all of these

81. Which of the following is false concerning to radio waves?

(A) Frequency range is from 3 kHz to 1 GHz regulated by authorities
(B) Radio waves can travel long distances, suitable for long-distance broadcasting
(C) The sender and receiver antennas need to be aligned
(D) Antenna transmissions are susceptible to interference from each other

82. Cyclic Redundancy Code (CRC) is used for error checking with Modulo-2 arithmetic. If the data transmitted is 11001001 with the generator polynomial $x^3 + 1$, the data transmitted is:

(A) 11001001011 (B) 110010010011
(C) 11001001110 (D) 1100100111

83. If a node in a network transmits 4000 frames per second, and each node has 8-bits multiplexing slot, then which multiplexing technique is used in this case?

(A) Frequency Division Multiplexing (FDM)
(B) Wavelength Division Multiplexing (WDM)
(C) Time Division Multiplexing (TDM)
(D) Code Division Multiplexing (CDM)

84. If T_p is the maximum possible propagation delay between 2 most widely separated stations and T_{fr} is the average time required to send out a frame, the vulnerable time (in which there is a possibility of collision) for CSMA is:

(A) T_p (B) T_{fr}

(C) $2T_p$ (D) $2T_{fr}$

85. In the Asynchronous Transfer Mode (ATM) network, the cells follow the same path and the cells do not usually arrive out of order because ATM:

(A) is asynchronous (B) uses virtual circuit routing

(C) is multiplexed (D) is a network

86. Which of the following are features of IPv6?

(1) Checksum field is available

(2) Fragmentation is performed only by the sender

(3) Broadcast Message Transmission Scheme

(4) Any cast message transmission scheme

(5) Autoconfiguration of addresses

(6) Network Address Translation (NAT) is required

(A) 2, 3, 6 (B) 1, 2, 4

(C) 2, 4, 6 (D) 2, 4, 5

87. Assume that a network system has an n-layer protocol hierarchy. Applications generate messages of length M bytes. At each of the layers, an h-byte header is added. What fraction of the network bandwidth is utilized for data transmission?

(A) $\frac{(M-h)}{M}$ (B) $\frac{(h*n)}{M}$

(C) $\frac{(M-h*n)}{M}$ (D) None of these

88. A small organization has a class C address (196.125.56.0) and needs 5 sub-networks, each with 25 hosts. What is the subnet mask?

(A) 255.255.255.224 (B) 196.125.56.192

(C) 196.125.56.224 (D) 255.255.255.192

89. In Additive Increase Multiplicative Decrease (AIMD) congestion control of TCP/IP network, if rwnd is the flow control's receiver window size and cwnd is the congestion control's window size, what is the flow control's sender window size?

(A) sum(rwnd, cwnd (B) diff((rwnd, cwnd))

(C) max(rwnd, cwnd) (D) min(rwnd, cwnd)

90. With respect to OSPF routing protocol, select the feature it has:

(A) Each router exchanges routing tables with only its neighbors

(B) Utilizes event-triggered updates

(C) Used to route between autonomous systems

(D) Provides high network overhead due to flooding

91. Which devices receive packets from the network layer and transmit them into the datalink layer after the formation of frames?

(1) Gateway

(2) Hub

(3) Router

(4) Switch

(5) Bridge

(6) Modem

(7) NIC

(8) Repeater

(A) 1, 4, 7

(B) 2, 4, 8

(C) 3, 5, 6

(D) 4, 5, 7

92. Routing of data through the Internet is done based on:

(A) the destination port number in the TCP segment

(B) the destination IP address in the IP packet

(C) the destination MAC address in the Ethernet frame

(D) the hostname of the destination

93. A certificate authority (CA) is a trusted entity that issues digital certificates. From the certificate, the certificate authority authenticates the:

(A) Signature of the certificate holder

(B) Private key of a certificate holder

(C) Public key of a certificate holder

(D) Secret key used by RSA

94. nslookup command queries the ———— in order to find the IP address for a given fully qualified domain name.

(A) Address Resolution Protocol (ARP)

(B) Network Address Translation (NAT)

(C) Domain Name Service (DNS)

(D) Media Access Control (MAC)

95. ———— HTTP request method performs a message loop-back test along the path to the target resource and returns a copy of the complete HTTP request message, including start line, header fields and body, received by the server.

(A) GET (B) POST

(C) PUT (D) TRACE

96. Consider the following Cascading Style Sheets (CSS) rules:

1. Style 1:

```
<HEAD>
<LINK REL = "STYLE SHEET" TYPE = "TEXT/CSS" HREF =
"FILE.CSS" >
</HEAD>
```

The contents of file.css are

```
h3 { font.family : Arial ; color : red; }
p { font.family : Times New Roman ; color : blue ; }
```

2. Style 2:

```
<h3 style = "font.family = Arial ; color = red">
```

3. Style 3:

```
<HEAD>
<STYLE TYPE = "TEXT/CSS">
h3 { font.family : Arial ; color : red ; }
</STYLE>
</HEAD>
```

The CSS styles used in these 3 are respectively:

(A) Internal, External, Inline (B) External, Internal, Inline

(C) Inline, External, Internal (D) External, Inline, Internal

97. Multiple Style Sheets can be defined on one HTML page. What is the order in which style sheets precedence is defined?

(A) Important > Inline > Internal > External

(B) External > Inline > Important > Internal

(C) External > Important > Internal > Inline

(D) Inline > Important > External > Internal

98. Which one of the following functions is used to kill only the specified session variable in PHP?

(A) session_destroy()

(B) unset()

(C) session_kill()

(D) session_set()

99. Consider the below 2 programs in JavaScript:

function compare1( )	function compare2( )
{	{
let a = 2 ;	let a = 2 ;
let b = 2.0 ;	let b = 2.0 ;
if (a == b)	if (a === b)
return true;	return true;
else	else
return false;	return false;
}	}

What will be the output of the following JavaScript code from the functions compare1 and compare2 respectively?

(A) true, false

(B) true, true

(C) false, true

(D) false, false

100. With My SQL, how do you select all the records from a table named "school" with the value of the column "name" starts with "A"?

(A) SELECT * FROM school WHERE name = 'A%'

(B) SELECT * FROM school WHERE name LIKE '%A%'

(C) SELECT * FROM school WHERE name = '%A%'

(D) SELECT * FROM school WHERE name LIKE 'A%'

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK