

## FINAL ANSWER KEY

Question 98/2023/OL

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Question1:-Number of subgraphs of a complete graph with five vertices  $K_5$  are isomorphic to a complete bipartite graph  $K_{1,3}$

A:-5

B:-10

C:-15

D:-20

Correct Answer:- Option-D

Question2:-Consider the statements related to the vertex colouring of a graph G,

(i) the chromatic number is atmost n, for an n-colourable graph

(ii) the chromatic number is atleast n for an n-colourable graph

(iii) complete graph with n vertices is n-1 colourable

(iv) degree of a chromatic polynomial is the number of vertices of G

Which of the following is true?

A:-(i) and (ii)

B:-(i) and (iv)

C:-(ii) and (iii)

D:-(ii) and (iv)

Correct Answer:- Option-B

Question3:-How many integer solutions are possible for the linear equation  $x_1 + x_2 + x_3 + x_4 + x_5 = 7$ ;  $x_1, x_2, x_3, x_4, x_5 \geq 0$ ?

A:-66

B:-36

C:-16

D:-6

Correct Answer:- Option-A

Question4:-Letters and digits are distinct, the possible number of codes formed by using two vowels from English letters followed by three digits is

A:-120

B:-12600

C:-10080

D:-none of these

Correct Answer:- Option-D

Question5:-In a course, there are five grades, say A, B, C, D, E. What is the minimum number of students required so that four of them are guaranteed to get the same grade?

A:-14

B:-16

C:-18

D:-none of these

Correct Answer:- Option-B

Question6:-Which of the following proposition is a tautology?

A:- $p \vee \neg p$

B:- $p \wedge \neg p$

C:- $p \vee (p \rightarrow q)$

D:-both (1) and (3)

Correct Answer:- Option-D

Question7:-Dual of the proposition  $(p \wedge q) \vee (p \vee \neg(p \vee q))$  is

A:- $(p \vee q) \wedge (p \wedge (p \vee q))$

B:- $(p \vee q) \wedge (\neg p \wedge (\neg p \vee q))$

C:- $(p \vee q) \wedge (\neg p \wedge (\neg p \wedge q))$

D:-none of these

Correct Answer:- Option-D

Question8:-Maximum number of maxterms formed by three variables/statements p, q, r is

A:-3

B:-8

C:-9

D:-27

Correct Answer:- Option-B

Question9:-Order of the matrix formed by the differential linear map  $D \in L(P_3(\mathbb{R}), P_2(\mathbb{R}))$  is

A:- $3 \times 2$

B:- $2 \times 3$

C:- $3 \times 4$

D:- $4 \times 3$

Correct Answer:- Option-C

Question10:-Eigenvalues of the linear map  $\tau \in L(\mathbb{R}_2)$  defined by  $\tau(x, y) = (-3y, x)$  is/are

A:- $\pm \sqrt{3}$

B:  $-\pm 1$

C: -1, 3

D: -0, 3

Correct Answer:- Option-A

Question11:-Which of the following matrix is not diagonalizable?

A:  $\begin{bmatrix} 5 & -8 & 1 \\ 0 & 0 & 7 \\ 0 & 0 & -2 \end{bmatrix}$

B:  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

C:  $\begin{bmatrix} 2 & 1 & 0 \\ 0 & 5 & 3 \\ 0 & 0 & 8 \end{bmatrix}$

D:  $\begin{bmatrix} 4 & 0 & 0 \\ 1 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

Correct Answer:- Option-D

Question12:- $\mathbb{Z}_{360}$  is isomorphic to

A:  $\mathbb{Z}_8 \oplus \mathbb{Z}_3 \oplus \mathbb{Z}_3 \oplus \mathbb{Z}_5$

B:  $\mathbb{Z}_8 \oplus \mathbb{Z}_9 \oplus \mathbb{Z}_5$

C:  $\mathbb{Z}_9 \oplus \mathbb{Z}_{40}$

D: -none of these

Correct Answer:- Option-B

Question13:-Euclidean valuation of  $a+ib \in \mathbb{Z}[i]$ , the ring of Gaussian integers is

A:  $-a^2+b^2$

B:  $-a^2-b^2$

C:  $-a^2+2b^2$

D:  $-a^2-2b^2$

Correct Answer:- Option-A

Question14:-Which of the following is not the order of a subfield of a field with 64 elements

A: -2

B: -4

C: -8

D: -16

Correct Answer:- Option-D

Question15:-Period and amplitude of the function  $f(x) = 3\cos\left(2x + \frac{\pi}{2}\right)$  are respectively

A:  $-2\pi, 6$

B:  $-\frac{\pi}{2}, 2$

C:  $-\frac{\pi}{2}, 6$

D:  $-\pi, 3$

Correct Answer:- Option-D

Question16:-The real valued function  $f(x) = x^2; x \in \mathbb{R}$  is

- A:-injective and surjective
- B:-injective and but not surjective
- C:-surjective and but not injective
- D:-none of these

Correct Answer:- Option-D

Question17:-What is the purpose of a decoder in combinational logic circuits?

- A:-to generate an output based on the majority of the input values
- B:-to convert binary inputs into decimal outputs
- C:-to generate multiple outputs based on a single input value
- D:-to implement arithmetic operations such as addition and subtraction

Correct Answer:- Option-C

Question18:-Which of the following components is used as a memory element in sequential circuits?

- A:-Flip flop
- B:-multiplexer
- C:-comparator
- D:-decoder

Correct Answer:- Option-A

Question19:-Which of the following is not a feature of combinational logic circuits?

- A:-Real-time processing
- B:-Deterministic behavior
- C:-Sequential processing
- D:-Feedback loops and memory elements

Correct Answer:- **Question Cancelled**

Question20:-Which of the following techniques is used to simplify logic functions and optimize circuit design?

- A:-Logic gates
- B:-Boolean algebra
- C:-Arithmetic operations
- D:-Clock signals

Correct Answer:- Option-B

Question21:-What is the decimal equivalent of octal number 325.736?

- A:-1704.93359375
- B:-213.93359375
- C:-213.810546875

D:-1704.810546875

Correct Answer:- Option-B

Question22:-The Macintosh Computer processes binary numbers that are 32 bit long. If a 32 bit number has all 1s, what is the decimal equivalent?

A:- $2^{32}-1$

B:- $2^{32}$

C:- $2^{32}+1$

D:-None of these

Correct Answer:- Option-A

Question23:-What is the 8-bit addition of +67 and -98 decimal numbers in 2's complement representation?

A:-10011110

B:-01100001

C:-11100001

D:-none of these

Correct Answer:- Option-C

Question24:-Convert the BCD number to decimal equivalent : 1000 0001 0011

A:-813

B:-318

C:-818

D:-313

Correct Answer:- Option-A

Question25:-What is the purpose of machine instructions in computer organization?

A:-To provide a graphical user interface to store data in secondary storage devices

B:-to provide a graphical user interface

C:-to represent high-level programming languages

D:-To encode low-level operations executed by the CPU

Correct Answer:- Option-D

Question26:-Which of the following addressing modes uses a base register and an offset to calculate the effective address?

A:-Relative addressing mode

B:-Immediate addressing mode

C:-Indexed addressing mode

D:-Indirect addressing mode

Correct Answer:- Option-C

Question27:-Which of the following is responsible for transforming logical addresses

into physical addresses in a computer system?

A:-Memory Management Unit (MMU)

B:-Random Access Memory (RAM)

C:-Cache memory

D:-Input/Output (I/O) Controller

Correct Answer:- Option-A

Question28:-What advantages does DMA offer in data transfer?

A:-It increases the size of the main memory

B:-It eliminates the need for a memory controller

C:-It reduces the need for interrupts during I/O operations

D:-It improves the performance of the CPU

Correct Answer:-**Question Cancelled**

Question29:-Which cache organization provides the highest level of associativity?

A:-Direct mapped cache

B:-2-way set associative cache

C:-4-way set-associative cache

D:-fully associative cache

Correct Answer:- Option-D

Question30:-Which component is responsible for prioritizing interrupts in a computer system?

A:-CPU

B:-Memory

C:-Interrupt controller

D:-Input/output devices

Correct Answer:- Option-C

Question31:-Which type of interrupt has the highest priority in most interrupt systems?

A:-Timer interrupt

B:-Non-maskable interrupt

C:-Software interrupt

D:-External interrupt

Correct Answer:- Option-B

Question32:-Consider a pipelined processor with the four steps instruction fetch, Decode, Execute and Write Back. The first three steps take one clock cycle each to complete the operation. The Execute stage depends on the instruction. The ADD and SUB instructions requires one clock cycle, MUL requires 2 clock cycle and DIV requires 3 clock cycles.

Operands forwarding is used in the pipelined processor. What is the number of clock cycles taken to complete the following sequence of instructions?

MUL R1, R2, R3  
ADD R2, R3, R4  
DIV R4, R5, R6  
SUB R6, R7, R8

A:-7

B:-10

C:-11

D:-19

Correct Answer:- Option-B

Question33:-In the C programming language, which of the following data types has the strictest alignment requirement?

A:-char

B:-double

C:-short

D:-int

Correct Answer:- Option-B

Question34:-Which type conversion requires an explicit cast in C?

A:-Implicit conversion from char to int

B:-Implicit conversion from double to float

C:-Implicit conversion from int to double

D:-None of the above

Correct Answer:- Option-C

Question35:-Which keyword is used to define a user-defined function in C?

A:-def

B:-func

C:-define

D:-none of the above

Correct Answer:- Option-D

Question36:-What is the return type of the fputc() function in C?

A:-int

B:-void

C:-FILE\*

D:-size\_t

Correct Answer:- Option-A

Question37:-Which of the following statement is not part of defining a union data type using a class object?

A:-Implement appropriate methods

B:-Use the tag or discriminant to identify the active data type

C:-Define the class objects

D:-Declare the union data type

Correct Answer:- Option-B

Question38:-Which of the following statements is true regarding data abstraction in C++?

A:-Data abstraction is only applicable to primitive data types in C++

B:-Data abstraction is a technique used to implement multiple inheritance in C++

C:-Data abstraction is not supported in C++ and is only available in other programming languages

D:-Data abstraction allows us to hide the implementation details and only expose the essential features of a class

Correct Answer:- Option-D

Question39:-Which of the following statements about interfaces in object-oriented programming (OOP) is true?

A:-Interface can only be implemented by abstract classes

B:-Interfaces define a contract that classes must adhere to but do not provide method implementations

C:-Interfaces provide concrete implementations of methods

D:-Interfaces can have both method implementations and member variables

Correct Answer:- Option-B

Question40:-What is the maximum number of Java Class files that can be kept inside a single Java package?

A:-4

B:-8

C:-64

D:-There is no explicit limit

Correct Answer:- Option-D

Question41:-What's happen if base condition is not defined in recursion?

A:-The program will throw a compilation error

B:-The recursive function will continue to call itself indefinitely, causing an infinite recursion

C:-The program will terminate without any issues

D:-Stack underflow

Correct Answer:- Option-B

Question42:-What is the advantage of pass by reference parameter passing?

A:-It allows for better memory management

B:-It eliminates the need for pointers

C:-It enables the called function to modify the original argument

D:-none of these

Correct Answer:- Option-C

Question43:-Which of the following statements is true regarding the lifetime of variables with automatic binding in C?

A:-They have a lifetime that extends until the function containing them completes execution

B:-They have a lifetime that extends until the program terminates

C:-They have a lifetime that extends throughout the program

D:-They have a lifetime that extends until they are explicitly deallocated

Correct Answer:- Option-A

Question44:-In most programming languages, what happens if two variables with the same name are declared in nested scopes?

A:-An error is raised, and the program fails to compile

B:-The innermost variable shadows the outer variable, and the inner variable is used within its scope

C:-The outer variable shadows the inner variable, and the outer variable is used within its scope

D:-Both variables are combined, and their values are merged within their respective scopes

Correct Answer:- Option-B

Question45:-Which of the following statement is/are correct about ER model?

i. the discriminator of a weak entity is underlined with a dashed line

ii. the discriminator of a weak entity is underlined with a solid line

iii. the relationship set connecting the weak entity set to the identifying strong entity set is depicted by a dashed diamond.

iv. the relationship set connecting the weak entity set to the identifying strong entity set is depicted by a double diamond

A:-only i and iii

B:-only i and iv

C:-only ii and iii

D:-only ii and iv

Correct Answer:- Option-B

Question46:-Which are the pitfalls that should avoid during the designing of a database schema?

A:-Redundancy

B:-Incompleteness

C:-Insufficient indexing

D:-All of the above

Correct Answer:- Option-D

Question47:-Consider the table "Sales" with columns: id(INTEGER), data (DATE), and total (DECIMAL). Which of the following queries will return the average total for each year?

A:-SELECT YEAR (date), AVG(total) FROM sales

B:-SELECT AVG (total) FROM sales GROUP BY YEAR (date)

C:-SELECT YEAR (date), AVG (total) FROM sales GROUP BY YEAR (date);

D:-SELECT AVG (total) FROM sales GROUP BY data ;

Correct Answer:- Option-C

Question48:-Which of the following statements is true regarding the CASCADE option in a FOREIGN KEY constraint?

A:- It prevents any modifications to the foreign key column

B:-it allows NULL values in the foreign key column

C:-It automatically creates a new primary key value when a referenced primary key is deleted or updated

D:-It deletes or updates the dependent rows in the referencing table when a referenced primary key is deleted or updated

Correct Answer:- Option-D

Question49:-'Q' in a five tuple DFA definition represents \_\_\_\_\_

A:-The finite set of states

B:-Finite set of outputs

C:-The set of all inputs

D:-None of the above

Correct Answer:- Option-A

Question50:-A linked list is a/an \_\_\_\_\_ linear data structure.

A:-Asymptotic

B:-Primitive

C:-Non-primitive

D:-Absolute

Correct Answer:- Option-C

Question51:-A parent process executing \_\_\_\_\_ system call will be suspended until its child process terminates

A:-Create()

B:-Exec()

C:-Wait()

D:-Run()

Correct Answer:- Option-C

Question52:-A context free language is called ambiguous if there exists a string

that can have

A:- no parse trees

B:-only one parse tree

C:-more than one parse trees

D:-none of the above

Correct Answer:- Option-C

Question53:-\_\_\_\_\_ occurs when a program tries to access a page that is mapped in its address space but not loaded in physical memory

A:-page fault

B:-frame error

C:-segmentation error

D:-bouncing error

Correct Answer:- Option-A

Question54:-\_\_\_\_\_ module gives control of the CPU to the process selected by the short-term scheduler.

A:-Loader

B:-Dispatcher

C:-Scheduler

D:-Compiler

Correct Answer:- Option-B

Question55:-The first phase of compilation process is \_\_\_\_\_

A:-Code generation

B:-Semantics analysis

C:-Syntax analysis

D:-Lexical analysis

Correct Answer:- Option-D

Question56:-\_\_\_\_\_ is a tool used for process synchronization

A:-parity checker

B:-semaphore

C:-symbolic constant

D:-segment

Correct Answer:- Option-B

Question57:-If the TTL field value reaches 0, \_\_\_\_\_

A:-Packets are dropped

B:-Packets are validated

C:-Packets are considered error-free

D:-None of the above

Correct Answer:- Option-A

Question58:-The number of edges present in a complete graph having n vertices is \_\_\_\_\_

A:- $n^2$

B:- $(n+1)/2$

C:- $(n*(n+1))/2$

D:- $(n*(n-1))/2$

Correct Answer:- Option-D

Question59:-The relocation register helps in \_\_\_\_\_

A:-protecting the address spaces of processes

B:-Allocating resources

C:-Re-allocating resources

D:-All of the above

Correct Answer:- Option-A

Question60:-The worst case complexity of bubble sort is

A:- $O(\log n)$

B:- $O(n \log n)$

C:- $O(n^2)$

D:- $O(n)$

Correct Answer:- Option-C

Question61:-A deterministic Finite Automation (DFA), is formally defined as \_\_\_\_\_

A:-5-tuple

B:-7-tuple

C:-0-tuple

D:-3-tuple

Correct Answer:- Option-A

Question62:-Resolution of externally defined symbols and functions associated with the program is done by \_\_\_\_\_

A:-Assembler

B:-Linker

C:-Loader

D:-Interpreter

Correct Answer:- Option-B

Question63:-When two or more bits in a data unit has been changed during transmission, the error is called \_\_\_\_\_

A:-double bit error

B:-single bit error

C:-random bit error

D:-burst error

Correct Answer:- Option-D

Question64:-The ArrayIndexOutOfBoundsException exception is a \_\_\_\_\_ exception.

A:-Compile-time

B:-Run-time

C:-Load time

D:-None of the above

Correct Answer:- Option-B

Question65:-Process-to-process communication happens at the \_\_\_\_\_ layer of OSI/ISO model

A:-Network

B:-Session

C:-Transport

D:-Physical

Correct Answer:- Option-C

Question66:-A \_\_\_\_\_ occurs when stack contains no elements and you try to pop elements

A:-Stack overflow

B:-Stack extension

C:-Stack underflow

D:-Stack Expansion

Correct Answer:- Option-C

Question67:-HTTP uses the services of \_\_\_\_\_

A:-TCP

B:-UDP

C:-ICMP

D:-SMTP

Correct Answer:- Option-A

Question68:-Several elements competing for the same slot in the hash table, results in \_\_\_\_\_

A:-inheritance

B:-resistance

C:-persistence

D:-collision

Correct Answer:- Option-D

Question69:-\_\_\_\_\_ is a device that connects networks with different protocols

A:-Router

B:-Hub

C:-Switch

D:-Gateway

Correct Answer:- Option-D

Question70:-The number of passes required to sort the elements [9, 3, 7, 0, 1] using insertion sort is

A:-25

B:-10

C:-5

D:-4

Correct Answer:- Option-D

Question71:-IPv4 addresses are \_\_\_\_\_ addresses that are unique to every host or device on the internet

A:-64-bit

B:-32-bit

C:-128-bit

D:-4-bit

Correct Answer:- Option-B

Question72:-\_\_\_\_\_ refers to the buildup of data at an I/O switch when buffers become full and are not able to receive additional data

A:-Backpressure

B:-Bufferstress

C:-Bufferblock

D:-Buffer pressure

Correct Answer:- Option-A

Question73:-The number of bits needed to represent a character set containing 31 characters is \_\_\_\_\_

A:-10

B:-4

C:-5

D:-2

Correct Answer:- Option-C

Question74:-In the readers-writers problem \_\_\_\_\_ are given exclusive access to the shared object for proper process synchronization.

A:-Writers

B:-Readers

C:-Both readers and writers

D:-None of the above

Correct Answer:- Option-A

Question75:- \_\_\_\_\_ occurs when a process begins execution with no pages in memory

A:-System crashes

B:-Deadlock

C:-Race condition

D:-A page fault for every page reference

Correct Answer:- Option-D

Question76:-Choose the correct option

(i) Stack is an abstract data type (ADT)

(ii) The datatype of each element of a stack can be of any type

A:-(i) is false, but (ii) is true

B:-(i) is true, but (ii) is false

C:-Both (i) and (ii) are true

D:-Both (i) and (ii) are false

Correct Answer:- Option-C

Question77:-Which of the following is the least secure method of authentication?

A:-Password

B:-Card authentication

C:-Fingerprints

D:-Voice recognition

Correct Answer:- Option-A

Question78:-The physical layer translates logical communication requests from the \_\_\_\_\_ into hardware specific operations.

A:-Application layer

B:-Network layer

C:-Transport layer

D:-Data link layer

Correct Answer:- Option-D

Question79:-For a regular language expression, the appropriate order of precedence, if the parenthesis is ignored is

A:-Kleene, Dot, Union

B:-Dot, Kleene, Union

C:-Union, Dot, Kleene

D:-Kleene, Union, Dot

Correct Answer:- Option-A

Question80:-In a queue, elements are deleted from the \_\_\_\_\_ end

A:-Back

B:-Front

C:-Rear

D:-Middle

Correct Answer:- Option-B

Question81:-Which of the following is/are unpaired tag/tags in HTML?

A:-<B>

B:-<BR>

C:-<HR>

D:-Both (2) and (3)

Correct Answer:- Option-D

Question82:-The CSS property used to make text bold

A:-Font-weight : bold

B:-Weight : bold

C:-Font : bold

D:-Style : bold

Correct Answer:- Option-A

Question83:-The built in function for converting JSON strings into JavaScript objects

A:-JSON.parse()

B:-JSON.stringify()

C:-Either (1) or(2)

D:-None of the above

Correct Answer:- Option-A

Question84:-Ajax sends data to a webserver

A:-In the background

B:-Before loading the page

C:-With loading the page

D:-Any of the above

Correct Answer:- Option-A

Question85:-Socket address is

A:-Combination of MAC address and domain address

B:-Combination of IP Address and port address

C:-Combination of Application layer address

D:-None of the above

Correct Answer:- Option-B

Question86:-Which server plays an intermediary role between users and targeted websites or servers

A:-File server

B:-Database server

C:-Proxy server

D:-Virtual private server

Correct Answer:- Option-C

Question87:-Which of the following is a client side scripting language

A:-HTML

B:-PHP

C:-Python

D:-Coldfusion

Correct Answer:- Option-A

Question88:-Conversion of IPaddress to hostname is

A:-DNS lookup

B:-Forward DNS lookup

C:-Reverse DNS lookup

D:-Lookup

Correct Answer:- Option-C

Question89:-Which of the following is/are true

A:-In an active attack, modification in information takes place

B:-In an active attack, attention is on detection

C:-The duration of a passive attack is short

D:-all the above

Correct Answer:- Option-A

Question90:-Which among the following ensures that a message or transaction has not been tampered with

A:-Confidentiality

B:-Non repudiation

C:-Integrity

D:-None of the above

Correct Answer:- Option-C

Question91:-An example for an asymmetric key cryptography is

- A:-RSA
- B:-AES
- C:-DES
- D:-3DES

Correct Answer:- Option-A

Question92:-The big-endian format is one in which

- A:-the least significant byte is stored in the low-address byte position
- B:-the least significant byte is stored in the high-address byte position
- C:-the most significant byte is stored in the high-address byte position
- D:-the most significant byte is stored in the low-address byte position

Correct Answer:- Option-D

Question93:-The property that no party to a contract can later deny that they have signed a document is called

- A:-integrity
- B:-authentication
- C:-non repudiation
- D:-encryption

Correct Answer:- Option-C

Question94:-SHA-1 is

- A:-Message digest function
- B:-Public key encryption algorithm
- C:-Private key encryption algorithm
- D:-None of these

Correct Answer:- Option-A

Question95:-An example for an authentication protocol is

- A:-ARP
- B:-DHCP
- C:-Kerberos
- D:-SSL

Correct Answer:- Option-C

Question96:-Which among the following are not associated with middleware layers

- A:-Marshalling
- B:-RMI
- C:-TCRPC
- D:-TCP

Correct Answer:- Option-D

Question97:-SOAP is designed to enable

- A:-client-server and synchronous communication
- B:-peer-to-peer and asynchronous communication
- C:-Client-server and asynchronous communication
- D:-Peer-to-peer and synchronous communication

Correct Answer:- Option-C

Question98:-Which of the following is true for public cloud?

- A:-High scalability
- B:-Multi tenancy
- C:-Hosted at service provider site
- D:-All of the above

Correct Answer:- Option-D

Question99:-Which among the following is known as on demand software?

- A:-PaaS
- B:-SaaS
- C:-IaaS
- D:-None of the above

Correct Answer:- Option-B

Question100:-The ability of the webserver to keep a track of the users who access the server and how long they have accessed is

- A:-Authentication
- B:-Accounting
- C:-Authorization
- D:-Assigning permission

Correct Answer:- Option-B