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MADE EASY PUBLICATIONS

UGC-NET Previous Solved Papers : Computer Science and Applications

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Preface

It is commonly said "Teaching is the profession which creates all other professions" and "Research is the new knowledge"; so aren't these professions an instruments to serve the nation?

Of course yes, from Dr.S.Radhakrishnan to Dr. APJ Abdul Kalam, they will be remembered for their marvellous works, apart from technical jobs in engineering services or PSUs, this is equally a good choice to contribute in the saga of India's development. UGC-NET provides opportunity for budding engineers to become future renowned scholars of this country and entire world.

B. Singh (Ex. IES)

This is one such exam which opens a direct gateway to lectureship in colleges, universities as an Assistant Professor and also to make remarkable progress in the field of research by awarding JRF.

Preparation of any exam is complete only when set of variety of questions is practised. To help all the students in their preparation MADE EASY team made efforts and came up with compilation of all previous years' questions of UGC-NET exam with accurate and detailed solutions. This book is not only helpful for UGC-NET but also for GATE, HAL, BARC, CIL, BHEL, DRDO, UPPCL, SAIL, GAIL, DMRC, CRIS, ISRO and other competitive exams for engineering graduates.

I would like to give credit to MADE EASY team for solving previous years' questions with correctness and making it a medium to serve students. Providing good study material and quality guidance are two ways to help each and every student and this book fulfils my aim to contribute in success of every aspirant.

With Best Wishes

B. Singh

CMD, MADE EASY Group

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UGC-NET
Previous Year Solved Papers

Computer Science and Applications

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UGC NET : 2004 (D2)

Note: *This paper contains fifty (50) multiple-choice questions, each question carrying two (2) marks. Attempt all of them.*

1. $A \vee A = A$ is called :
   (a) Identity law
   (b) De Morgan's law
   (c) Idempotant law
   (d) Complement law

2. If $f(x) = x+1$ and $g(x) = x+3$ then $f \circ f \circ f \circ f$ is
   (a) g
   (b) $g + 1$
   (c) g^4
   (d) None of these

3. The context-free languages are closed for:
   (*i*) Intersection
   (*ii*) Union
   (*iii*) Complementation
   (*iv*) Kleene Star
   then
   (a) (*i*) and (*iv*)
   (b) (*i*) and (*iii*)
   (c) (*ii*) and (*iv*)
   (d) (*ii*) and (*iii*)

4. The following lists are the degrees of all the vertices of a graph
   (*i*) 1, 2, 3, 4, 5
   (*ii*) 3, 4, 5, 6, 7
   (*iii*) 1, 4, 5, 8, 6
   (*iv*) 3, 4, 5, 6
   then
   (a) (*i*) and (*ii*)
   (b) (*iii*) and (*iv*)
   (c) (*iii*) and (*ii*)
   (d) (*ii*) and (*iv*)

5. If I_m denotes the set of integers modulo m, then the following are fields with respect to the operations of addition modulo m and multiplication modulo m :
   (*i*) Z_{23}
   (*ii*) Z_{29}
   (*iii*) Z_{31}
   (*iv*) Z_{33}
   Then
   (a) (*i*) only
   (b) (*i*) and (*ii*) only
   (c) (*i*), (*ii*) and (*iii*) only
   (d) (*i*), (*ii*), (*iii*) and (*iv*)

6. An example of a binary number which is equal to its 2's complement is :
   (a) 1100
   (b) 1001
   (c) 1000
   (d) 1111

7. When a tri-state logic device is in the third state, then :
   (a) it draws low current
   (b) it does not draw any current
   (c) it draws very high current
   (d) it presents a low impedance

8. An example of a connective which is not associative is :
   (a) AND
   (b) OR
   (c) EX-OR
   (d) NAND

9. Essential hazards may occur in :
   (a) Combinational logic circuits
   (b) Synchronous sequential logic circuits
   (c) Asynchronous sequential logic circuits working in the fundamental mode
   (d) Asynchronous sequential logic circuits working in the pulse mode

10. The characteristic equation of a T flip-flop is
    (a) $Q_{n+1} = T\bar{Q}_n + \bar{T}Q_n$
    (b) $Q_{n+1} = T + Q_n$
    (c) $Q_{n+1} = TQ_n$
    (d) $Q_{n+1} = \bar{T}\bar{Q}_n$
    The symbols used have the usual meaning.

11. Suppose x and y are two Integer Variables having values O× 5AB6 and O× 61CD respectively. The result (in hex) of applying bitwise operator AND to x and y will be :
    (a) O× 5089
    (b) O× 4084
    (c) O× 78A4
    (d) O× 3AD1

12. Consider the following statements:
    Int $i = 4, j = 3, k = 0$;
    $k = ++ i - --j + i++ - --j + j ++$;
    What will be the values of i, j and k after the statement.
    (a) 7, 2, 8
    (b) 5, 2, 10
    (c) 6, 2, 8
    (d) 4, 2, 8

13. What is the value of the arithmetic expression (Written in *C*)

    $2 * 3 / 4 - 3 / 4 * 2$

    (a) 0   (b) 1
    (c) 1.5   (d) None of these

14. A function object :
    (a) is an instance of a class for which operator ( ) is a member function.
    (b) is an instance of a class for which operator → is a member function.
    (c) is a pointer to any function
    (d) is a member function of a class

15. Polymorphism means :
    (a) A template function
    (b) Runtime type identification within a class hierarchy
    (c) Another name for operator overloading
    (d) Virtual inheritance

16. The E-R model is expressed in terms of :
    (*i*) Entities
    (*ii*) The relationship among entities
    (*iii*) The attributes of the entities
    Then
    (a) (*i*) and (*iii*)   (b) (*i*), (*ii*) and (*iii*)
    (c) (*ii*) and (*iii*)   (d) None of these

17. Specialization is a _____ process.
    (a) Top-down   (b) Bottom-up
    (c) Both (a) and (b) (d) None of these

18. The completeness constraint has rules:
    (a) Supertype, Subtype
    (b) Total specialization, partial specialization
    (c) Specialization, Generalization
    (d) All of the above

19. The entity type on which the _____ type depends is called the identifying owner.
    (a) Strong entity   (b) Relationship
    (c) Weak entity   (d) E-R

20. Match the following :

    List-I
    A. 2 NF
    B. 3 NF
    C. 4 NF
    D. 5 NF

    List-II
    1. Transitive dependencies eliminated
    2. Multivalued attribute removed
    3. Contains no partial functional dependencies
    4. Contains no join dependency

    Codes:

	A	B	C	D
(a)	1	3	2	4
(b)	4	3	1	2
(c)	4	3	2	1
(d)	1	2	3	4

21. What item is at the root after the following sequence of insertions into an empty splay tree:

    1, 11, 3, 10, 8, 4, 6, 5, 7, 9, 2, ?

    (a) 1   (b) 2
    (c) 4   (d) 8

22. Suppose we are implementing quadratic probing with a Hash function, Hash(y) = X mode 100. If an element with key 4594 is inserted and the first three locations attempted are already occupied, then the next cell that will be tried is :
    (a) 2   (b) 3
    (c) 9   (d) 97

23. Weighted graph :
    (a) Is a bi-directional graph
    (b) Is directed graph
    (c) Is graph in which number associated with arc
    (d) Eliminates table method

24. What operation is supported in constant time by the doubly linked list, but not by the singly linked list?
    (a) Advance   (b) Backup
    (c) First   (d) Retrieve

25. How much extra space is used by heap sort?
    (a) $O(1)$ (b) $O(\log n)$
    (c) $O(n)$ (d) $O(n^P)$

26. Error control is needed at the transport layer because of potential error occurring _____.
    (a) from transmission line noise
    (b) in router
    (c) from out of sequence delivery
    (d) from packet losses

27. Making sure that all the data packets of a message are delivered to the destination is_____ control.
    (a) Error   (b) Loss
    (c) Sequence   (d) Duplication

28. Which transport class should be used with a perfect network layer?
    (a) TP0 and TP2
    (b) TP1 and TP3

(c) TP0, TP1, TP3

(D) TP0, TP1, TP2, TP3, TP4

29. Which transport class should be used with residual-error network layer?
(a) TP0, TP2
(b) TP1, TP3
(c) TP1, TP3, TP4
(d) TP0, TP1, TP2, TP3, TP4

30. Virtual circuit is associated with a _____ service.
(a) Connectionless
(b) Error-free
(c) Segmentation
(d) Connection-oriented

31. Which activity is not included in the first pass of two pass assemblers?
(a) Build the symbol table
(b) Construct the intermediate code
(c) Separate mnemonic opcode and operand fields
(d) None of the above

32. Which of the following is not collision resolution technique?
(a) Hash addressing (b) Chaining
(c) Both (a) and (b) (d) Indexing

33. Code optimization is responsibility of :
(a) Application programmer
(b) System programmer
(c) Operating system
(d) All of the above

34. Which activity is included in the first pass of two pass assemblers?
(a) Build the symbol table
(b) Construct the intermediate code
(c) Separate mnemonic opcode and operand fields
(d) None of these

35. In two pass assembler the symbol table is used to store:
(a) Label and value (b) Only value
(c) Mnemonic (d) Memory Location

36. Semaphores are used to :
(a) Synchronize critical resources to prevent deadlock
(b) Synchronize critical resources to prevent contention

(c) Do I/O

(d) Facilitate memory management

37. In which of the following storage replacement strategies, is a program placed in the largest available hole in the memory?
(a) Best fit (b) First fit
(c) Worst fit (d) Buddy

38. Remote computing system involves the use of time sharing systems and :
(a) Real time processing
(b) Batch processing
(c) Multiprocessing
(d) All of the above

39. Non modifiable procedures are called
(a) Serially usable procedures
(b) Concurrent procedures
(c) Reentrant procedures
(d) Top down procedures

40. Match the following

List-I		List-II
A.	Disk scheduling	1. Round robin
B.	Batch processing	2. Scan
C.	Time sharing	3. LIFO
D.	Interrupt processing	4. FIFO

Codes:

	A	B	C	D
(a)	3	4	2	1
(b)	4	3	2	1
(c)	2	4	1	3
(d)	3	4	1	2

41. The main objective of designing various modules of a software system is :
(a) To decrease the cohesion and to increase the coupling
(b) To increase the cohesion and to decrease the coupling
(c) To increase the coupling only
(d) To increase the cohesion only

42. Three essential components of a software project plan are :
(a) Team structure, Quality assurance plans, Cost estimation
(b) Cost estimation, Time estimation, Quality assurance plan
(c) Cost estimation, Time estimation, Personnel estimation
(d) Cost estimation, Personnel estimation, Team structure

43. Reliability of software is dependent on :
    (a) Number of errors present in software
    (b) Documentation
    (c) Testing suties
    (d) Development processes

44. In transform analysis, input portion is called:
    (a) Afferent branch
    (b) Efferent branch
    (c) Central transform
    (d) None of the above

45. The Function Point (FP) metric is :
    (a) Calculated from user requirements
    (b) Calculated from lines of code
    (c) Calculated from software's complexity assessment
    (d) None of the above

46. Data Mining can be used as _____ tool.
    (a) Software   (b) Hardware
    (c) Research   (d) Process

47. The processing speeds of pipeline segments are usually :
    (a) Equal   (b) Unequal
    (c) Greater   (d) None of these

48. The cost of a parallel processing is primarily determined by :
    (a) Time complexity
    (b) Switching complexity
    (c) Circuit complexity
    (d) None of the above

49. A data warehouse is always _____.
    (a) Subject oriented
    (b) Object oriented
    (c) Program oriented
    (d) Compiler oriented

50. The term 'hacker' was originally associated with:
    (a) A computer program
    (b) Virus
    (c) Computer professionals who solved complex computer problems.
    (d) All of the above

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Answers   UGC NET : 2004 (D2)

1.	(c)	**2.**	(b)	**3.**	(c)	**4.**	(b)	**5.**	(c)	**6.**	(c)	**7.**	(a)	**8.**	(d)	**9.** (c)
10.	(a)	**11.**	(b)	**12.**	(*)	**13.**	(b)	**14.**	(a)	**15.**	(b)	**16.**	(b)	**17.**	(a)	**18.** (b)
9.	(c)	**20.**	(b)	**21.**	(b)	**22.**	(d)	**23.**	(c)	**24.**	(b)	**25.**	(a)	**26.**	(b)	**27.** (a)
28.	(a)	**29.**	(b)	**30.**	(d)	**31.**	(d)	**32.**	(d)	**33.**	(b)	**34.**	(a,b,c)	**35.**	(a)	**36.** (a)
37.	(c)	**38.**	(b)	**39.**	(c)	**40.**	(c)	**41.**	(b)	**42.**	(b)	**43.**	(a)	**44.**	(a)	**45.** (c)
46.	(c)	**47.**	(b)	**48.**	(b)	**49.**	(a)	**50.**	(c)							

Explanations   UGC NET : 2004 (D2)

1. **(c)**

In **Boolean algebra**, idempotent law states that combining a quantity with itself either by logical addition or logical multiplication will result in a logical sum or product that is the equivalent of the quantity (ex. $A \vee A = A$; $A \wedge A = A$).

2. **(b)**

If $f(x) = x + 1$ and $g(x) = x + 3$
then composition
$f \circ g(x) = x + 4$; $g \circ f(x) = x + 4$

and, $f \circ f(x) = x + 2$
$f \circ f \circ f(x) = x + 3$
$f \circ f \circ f \circ f(x) = x + 4 = (x + 3) + 1$
$f \circ f \circ f \circ f(x) = g(x) + 1$

3. **(c)**

- The **context-free languages** are closed under union and Kleene star properties.

- The **context-free languages** are not closed under complement, intersection or difference properties.

4. **(b)**

The **Handshaking lemma** is the statement that every finite undirected graph has an even number of vertices with odd degree.

(i) Number of vertices with odd degree is 3 which is not possible.

(ii) Number of vertices with odd degree is 3 which is not possible

(iii)Number of vertices with odd degree is 2.

(iv) Number of vertices with odd degree is 2.

5. **(c)**

Basically, a **field** is a thing where you can add, substract, multiply and divide. It is bit tricky to see that the first three (Z_{23}, Z_{29}, Z_{31}) are indeed fields. In fact, Z_P happens to be a field always when P is prime, and this result follows from Fermat's little theorem.

6. **(c)**

(a) $1100 \rightarrow$ 2's complement $\rightarrow$ 0011 + 1 = 0100

(b) $1001 \rightarrow$ 2's complement $\rightarrow$ 0110 + 1 = 0111

(c) $1000 \rightarrow$ 2's complement $\rightarrow$ 0111+1 = 1000

(d) $1111 \rightarrow$ 2's complement $\rightarrow$ 0000+1 = 0001

7. **(a)**

The third state of tri-state logic has high impedance hence resulting to a low current.

8. **(d)**

Associativity: Within an expression containing two or more of the same associative connective in a row, the order of the operations does not matter as long as the sequence of the operands is not changed.

Formally, a binary operation $*$ on a set S is called associative if it satisfies the associative law.

$(x * y)*z = x * (y * z)$ for all x, y, z in S.

AND, OR and EX-OR associative operators, but NAND is not, since,

$(x \uparrow y) \uparrow z \neq x \uparrow (y \uparrow z)$

$\Rightarrow \overline{\overline{(x \wedge y)} \wedge z} \neq \overline{x \wedge \overline{(y \wedge z)}}$

$\Rightarrow (x \wedge y) \vee \overline{z} \neq \overline{x} \vee (y \wedge z)$

9. **(c)**

Essential hazard due to delay in different latches of different flip-flop. This results in the logic not performing its function property. The three different most common kinds of hazards are usually referred to as static, dynamic and functions hazards.

These hazards may occur in **asynchronous sequential logic** circuits working in the fundamental mode.

10. **(a)**

T-flip-flop:
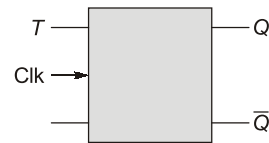
Characteristic equation:

T	$Q_{(n+1)}$
0	Q_n
1	$\overline{Q}_n$

Excitation table:

Q_n	$Q_{(n+1)}$	T
0	0	0
0	1	1
1	0	1
1	1	0

The characteristic equation of a T-flip-flop is

$$Q_{n+1} = T\overline{Q}_n + \overline{T}Q_n = T \oplus Q$$

Option (a) is true.

11. **(b)**

$0 \times 5AB6$ = 0101 1010 1011 0110

$0 \times 61CD$ = 0110 0001 1100 1101

AND = 0100 0000 1000 0100

= 0×4084

12. **(*)**

The code is undefined behaviour under the C standard, so its entirely upto what your specific compiler does, and there is absolutely no guaranteed it will do any thing the way any other compiler will.

13. **(b)**

$2 \times 3/4 - 3/4 \times 2 = 6/4 - 3/8 = 1 - 0 = 1$

C treat all expression values as integer.

14. **(a)**

A function object or functor (the two terms are synonymous) is simply any object that can be

Note: *This paper contains fifty (50) objective-type questions, each question carrying two (2) marks. Attempt all of them.*

1. T is a graph with n vertices. T is connected and has exactly $n - 1$ edges, then :
    (a) T is a tree
    (b) T contains no cycles
    (c) Every pairs of vertices in T is connected by exactly one path
    (d) All of these

2. If the proposition $\neg P \rightarrow Q$ is true, then the truth value of the proportion $\neg P \vee (P \rightarrow Q)$ is:
    (a) True
    (b) Multi-valued
    (c) False
    (d) Cannot determined

3. Let A and B be two arbitrary events, then :
    (a) $P(A \cap B) = P(A)\, P(B)$
    (b) $P(P \cup B) = P(A) + P(B)$
    (c) $P(A \cup B) \leq P(A) + P(B)$
    (d) $P(A / B) = P(A \cap B) + P(B)$

4. Which sentence can be generated by
    $$S \rightarrow d\,|\,bA,\ A \rightarrow d\,|\,ccA$$
    (a) *bccccd*   (b) *aabccd*
    (c) *ababccd*   (d) *abbbd*

5. Regular expression $a + b$ denotes the set:
    (a) $\{a\}$ (b) $\{\in, a, b\}$
    (c) $\{a, b\}$ (d) None of these

6. Which of the following is divisible by 4?
    (a) 100101100   (b) 1110001110001
    (c) 11110011   (d) 10101010101010

7. A half-adder is also known as:
    (a) AND Circuit   (b) NAND Circuit
    (c) NOR Circuit   (d) EX-OR Circuit

8. Consider the following sequence of instructions :
    $$a = a \oplus b,\ b = a \oplus b,\ a = b \oplus a$$
    This Sequence
    (a) retains the value of the a and b
    (b) complements the value of a and b
    (c) swap a and b
    (d) negates values of a and b

9. Consider the following circuit :
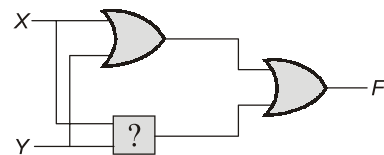
    to make it a Tautology the [?] should be :
    (a) NAND gate   (b) AND gate
    (c) OR gate   (d) EX-OR gate

10. When an inventor is placed between both inputs of an S-R flip-flop, the resulting flip flop is :
    (a) JK flip-flop   (b) D-flip-flop
    (c) T flip-flop   (d) None of these

11. What is the output of the following C program
    main( );
    { printf("%d%d%d", sizeof (3.14f), size of (3.14), size of (3.141));
    }
    (a) 4 4 4   (b) 4 8 10
    (c) 8 4 8   (d) 8 8 8

12. The bitwise OR of 35 with 7 in C will be :
    (a) 35   (b) 7
    (c) 42   (d) 39

13. Data members and member function of a class by default is respectively :
    (a) private and public
    (b) public
    (c) public and private
    (d) private

14. Function over loading done at :
    (a) Runtime
    (b) Compile time

(c) Linking time

(d) Switching from function to function

15. What will be the value of *i* for the following expression:

int *i* = 11, *i* = 3 ;

i+ = (*f* > 3)? *i* & 2 : 5 ;

(a) 2   (b) 5

(c) 13   (d) 12

16. A schema describes :

(a) data elements

(b) records and files

(c) record relationship

(d) all of the above

17. One approach to standardizing storing of data :

(a) MIS

(b) CODASYL

(c) Structured programing

(d) None of the above

18. In a relational schema, each tuple is divided in fields called :

(a) Relations   (b) Domains

(c) Queries   (d) All of above

19. An embedded printer provides :

(a) Physical record key

(b) An inserted Index

(c) A secondary access path

(d) All the above

20. A locked file can be :

(a) accessed by only one user

(b) modified by users with the correct password

(c) is used to hide sensitive information

(d) both (b) and (c)

21. In what tree, for every node the height of its left subtree and right subtree differ at least by one :

(a) Binary search tree

(b) AVL-tree

(c) Threaded binary tree

(d) Complete tree

22. A hash function *f* defined as *f*(key) = key mod 7, with linear probing it is used to insert the key 37, 38, 72, 48, 98, 11, 56 into a table index from 0 to 6. What will be the locations of 11 :

(a) 3   (b) 4

(c) 5   (d) 6

23. Consider the graph, which of the following is a valid topological sorting?
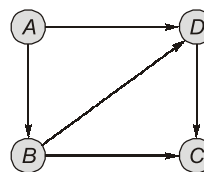
(a) ABCD   (b) BACD

(c) BADC   (d) ABDC

24. The initial configuration of queue is *a*, *b*, *c*, *d*. '*a*' is at the front. To get the configuration *d*, *c*, *b*, *a*. How many deletions and additions required :

(a) 2 deletions, 3 additions

(b) 3 deletions, 2 additions

(c) 3 deletions, 4 additions

(d) 3 deletions, 3 additions

25. Which traversal techniques lists the nodes of a binary search tree in ascending order?

(a) post-order   (b) in-order

(c) pre-order   (d) linear-order

26. The data unit in the TCP/IP application Layer is called a _____.

(a) message   (b) segment

(c) datagram   (d) frame

27. Which of following file retrieval methods use hypermedia?

(a) HTML   (b) Veronica

(c) WAIS   (d) HTTP

28. Which of following is an example of a client-server model :

(a) DNS   (b) FTP

(c) TELNET   (d) All of these

29. _____ provide a method to recover data that has been delivered but not get used :

(a) Segmentation   (b) Concatenation

(c) Translation   (d) Synchronization

30. Encryption and decryption are the functions of the _____ layer of OSI model :

(a) transport   (b) session

(c) router   (d) presentation

31. The Register or main memory location which contains the effective address of the operand is known as :

(a) Pointer
(b) Indexed register
(c) Special locations
(d) Scratch Pad

32. A Top-down Parse generates :
    (a) Left most derivation
    (b) Right-most derivation
    (c) Right-most derivation in reverse
    (d) Left-most derivation in reverse

33. A general macroprocessor is an in built function of :
    (a) Loader   (b) Linker
    (c) Editor   (d) Assembler

34. Which of the following is not collision Resolution Technique :
    (a) Hash addressing
    (b) Chaining
    (c) Indexing
    (d) None of these

35. Which activities is not included in the first pass of two pass assembler?
    (a) build the symbol table
    (b) construct the Intermediate code
    (c) separate mnemonic opcode and operand field
    (d) None of these

36. Producer consumer problem can be solved using:
    (a) semaphores   (b) event counters
    (c) monitors   (d) All the above

37. If you want to execute more than one program at a time, the systems software that are used must be capable of :
    (a) word processing
    (b) virtual memory
    (c) compiling
    (d) multitasking

38. Which of the following checks cannot be carried out on the input data to a system
    (a) Consistency check
    (b) Syntax check
    (c) Range check
    (d) All the above

39. Non-modifiable procedures are called
    (a) Serially usable procedure
    (b) Concurrent procedure

(c) Reentrant procedure
(d) Top-down procedure

40. Banker's algorithm is used for _____ purpose:
    (a) Deadlock avoidance
    (b) Deadlock removal
    (c) Deadlock prevention
    (d) Deadlock continuations

41. The testing of software against SRS is called
    (a) Acceptance testing
    (b) Integration testing
    (c) Regression testing
    (d) Series testing

42. The lower degree of cohesion is :
    (a) logical cohesion
    (b) coincidental cohesion
    (c) procedural cohesion
    (d) communicational cohesion

43. The Reliability of the software is directly dependent upon :
    (a) Quality of the design
    (b) Programmer's experience
    (c) Number of error
    (d) Set of user requirements

44. Successive layer of design in software using bottom-up design is called :
    (a) Layer of definement
    (b) Layer of construction
    (c) Layer of abstraction
    (d) None of the above

45. Sliding window concept of software project management is :
    (a) Preparation of comprehenciable plan
    (b) Preperation of the various stages of development
    (c) Ad-hoc planning
    (d) Requirement analysis

46. Which of the following transmission media is used in Bluetooth Technology :
    (a) Radio links
    (b) Microwave links
    (c) VSAT Communication
    (d) Fiber-optic

47. Which of the following is a EDI standard?
    (a) ANSI X.15   (b) ANSI X.14
    (c) ANSI X.13   (d) ANSI X.12

48. Analysis of large database to retrieve information is called :
(a) OLTP   (b) OLAP
(c) OLDP   (d) TLPP

49. The cost of the network is usually determined by:
(a) Time complexity
(b) Switching complexity

(c) Circuit complexity
(d) None of these

50. The mechanism with which several uses can share a medium without interference is :
(a) Frequency modulation
(b) Amplitude modulation
(c) Multiplexing
(d) None of these

■■■■

Answers | UGC NET : 2005 (D2)

1.	(d)	**2.**	(d)	**3.**	(c)	**4.**	(a)	**5.**	(c)	**6.**	(a)	**7.**	(d)	**8.**	(c)	**9.**	(a)
10.	(b)	**11.**	(b)	**12.**	(d)	**13.**	(d)	**14.**	(b)	**15.**	(b)	**16.**	(d)	**17.**	(b)	**18.**	(b)
19.	(c)	**20.**	(a)	**21.**	(b)	**22.**	(c)	**23.**	(d)	**24.**	(d)	**25.**	(b)	**26.**	(a)	**27.**	(d)
28.	(d)	**29.**	(d)	**30.**	(d)	**31.**	(a)	**32.**	(a)	**33.**	(d)	**34.**	(c)	**35.**	(d)	**36.**	(d)
37.	(d)	**38.**	(b)	**39.**	(c)	**40.**	(a)	**41.**	(a)	**42.**	(b)	**43.**	(c)	**44.**	(c)	**45.**	(b)
46.	(a)	**47.**	(d)	**48.**	(b)	**49.**	(b)	**50.**	(c)								

Explanations | UGC NET : 2005 (D2)

1. (d)

If a graph G with n vertices and $(n-1)$ edges with connected node then graph will be minimal connected. So, it can not be cycle and every pairs of vertices in graph is connected by exactly one path. This is the property of a tree.

2. (d)

From the union $\neg P \rightarrow Q$, we can conclude that $P \vee Q$.
So, P can be true or false, Q also can be true or false, i.e., nothing can be said about it's value.
$$= \neg P \vee (P \rightarrow Q)$$
$$= \neg P \vee (\neg P \vee Q)$$
$$= \neg P \vee Q$$
Since, nothing can be said about the truth value of P or Q it implies that $\neg P \vee Q$ can also be true or false.
Hence, the value can not be determined.

3. (c)

Generally,
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$
$P(A \cap B)$ can be zero or more then zero when it more than zero

$$P(A \cup B) < P(A) + P(B) \quad \text{when it is zero}$$
$$P(A \cup B) = P(A) + P(B)$$
we concluded that
$$P(A \cup B) \leq P(A) + P(B)$$
Arbitrary events does not mean it is also independent, so

$$P\left(\frac{A}{B}\right) = \frac{P(A \cap B)}{P(B)}$$

or
$$P\left(\frac{B}{A}\right) = \frac{P(A \cap B)}{P(A)}$$

So, $\quad P(A \cap B) = P\left(\frac{A}{B}\right) \times P(B)$

$$= P\left(\frac{B}{A}\right) \times P(A)$$

4. (a)

$$A \rightarrow d \,|\, ccA$$
$$\Rightarrow \quad A \rightarrow (cc)^*d$$
Substitute in,
$$S \rightarrow d \,|\, bA \text{ to give}$$
$$S \rightarrow d \,|\, b(cc)^*d$$
$$L(G) = b(cc)^*d + d$$
Only (a) $bccccd$ can be generated by above regular expression.

5. (c)

Regular expression $a+b$ means either a or b can be accepted only this can be written as $\{a, b\}$ also.

6. (a)

(a) $(100101100)_2 = (300)_{10}$
(b) $(1110001110001)_2 = (7281)_{10}$
(c) $(11110011)_2 = (243)_{10}$
(d) $(10101010101010)_2 = (10922)_{10}$

$\quad\quad 300/4 = 75$
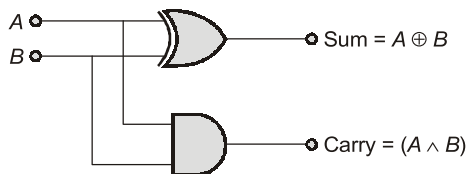$\quad\quad 7281/4 = 1820.25$
$\quad\quad\quad 243/4 = 60.75$
$\quad\quad 10922/4 = 2730.5$

Checking last 3 binary bits 100. If any number contain last 3 bit 100 then always divisible by 4(100).

7. (d)

Half adder

Input		Output	
A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Sum (adder) is used EX-OR circuit.

8. (c)

Assume a and b are some binary number.

$\quad\quad a = 10101110$
$\quad\quad b = 10001010$

(i) $a = a \oplus b = 00100100$
(ii) $b = a \oplus b = 10101110$
(iii) $a = a \oplus b = 10001010$

New value

$\quad\quad a = 10001010$
$\quad\quad b = 10101110$

So, it swaps value of a and b.

9. (a)
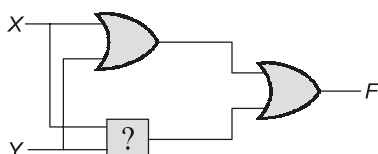
$f = ((x + y) + (x \,?\, y))$
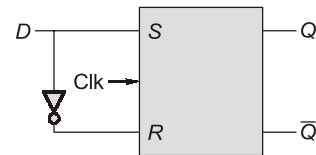
(a) $f = ((x+y)+(\overline{x \cdot y}))$

$\quad\quad = (x + y) + \overline{x} + \overline{y} = 1$

(b) $f = ((x + y) + (x \cdot y)) = x + y$
(c) $f = ((x + y) + (x + y)) = x + y$
(d) $f = ((x+y)+(x \oplus y))$

$\quad\quad = ((x+y) + x\overline{y} + \overline{x}y) = x + y$

10. (b)

Logic diagram.

11. (b)

Size of (3.14f) C compiler consider as float which size is 4.
Size of (3.14) and size of (3.141) C compiler consider as double which size is 8.

12. (d)

Binary equivalent.
If 35 is 100011 and 7 is 111.

$$\begin{array}{r} 100011 \\ \text{Bitwise OR}\quad \underline{000111} \\ 100111 \end{array}$$

Which decimal equivalent is
$32 + 4 + 2 + 1 = 39$

13. (d)

Data members of a class are by default private and also member function of a class are by default private.

14. (b)

Function overloading done compile time because before execution of program compiler decides the flow of program (i.e., which form will be used during runtime. It also done at runtime.

15. (b)

Given, int $f = 11$, $i = 3$;

$\quad\quad i+ = (f > 3)?\ i\ \&2:\ 5;$
$\Rightarrow\quad i+ = (f > 3)?\ i\ \&2:\ 5$
$\Rightarrow\quad i+ = (11 > 3)?\ i\ \&2:\ 5$
$\Rightarrow\quad i+ = (11 > 3)?$ is true so $i+= i\ \&2$
$\Rightarrow\quad i+ = 1011\ \&0010$ which is 2

So, $i+ = 2$

$\Rightarrow$ $i = i + 2 = 3 + 2 = 5$

16. (d)

A database generally stores it schema in a data dictionary. Although a schema is defined in text database language, the term is often used to refer to a graphical depiction on the database structure. In other words, schema is the structure of the database that defines the objects in the database.

17. (b)

CODASYL is an acronym for "conference/committee on data systems languages". This was consortium formed in 1959 to guide the development of a standard programming language that could be used on many computers. The effort led to the development of COBOL and other standards.

18. (b)

A domain is defined as the set of all unique values permitted for an attribute. For example, a domain of date is the set of all possible valid dates, a domain of integer is all possible whole numbers, a domain of day of week is Monday, Tuesday,... Sunday. This in effect is defining rules for a particular attribute.

19. (c)

- **Embedded pointers** are pointers that are embedded in data structures such as arrays, structures and unions. When embedded pointers only write output to a buffer and are null on input, the server application can change their values to non-null. In this case, the client stubs allocate new memory for this data.
- **Embedded pointer** is a pointer set in a data record instead of in directory.

20. (a)

File locking is a mechanism that restrict access to a computer file by allowing only one user or process access at any specific time.

21. (b)

An AVL tree is a self-balancing binary search tree. It was the first such data structure to be invented. In an AVL tree, the heights of the two child subtrees of any node differ by at most one; if at any time they differ by more than one, rebalancing is done to restore this property.

22. (c)

Given hash function

f (key) = (key) Mod 7

with linear probing and keys are:

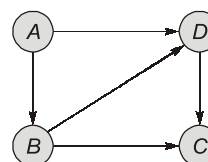37, 38, 72, 48, 98, 11, 56

0	1	2	3	4	5	6
98	56	37	38	72	11	48

So, location of element 11 is 5.

23. (d)

Given graph is

A **topological sort** or **topological ordering** of a directed graph is a linear ordering of its vertices such that for every directed edge *uv* from vertex *u* to vertex *v*, *u* comes before *v* in the ordering. So, topological ordering of given graph is *ABDC*.

24. (d)

A queue is set up as FIFO (First-in, First-out). Therefore, since '*a*' is the first one in the queue. '*a*' has to be the first one out.

So, if '*d*' has to be the first one in the queue, the three items that come in front of '*d*' have to be removed.

There are 3 deletion of *a*, *b*, *c* and 3 insertion of *c*, *b*, *a*.

25. (b)

Inorder traversal of a binary search tree gives always **sorted order**.

26. (a)

Protocol data unit (PDU) is known as at various layer as:
1. Physical layer – bit.
2. Data link layer – frame.
3. Network layer – Packet.
4. Transport layer – Segment/datagram.
5. Application layer – Message.