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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.

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.



B. Singh (Ex. IES)

With Best Wishes

B. Singh

CMD, MADE EASY Group

UGC-NET

Previous Year Solved Papers

Computer Science and Applications

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

- $A \vee A = A$ is called :
 - Identity law
 - De Morgan's law
 - Idempotent law
 - Complement law
- If $f(x) = x+1$ and $g(x) = x+3$ then $f \circ f \circ f \circ f$ is
 - g
 - $g + 1$
 - g^4
 - None of these
- The context-free languages are closed for:
 - Intersection
 - Union
 - Complementation
 - Kleene Star
 then
 - (i) and (iv)
 - (i) and (iii)
 - (ii) and (iv)
 - (ii) and (iii)
- The following lists are the degrees of all the vertices of a graph
 - 1, 2, 3, 4, 5
 - 3, 4, 5, 6, 7
 - 1, 4, 5, 8, 6
 - 3, 4, 5, 6
 then
 - (i) and (ii)
 - (iii) and (iv)
 - (iii) and (ii)
 - (ii) and (iv)
- 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 :
 - Z_{23}
 - Z_{29}
 - Z_{31}
 - Z_{33}
 Then
 - (i) only
 - (i) and (ii) only
 - (i), (ii) and (iii) only
 - (i), (ii), (iii) and (iv)
- An example of a binary number which is equal to its 2's complement is :
 - 1100
 - 1001
 - 1000
 - 1111
- When a tri-state logic device is in the third state, then :
 - it draws low current
 - it does not draw any current
 - it draws very high current
 - it presents a low impedance
- An example of a connective which is not associative is :
 - AND
 - OR
 - EX-OR
 - NAND
- Essential hazards may occur in :
 - Combinational logic circuits
 - Synchronous sequential logic circuits
 - Asynchronous sequential logic circuits working in the fundamental mode
 - Asynchronous sequential logic circuits working in the pulse mode
- The characteristic equation of a T flip-flop is
 - $Q_{n+1} = T\bar{Q}_n + \bar{T}Q_n$
 - $Q_{n+1} = T + Q_n$
 - $Q_{n+1} = TQ_n$
 - $Q_{n+1} = \bar{T}\bar{Q}_n$
 The symbols used have the usual meaning.
- Suppose x and y are two Integer Variables having values $0x5AB6$ and $0x61CD$ respectively. The result (in hex) of applying bitwise operator AND to x and y will be :
 - $0x5089$
 - $0x4084$
 - $0x78A4$
 - $0x3AD1$
- Consider the following statements:

$$\text{Int } i = 4, j = 3, k = 0;$$

$$k = ++i - --j + i++ - --j + j++;$$
 What will be the values of i , j and k after the statement.
 - 7, 2, 8
 - 5, 2, 10
 - 6, 2, 8
 - 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 \rightarrow 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**
- Transitive dependencies eliminated
 - Multivalued attribute removed
 - Contains no partial functional dependencies
 - 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, $\text{Hash}(y) = X \text{ mode } 100$. 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



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, subtract, 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.

$$(x * y) * z = x * (y * z) \text{ for all } x, y, z \text{ in } S.$$

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

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

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

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

9. (c)

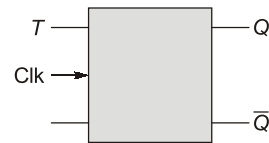
Essential hazard due to delay in different latches of different flip-flop. This results in the logic not

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	\bar{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

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

Option (a) is true.

11. (b)

$$\begin{aligned} 0 \times 5AB6 &= 0101\ 1010\ 1011\ 0110 \\ 0 \times 61CD &= 0110\ 0001\ 1100\ 1101 \\ \hline \text{AND} &= 0100\ 0000\ 1000\ 0100 \\ &= 0 \times 4084 \end{aligned}$$

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

called as if it is a function. An ordinary function is a function object and so is a function pointer; more generally, so is an object of a class that defines operator().

Functors (function objects or functional) are simply put object + ().

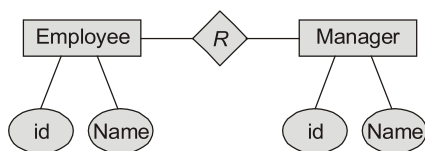
15. (b)

Polymorphism is an object-oriented programming concept that refers to the ability of a variable, function or object to take a multiple forms. Polymorphism is a runtime type identification within a class hierarchy. A language that features polymorphism allows developers to program in the general rather than program in the specific.

16. (b)

An **entity relationship model** (ER model) describes inter related things of interest in a specific domain of knowledge. An ER model is composed of entity types (which classify the things of interest) and specifies relationships that can exist between instances of those entity types.

Entity can have attributes e.g.,



17. (a)

- **Specialization** may be seen as the reverse process of generalization. Specialization is the abstracting process of introducing new characteristics to an existing class of objects to create one or more new classes of objects.
- In simple terms, a group of entities in specialization can be categorized into subgroups based on their characteristics. So, it is a top-down approach in which one higher level entity can be broken down into two lower level entity. It defines one or more prototypes of the super types and forming supertype / subtype relationships.

18. (b)

There are two rules of completeness constraint (i) Total specialization, and (ii) Partial specialization.

19. (c)

Weak entity is an entity that alone cannot uniquely identify its attributes therefore, it must use a foreign key in conjunction with its attributes to create a primary key. The foreign key is typically a primary key of an entity it is related to.

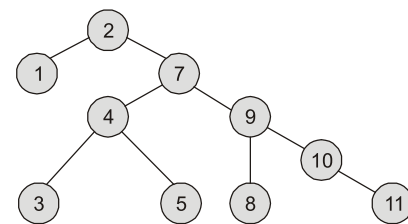
20. (b)

- **2NF** can not have partial functional dependencies.
- **3NF** can not have transitive dependencies.
- **4NF** deals with multivalued dependencies.
- **5NF** deals with join dependencies.

21. (b)

Splaying the tree for a certain element rearranges the tree so that the element is placed at the root of the tree.

Splay tree is :



The last element will be root node.

22. (d)

Since, hash $(y) = 4594 \text{ Mod } 100 = 94$.

But first 3 location are already occupied which are attempted i.e., 94, 95, 96 so answer is 97.

23. (c)

A graph in which each edge carries a value is said to be a **weighted graph**.

24. (b)

Double-linked list are after easier to manipulate because they allow fast and easy sequential access to the list in both directions but single linked list can not access to back node or previous node.

25. (a)

Heap sort also computes with merge sort, which has the same time bounds. Merge sort requires $\Omega(n)$ auxiliary space, but heap sort requires only a constant amount. (i.e., $O(1)$).

26. (b)

Consider a scenario where there are two router in between source and destination. The packet flows

from source to router R_1 correctly, hence the DLL will notify the delivery of the packet to DLL of source but than suddenly router R_2 gets down now, such kind of errors will be notified by transport layer.

27. (a)

Error control (detection and correction) are technique that enable reliable delivery of digital data over unreliable communication channels.

28. (a)

TP0 and TP2 are perfect network layers, loss or data is zero.

OSI model defines five types of transport classes:

- (i) **TP0** : Simple class
- (ii) **TP1** : Basic error recovery class
- (iii) **TP2** : Multiplexing class
- (iv) **TP3** : Error recovery and multiplexing class
- (v) **TP4** : Error detection and recovery class.

29. (b)

OSI model defines five types of transport classes.

- (i) **TP0** : Simple class
- (ii) **TP1** : Basic error recovery class
- (iii) **TP2** : Multiplexing class
- (iv) **TP3** : Error recovery and multiplexing class
- (v) **TP4** : Error detection and recovery class.

TP1 and TP3 are residual error network, some percentage of errors are never corrected.

30. (d)

- A **Virtual Circuit** (VC) is a means of transporting data over a packet switching data over a packet switching computer network in such a way that it appears as through there is a dedicated physical layer link between the source and destination end systems of this data. The term virtual circuit is synonymous with virtual connection and virtual channel.
- **Virtual circuit** communication resembles circuit switching, since both are connection oriented, meaning that in both cases data is delivered in correct order and signalling overhead is required during a connection establishment phase.

31. (d)

All are in given option (a), (b) and (c) is included in the first pass of two pass assembler.

32. (d)

Both hash addressing and chaining are **collision resolution techniques**.

33. (b)

Code optimization is any method of code optimization to improve code quality and efficiency. A program may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly or perform fewer input/output operations.

- **Application programmers** write programs to handle a specific job, such as a program to track inventory within an organization.
- **Systems programmers** writes program to maintain and control computer systems software, such as operating system and database management systems.

34. (a, b, c)

All given option (a), (b) and (c) are included in the first pass of assembler.

35. (a)

A **two-pass assembler** makes two passes over the input program. That is, it reads the program twice. On the first pass the symbol table is constructed. On the second pass, the complete symbol table is used to allow expressions to be evaluated without problems due to forward reference.

36. (a)

- Semaphores can be used to solved synchronization problems, which arise through cooperation between processes basic use of semaphores, to critical sections of code.
- Semaphores is variables whose values can be accessed and altered only by the wait(p) and signal(p) may process tries to access the same critical section.

37. (c)

- **First fit**: Choose the first hole we find that is large enough. This is fast, minimizing the search time.

- **Best fit:** Allocate the smallest available hole that is large enough to work. The search may be shortened by maintaining the list of holes ordered by size.
- **Worst fit:** Allocate the largest hole. This is counter intuitive, but may be reasonable. It produces the largest left over holes. However, in practice, it perform worse.

38. (b)

Batch processing is the execution of a series of programs on a computer without manual intervention (non-interactive).

39. (c)

- A **re-entrant procedure** is one in which a single copy of the program code can be shared by multiple users during the same period of time.
- **Re-entrancy** is a useful, has 2 key aspects. The program code cannot modify itself and the local data for each user process must be stored separately.

40. (c)

- **SCAN** is a disk scheduling algorithm. Batch processing works in order first in first out.
- **Round robin** is time sharing CPU scheduling algorithm.
- **Interrupt** is processing in order last in first out.

41. (b)

- **Coupling** and **cohesion** are terms which occur together very frequently. Coupling refers to the interdependencies between modules, while cohesion describes how related are the functions within a single module. Low cohesion implies that a given module perform tasks which are not very related to each other and hence can create problems as the module becomes large.
- All good software design will go for **high cohesion** and **low coupling**.

42. (b)

The three essential components of a software project plan are **cost estimation**, **time estimation** and **quality assurance plan**.

43. (a)

Software reliability is measured in terms of mean time between failures (MTBF). Reliability increases when errors or bugs from the program are removed.

44. (a)

The input portion of the DFD includes processes that transform input data from physical (e.g., character from terminal) to logical forms (e.g., internal tables, lists etc.).

Each input portion is called on afferent branch.

45. (c)

A **function point** is a 'unit of measurement' to express the amount of business functionality an information system (as a product) provides to a user. Function points are used to compute a functional size measurement of software. The cost (in dollars or hours) of a single unit is calculated from past projects.

46. (c)

Data mining is a process used by companies to turn raw data into useful information. By using software to look for patterns in large batches of data, business and develop more effective marketing strategies as well as increase sales and decrease costs.

47. (b)

The speed of the pipelining is determined by the speed of the stage, since, the processing speed of pipeline segments are unequal.

48. (b)

The cost of a parallel processing is primarily determined by switching complexity.

49. (a)

A **data warehouse** is a repository of historical data that are organized by subject to support decision makers in the organization.

50. (c)

A **hacker** is any highly skilled computer expert.



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

- T is a graph with n vertices. T is connected and has exactly $n - 1$ edges, then :
 - T is a tree
 - T contains no cycles
 - Every pairs of vertices in T is connected by exactly one path
 - All of these
- If the proposition $\neg P \rightarrow Q$ is true, then the truth value of the proportion $\neg P \vee (P \rightarrow Q)$ is:
 - True
 - Multi-valued
 - False
 - Cannot determined
- Let A and B be two arbitrary events, then :
 - $P(A \cap B) = P(A) P(B)$
 - $P(P \cup B) = P(A) + P(B)$
 - $P(A \cup B) \leq P(A) + P(B)$
 - $P(A / B) = P(A \cap B) + P(B)$
- Which sentence can be generated by

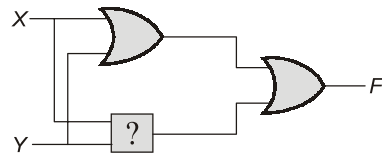
$$S \rightarrow d \mid bA, A \rightarrow d \mid ccA$$
 - $bccccd$
 - $aabccd$
 - $ababccd$
 - $abbbd$
- Regular expression $a + b$ denotes the set:
 - $\{a\}$
 - $\{\epsilon, a, b\}$
 - $\{a, b\}$
 - None of these
- Which of the following is divisible by 4?
 - 100101100
 - 1110001110001
 - 11110011
 - 10101010101010
- A half-adder is also known as:
 - AND Circuit
 - NAND Circuit
 - NOR Circuit
 - EX-OR Circuit
- Consider the following sequence of instructions :

$$a = a \oplus b, b = a \oplus b, a = b \oplus a$$

This Sequence

- retains the value of the a and b
- complements the value of a and b
- swap a and b
- negates values of a and b

9. Consider the following circuit :



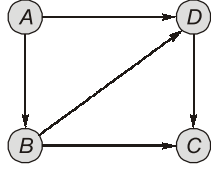
to make it a Tautology the $\boxed{?}$ should be :

- NAND gate
- AND gate
- OR gate
- EX-OR gate

- When an inventor is placed between both inputs of an S-R flip-flop, the resulting flip flop is :
 - JK flip-flop
 - D-flip-flop
 - T flip-flop
 - None of these
- 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));
}
```

 - 4 4 4
 - 4 8 10
 - 8 4 8
 - 8 8 8
- The bitwise OR of 35 with 7 in C will be :
 - 35
 - 7
 - 42
 - 39
- Data members and member function of a class by default is respectively :
 - private and public
 - public
 - public and private
 - private
- Function over loading done at :
 - Runtime
 - 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 programming
 (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 $f(\text{key}) = \text{key} \bmod 7$, 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) Preperation of comprehenciabale 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 users 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 its value.

$$\begin{aligned} &= \neg P \vee (P \rightarrow Q) \\ &= \neg P \vee (\neg P \vee Q) \\ &= \neg P \vee Q \end{aligned}$$

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 than zero when it more than zero

$P(A \cup B) < P(A) + P(B)$ 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

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

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

$$\begin{aligned} \text{So, } P(A \cap B) &= P\left(\frac{A}{B}\right) \times P(B) \\ &= P\left(\frac{B}{A}\right) \times P(A) \end{aligned}$$

4. (a)

$$A \rightarrow d | ccA$$

$$\Rightarrow A \rightarrow (cc)^*d$$

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) $(10101010101010)_2 = (10922)_{10}$

$$300/4 = 75$$

$$7281/4 = 1820.25$$

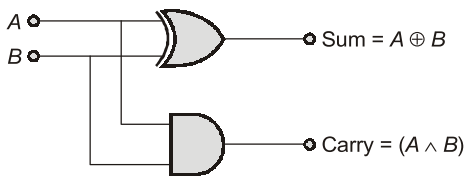
$$243/4 = 60.75$$

$$10922/4 = 2730.5$$

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.

$$a = 10101110$$

$$b = 10001010$$

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

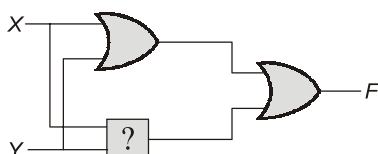
New value

$$a = 10001010$$

$$b = 10101110$$

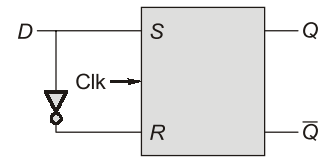
So, it swaps value of a and b .

9. (a)



- (a) $f = ((x + y) + (x \cdot y))$
- (b) $f = ((x + y) + (\overline{x \cdot y}))$
 $= (x + y) + \overline{x} + \overline{y} = 1$
- (c) $f = ((x + y) + (x \cdot y)) = x + y$
- (d) $f = ((x + y) + (x \oplus y))$
 $= ((x + y) + x\overline{y} + \overline{x}y) = x + y$

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.

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

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