Set - 1

1. Two main measures for the efficiency of an algorithm are

a. Processor and memory

b. Complexity and capacity

c. Time and space

d. Data and space

2. The time factor when determining the efficiency of algorithm is measured by

a. Counting microseconds

b. Counting the number of key operations

c. Counting the number of statements

d. Counting the kilobytes of algorithm

3. The space factor when determining the efficiency of algorithm is measured by

a. Counting the maximum memory needed by the algorithm

b. Counting the minimum memory needed by the algorithm

c. Counting the average memory needed by the algorithm

d. Counting the maximum disk space needed by the algorithm

4. Which of the following case does not exist in complexity theory

a. Best case

b. Worst case

c. Average case

d. Null case

5. The Worst case occur in linear search algorithm when

a. Item is somewhere in the middle of the array

b. Item is not in the array at all

c. Item is the last element in the array

d. Item is the last element in the array or is not there at all

6. The Average case occur in linear search algorithm

a. When Item is somewhere in the middle of the array

b. When Item is not in the array at all

c. When Item is the last element in the array

d. When Item is the last element in the array or is not there at all

---

7. The complexity of the average case of an algorithm is

a. Much more complicated to analyze than that of worst case

b. Much more simpler to analyze than that of worst case

c. Sometimes more complicated and some other times simpler than that of worst case

d. None or above

---

8. The complexity of linear search algorithm is

a. O(n)

b. O(log n)

c. O(n2)

d. O(n log n)

---

9. The complexity of Binary search algorithm is

a. O(n)

b. O(log)

c. O(n2)

d. O(n log n)

---

10. The complexity of Bubble sort algorithm is

a. O(n)

b. O(log n)

c. O(n2)

d. O(n log n)

---

11. The complexity of merge sort algorithm is

a. O(n)

b. O(log n)

c. O(n2)

d. O(n log n)

---

12. The indirect change of the values of a variable in one module by another module is called

a. internal change

b. inter-module change

c. side effect

d. side-module update

---

13. Which of the following data structure is not linear data structure?

a. Arrays

b. Linked lists

c. Both of above

d. None of above

---

14. Which of the following data structure is linear data structure?

a. Trees

b. Graphs

c. Arrays

d. None of above

---

15. The operation of processing each element in the list is known as

a. Sorting

b. Merging

c. Inserting

d. Traversal

---

16. Finding the location of the element with a given value is:

a. Traversal

b. Search

c. Sort

d. None of above

---

17. Arrays are best data structures

a. for relatively permanent collections of data

b. for the size of the structure and the data in the structure are constantly changing

c. for both of above situation

d. for none of above situation

---

18. Linked lists are best suited

a. for relatively permanent collections of data

b. for the size of the structure and the data in the structure are constantly changing

c. for both of above situation

d. for none of above situation

---

19. Each array declaration need not give, implicitly or explicitly, the information about

a. the name of array

b. the data type of array

c. the first data from the set to be stored

d. the index set of the array

---

20. The elements of an array are stored successively in memory cells because

a. by this way computer can keep track only the address of the first element and   the addresses of other elements can be calculated

b. the architecture of computer memory does not allow arrays to store other than serially

c. both of above

d. none of above

Answers [Set-1]

---

1. Two main measures for the efficiency of an algorithm are

c. Time and space

2. The time factor when determining the efficiency of algorithm is measured by

b. Counting the number of key operations

3. The space factor when determining the efficiency of algorithm is measured by
a. Counting the maximum memory needed by the algorithm

4. Which of the following case does not exist in complexity theory
d. Null case

5. The Worst case occur in linear search algorithm when
d. Item is the last element in the array or is not there at all

6. The Average case occur in linear search algorithm
a. When Item is somewhere in the middle of the array

7. The complexity of the average case of an algorithm is
a. Much more complicated to analyze than that of worst case

8. The complexity of linear search algorithm is
a. O(n)

9. The complexity of Binary search algorithm is
b. O(log n)

10. The complexity of Bubble sort algorithm is
c. $O(n^2)$

11. The complexity of merge sort algorithm is
d. O(n log n)

12. The indirect change of the values of a variable in one module by another module is called
c. side effect

13. Which of the following data structure is not linear data structure?
d. None of above

14. Which of the following data structure is linear data structure?
c. Arrays

15. The operation of processing each element in the list is known as

d. Traversal

16. Finding the location of the element with a given value is:
b. Search

17. Arrays are best data structures
a. for relatively permanent collections of data

18. Linked lists are best suited
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19. Each array declaration need not give, implicitly or explicitly, the information about
c. the first data from the set to be stored

20. The elements of an array are stored successively in memory cells because
a. by this way computer can keep track only the address of the first element and the addresses of other elements can be calculated

Set - 2

1. The memory address of the first element of an array is called

a. floor address
b. foundation address
c. first address
d. base address

2. The memory address of fifth element of an array can be calculated by the formula

a. LOC(Array[5]=Base(Array)+w(5-lower bound), where w is the number of words per memory cell for the array
b. LOC(Array[5])=Base(Array[5])+(5-lower bound), where w is the number of words per memory cell for the array
c. LOC(Array[5])=Base(Array[4])+(5-Upper bound), where w is the number of words per memory cell for the array
d. None of above

3. Which of the following data structures are indexed structures?

a. linear arrays

b. linked lists

c. both of above

d. none of above

---

4. Which of the following is not the required condition for binary search algorithm?

a. The list must be sorted

b. there should be the direct access to the middle element in any sublist

c. There must be mechanism to delete and/or insert elements in list

d. none of above

---

5. Which of the following is not a limitation of binary search algorithm?

a. must use a sorted array

b. requirement of sorted array is expensive when a lot of insertion and deletions are needed

c. there must be a mechanism to access middle element directly

d. binary search algorithm is not efficient when the data elements are more than 1000.

---

6. Two dimensional arrays are also called

a. tables arrays

b. matrix arrays

c. both of above

d. none of above

---

7. A variable P is called pointer if

a. P contains the address of an element in DATA.

b. P points to the address of first element in DATA

c. P can store only memory addresses

d. P contain the DATA and the address of DATA

---

8. Which of the following data structure can't store the non-homogeneous data elements?

a. Arrays

b. Records

c. Pointers

d. None

---

9. Which of the following data structure store the homogeneous data elements?

a. Arrays

b. Records

c. Pointers

d. None

---

10. Each data item in a record may be a group item composed of sub-items; those items which are indecomposable are called

a. elementary items

b. atoms

c. scalars

d. all of above

---

11. The difference between linear array and a record is

a. An array is suitable for homogeneous data but hte data items in a record may have different data type

b. In a record, there may not be a natural ordering in opposed to linear array.

c. A record form a hierarchical structure but a lienear array does not

d. All of above

---

12. Which of the following statement is false?

a. Arrays are dense lists and static data structure

b. data elements in linked list need not be stored in adjecent space in memory

c. pointers store the next data element of a list

d. linked lists are collection of the nodes that contain information part and next pointer

---

13. Binary search algorithm can not be applied to

a. sorted linked list

b. sorted binary trees

c. sorted linear array

d. pointer array

---

14. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called

a. underflow

b. overflow

c. housefull

d. saturated

---

15. The situation when in a linked list START=NULL is

a. underflow

b. overflow

c. housefull

d. saturated

---

16. Which of the following is two way list?

a. grounded header list

b. circular header list

c. linked list with header and trailer nodes

d. none of above

---

17. Which of the following name does not relate to stacks?

a. FIFO lists

b. LIFO list

c. Piles

d. Push-down lists

---

18. The term "push" and "pop" is related to the

a. array

b. lists

c. stacks

d. all of above

---

19. A data structure where elements can be added or removed at either end but not in the middle

a. Linked lists

b. Stacks

c. Queues

d. Deque

---

20. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return

a. FAEKCDBHG

b. FAEKCDHGB

c. EAFKHDCBG

d. FEAKDCHBG

Answers [Set-2]

---

1. The memory address of the first element of an array is called

d. base address

---

2. The memory address of fifth element of an array can be calculated by the formula

a. LOC(Array[5]=Base(Array)+w(5-lower bound), where w is the number of words per memory cell for the array

---

3. Which of the following data structures are indexed structures?

a. linear arrays

---

4. Which of the following is not the required condition for binary search algorithm?

c. There must be mechanism to delete and/or insert elements in list

---

5. Which of the following is not a limitation of binary search algorithm?

d. binary search algorithm is not efficient when the data elements are more than 1000.

---

6. Two dimensional arrays are also called

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---

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a. P contains the address of an element in DATA.

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a. Arrays

---

9. Which of the following data structure store the non-homogeneous data elements?

b. Records

---

10. Each data item in a record may be a group item composed of sub-items; those items which are indecomposable are called

d. all of above

---

11. The difference between linear array and a record is

d. All of above

---

12. Which of the following statement is false?

c. pointers store the next data element of a list

---

13. Binary search algorithm can not be applied to

a. sorted linked list

---

14. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called

b. overflow

---

15. The situation when in a linked list START=NULL is

a. underflow

---

16. Which of the following is two way list?

d. none of above

---

17. Which of the following name does not relate to stacks?

a. FIFO lists

---

18. The term "push" and "pop" is related to the

c. stacks

---

19. A data structure where elements can be added or removed at either end but not in the middle

d. Deque

---

20. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return

b. FAEKCDHGB

Set - 3

---

1.   Which data structure allows deleting data elements from front and inserting at rear?

a. Stacks

b. Queues

c.   Deques

d. Binary search tree

---

2.   Identify the data structure which allows deletions at both ends of the list but insertion at only one end.

a. Input-restricted deque

b. Output-restricted deque

c.   Priority queues

d. None of above

---

3.   Which of the following data structure is non-linear type?

a. Strings

b. Lists

c. Stacks

d. None of above

---

4. Which of the following data structure is linear type?

a. Strings

b. Lists

c. Queues

d. All of above

---

5. To represent hierarchical relationship between elements, which data structure is not suitable?

a. Deque

b. Priority

c. Tree

d. All of above

---

6. A binary tree whose every node has either zero or two children is called

a. Complete binary tree

b. Binary search tree

c. Extended binary tree

d. None of above

---

7. The depth of a complete binary tree is given by

a. $D_n = n \log_2 n$

b. $D_n = n \log_2 n + 1$

c. $D_n = \log_2 n$

d. $D_n = \log_2 n + 1$

---

8. When representing any algebraic expression E which uses only binary operations in a 2-tree,

a. the variable in E will appear as external nodes and operations in internal nodes

b. the operations in E will appear as external nodes and variables in internal nodes

c. the variables and operations in E will appear only in internal nodes

d. the variables and operations in E will appear only in external nodes

---

9. A binary tree can easily be converted into q 2-tree

a. by replacing each empty sub tree by a new internal node

b. by inserting an internal nodes for non-empty node

c. by inserting an external nodes for non-empty node

d. by replacing each empty sub tree by a new external node

---

10. When converting binary tree into extended binary tree, all the original nodes in binary tree are

a. internal nodes on extended tree

b. external nodes on extended tree

c. vanished on extended tree

d. None of above

---

11. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

a. ABFCDE

b. ADBFEC

c. ABDECF

d. ABDCEF

---

12. Which of the following sorting algorithm is of divide-and-conquer type?

a. Bubble sort

b. Insertion sort

c. Quick sort

d. All of above

---

13. An algorithm that calls itself directly or indirectly is known as

a. Sub algorithm

b. Recursion

c. Polish notation

d. Traversal algorithm

---

14. In a binary tree, certain null entries are replaced by special pointers which point to nodes higher in the tree for efficiency. These special pointers are called

a. Leaf

b. branch

c. path

d. thread

---

15. The in order traversal of tree will yield a sorted listing of elements of tree in

a. Binary trees

b. Binary search trees

c. Heaps

d. None of above

16. In a Heap tree

a. Values in a node is greater than every value in left sub tree and smaller than right sub tree

b. Values in a node is greater than every value in children of it

c. Both of above conditions applies

d. None of above conditions applies

---

17. In a graph if e=[u, v], Then u and v are called

a. endpoints of e

b. adjacent nodes

c. neighbors

d. all of above

---

18. A connected graph T without any cycles is called

a. a tree graph

b. free tree

c. a tree

d. All of above

---

19. In a graph if e=(u, v) means

a. u is adjacent to v but v is not adjacent to u

b. e begins at u and ends at v

c. u is processor and v is successor

d. both b and c

---

20. If every node u in G is adjacent to every other node v in G, A graph is said to be

a. isolated

b. complete

c. finite

d. strongly connected

Answers [Set-3]:

---

 1. Which data structure allows deleting data elements from front and inserting at rear?

b. Queues

---

2. Identify the data structure which allows deletions at both ends of the list but insertion at only one end.

a. Input-restricted deque

---

3. Which of the following data structure is non-linear type?

d. None of above

---

4. Which of the following data structure is linear type?

d. All of above

---

5. To represent hierarchical relationship between elements, which data structure is suitable?

c. Tree

---

6. A binary tree whose every node has either zero or two children is called

c. Extended binary tree

---

7. The depth of a complete binary tree is given by

d. $D_n = \log_2 n + 1$

---

8. When representing any algebraic expression E which uses only binary operations in a 2-tree,

a. the variable in E will appear as external nodes and operations in internal nodes

---

9. A binary tree can easily be converted into q 2-tree

d. by replacing each empty sub tree by a new external node

---

10. When converting binary tree into extended binary tree, all the original nodes in binary tree are

a. internal nodes on extended tree

---

11. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

c. ABDECF

---

12. Which of the following sorting algorithm is of divide-and-conquer type?

c. Quick sort

---

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b. Recursion

---

14. In a binary tree, certain null entries are replaced by special pointers which point to nodes higher in the tree for efficiency. These special pointers are called

d. thread

---

15. The in order traversal of tree will yield a sorted listing of elements of tree in

b. Binary search trees

16.In a Heap tree

b. Values in a node is greater than every value in children of it

---

17.In a graph if e=[u, v], Then u and v are called

d. all of above

18.A connected graph T without any cycles is called

d. All of above

19.In a graph if e=(u, v) means

d. both b and c

20.If every node u in G is adjacent to every other node v in G, A graph is said to be

b. complete

SET 4

The _____ determines whether connected resistors are in series, parallel, or series-parallel?

- A.   current flow

- B.   power source

- C.   voltage flow

- D.   wattage source

Answer: Option **A**

---

2.   Which resistive component is designed to be temperature sensitive?

- A.   Thermistor

- B.   Rheostat

- C.   Potentiometer

☐ D. Photoconductive cell

Answer: Option **A**

---

3. RTDs, strain gauges, and pressure transducers are _____ devices.

☐ A. resistive   ☐ B. inductive

☐ C. capacitive   ☐ D. solid-state

Answer: Option **A**

---

4. A decrease in base current of a CE amplifier causes the voltage measured between the emitter and the collector to increase.

☐ A. True   ☐ B. False

Answer: Option **A**

---

5. The control of digital circuits is usually achieved with _____.

☐ A. random pulses

☐ B. clock signals

☐ C. sophisticated gating

☐ D. selected frequencies

Answer: Option **B**

---

6. Which digital system translates coded characters into a more intelligible form?

☐ A. encoder   ☐ B. display

☐ C. counter   ☐ D. decoder

Answer: Option **D**

---

7. Pressure transducers are devices that exhibit a change in resistance inversely proportional to a change in pressure.

    ☐   A.   True   ☐   B.   False

    Answer: Option **B**

---

8. An input to the mode pin of an arithmetic-logic unit (ALU) determines if the function will be _____.

    ☐   A.   one's complemented

    ☐   B.   positive or negative

    ☐   C.   with or without carry

    ☐   D.   arithmetic or logic

    Answer: Option **D**

---

9. Memory configuration refers to the organization of storage bits within a memory.

    ☐   A.   True   ☐   B.   False

    Answer: Option **A**

---

10. The commutative law of addition and multiplication indicates that:

    ☐   A.   the way we OR or AND two variables is unimportant because the result is the same

    ☐   B.   we can group variables in an AND or in an OR any way we want

    ☐   C.   an expression can be expanded by multiplying term by term just the same as in ordinary algebra

    ☐   D.   the factoring of Boolean expressions requires the multiplication of product terms that contain like variables

Answer: Option **A**

---

11. Voltage is _____.

☐   A.   the opposition to the flow of current

☐   B.   the movement of free electrons

☐   C.   the force that exists between charged particles

☐   D.   the force that causes water to flow

Answer: Option **C**

---

12. A ___ resistor has color bands of yellow, violet, yellow, gold.

☐   A.   470 Ω 5%

☐   B.   5.7 MΩ 5%

☐   C.   37 kΩ 5%

☐   D.   470 kΩ 5%
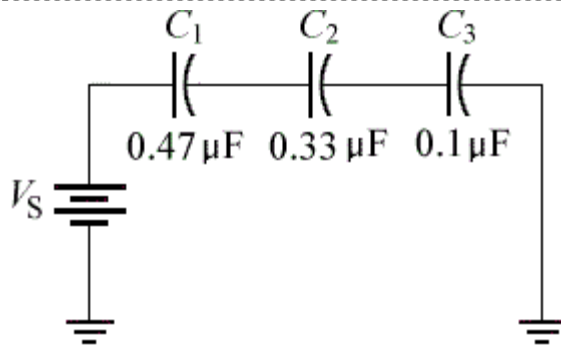
Answer: Option **D**

---

13. The output phase for a transformer is:

☐   A.   in phase with the input

☐   B.   out of phase with the input

☐   C.   dependent on the direction of the primary and secondary windings

☐   D.   dependent on the frequency of the primary source

Answer: Option **C**

14.

What is the capacitance of the circuit shown in the given circuit?

  ☐   A.   0.066 μF

  ☐   B.   0.9 μF

  ☐   C.   65.97 pF

  ☐   D.   900 pF

Answer: Option **A**

---

15. As a capacitor is being charged, current flowing into the capacitor will:

  ☐   A.   increase

  ☐   B.   decrease

  ☐   C.   remain the same

  ☐   D.   cannot tell

Answer: Option **B**

---

16. After which time constant can a capacitor be considered to be fully charged?

	A.	first		B.	third

	C.	fifth		D.	seventh

Answer: Option **C**

---

17. If an input signal ranges from 20–40 μA (microamps), with an output signal ranging from .5–1.5 mA (milliamps), what is the ac beta?

	A.	0.05		B.	20

	C.	50		D.	500

Answer: Option **C**

---

18. If a 100 Ω resistance is connected to a 100 Ω capacitive reactance in a series *RC* circuit, the impedance equals 200 Ω.

	A.	True		B.	False

Answer: Option **B**

---

19. The problem of interfacing IC logic families that have different supply voltages (V_{CC}s) can be solved by using a:

	A.	level-shifter

	B.	tri-state shifter

	C.	translator

	D.	level-shifter or translator

Answer: Option **D**

---

20. Power is measured in units of:

A.   joules x charge

B.   joules/work

C.   joules x voltage

D.   joules/time

Answer: Option **D**

Other Questions:

Q .1 Why are ICs more reliable than discrete circuits?

A . They are more reliable because of the elimination of the soldered joints and need for fewer interconnections.

Q .2 What is monolithic IC?

A . A monolithic IC is one in which all the circuits components and their interconnections are formed on a single thin wafer, called the substrate.

Q .3 Why is SiO2 layer formed over the entire surface in a monolithic IC?

A . To prevent contamination of the epitaxial layer.

Q . 4 which configurations among CE,CCC,CB gives highest input impedence and low voltage gain?

A . CC has the highest input gain and lowest voltage gain i.e. less than unity.

Q .5 Why CE configurations is most popular in amplifier circuits?

A .because its current,voltage and power gains are quite high and the ratio of output impedence and the input impedence are quite moderate.

Q .6 What are 'emitter injection efficiency' and 'base transport factor' and how do they influence the transistor operation?

A . The ratio of current of injected carriers at emitter junction to the total emitter current is called the emitter efficiency.

The ratio of collector current to the base current is known as transport factor.

Q .7 Why collector is made larger than emitter and base?

A .collector is made physically larger than emitter and base because collector is to dissipate much power.

Q 8. Why is the width of the base region of a transistor is kept very small compared to other regions?

A . base region is kept small and very lightly doped so as to pass most of the injected charge carriers to the collector.

Q 9. Define beta in a transistor ?

A. the beta factor is the current gain factor of a common emitter circuit and is defined as the ratio of the collector current to the base current.

Q10. Why is diffusion technique of formation of resistors most widely used?

A. the diffused resistors can be processed while diffusing transistors , so the diffusion technique is the cheapest and , therefore , is most widely used.

Q11. Why are field-effect transistors called unipolar transistors?

A. in field effect transistors current conduction is by only one type of majority carriers and therefore, these are called unipolar transistors.

Q12. Why the channel of a JFET is never completely closed at the drain end?

    A.   If the channel is completely closed in JFET, then there will be no drain current, so there will be no voltage drop along the channel length and amount of the reverse will become uniform and wedge shaped depletion layer will become rectangular one.

Q 13. How is drain current controlled in a JEFET?

A . In a JFET drain current is controlled by controlling the reverse bias given t its gate.

Q 14. What is meant by drain characteristics of FETs ?

A . the curve drawn between drain current and drain-source voltage with gate-source voltage as the parameter is called the drain characteristics.

Q 15. What is meant by the transfer characteristics of FETs?

A . the curve drawn between drain current and gate-source voltage for a given value for a given value of drain-source voltage is called the transfer characteristics.

Q 16. Why the channel is open when Vgs=0 and Vds =0 ?

A . when drain-source voltage is zero,there is no attracting potential at the drain,so no current flows inspite of the fact that the channel is fully open.

Q 17. What is pinch-off voltage in a JFET?

A. The value of drain-source voltage at which channel is pinched –off is called the pinch-off voltage.

Q 18. What are the factors that control the pinch-off voltage of JFET?

A . Electron charge,donor/acceptor concentration density .permittivity of channel material and half width of channel bar.

Q 19. Why FET is called a voltage controlled device?

A . in a FET , drain current is controlled by the effect of the extension of the field associated with the depletion region developed by the reverse bias on the gate ,so it is called a voltage controlled device.

Q 20. How does FET behave (i) small values of |Vds| (ii) larger value of |Vds|?

A . (i) FET behave as an ordinary resistor for small values of |Vds| i.e. ohmic region

(ii)FET behave as a constant current source for larger values of |Vds| till breakdown.

Q 21. How does the current vary with the gate voltage in the saturation region?

A . drain current decreases with the increase in |Vds|. When Vgs =0; drain current Id= Idss,drain-source saturation current and when Vgs=Vp;drain current Id =0.

Q.22.What is meant by gate-source cut-off voltage?

A. The gate source bias voltage required to reduce the drain current to zero is designated the gate-source cut-off voltage Vgs(off). It is equal to pinch-off voltage Vf.

Q.23 What is meant by saturation region?

A. The region of drain characteristic of a FET in which drain current remains fairly constant is called the saturation or pinch-off region.

Q.24 What is meant by drain-source saturation current Idss?

A. The drain current in pinch-off or saturation region with zero gate-source voltage (Vgs=0) is referred to the drain-source saturation current Idss.

Q.25. Why is input impedance of the FET very high?

A. FET has very high input impedance because its input circuit (gate-to-source) is reverse biased and the input gate current is very small(of the order of few nano-amperes).

Q.26. What is the value of gate-source voltage Vgs that gives drain current of both N-and P-channel JFETs a zero temperature coefficient?

A.|Vgs|~|V p|-0.63 V

Q.27. What is dynamic resistance of a JFET?

A. The ratio of change in drain-source voltage to change in drain current at a given gate-source voltage is known as ac drain resistance or dynamic resistance rd

        i.e. rd= /\ Vds/ /\Id   at constant Vgs

Q.28. What is meant by transconductance with reference to JFET?

A. The control that gate-source voltage has over the drain current is measured by the transconductance of a JFET. It may be defined as the ratio of change in drain current to the change in gate-source voltage for a given value of drain-source voltage i.e.

        Gm=/\ Id/ /\ Vgs   at constant Vds

Q.29. Why is MOSFET called sometimes IGFET?

A. MOSFET is constructed with the gate terminal insulated from the channel so it is sometimes called insulated gate (or IGFET).

Q.30. What is the significant difference between the construction of an enhancement type MOSFET and a depletion type MOSFET?

A. In the depletion type MOSFET a channel is physically constructed and a current between drain and source is due to voltage applied across the drain-source terminals while in enhancement type construction no channel is formed during is construction. Voltage is applied to the gate in case of enhancement type MOSFET, to develop a channel of charge carries so that a current results when a voltage is applied across the drain-source terminals.

Q.31. Why E-MOSFET is called sometimes normally-off MOSFET?

A. E-MOSFET operates with large positive gate voltages only and does not conduct when gate-source voltage Vgs=0,so it is called normally-off MOSFET.

Q.32. What is meant by gate-to-source threshold voltage in E-MOSFET?

A. The minimum value of gate-to-source voltage Vgs that is required to form the inversion layer is termed the gate-to-source threshold voltage Vgst.

Q.33. How is threshold voltage of the MOS transistor adjusted?

A. Threshold voltage of a MOS transistor can be adjusted by the following three methods.

1. If the silicon crystal orientation is <111>,it results in high threshold voltage. If the crystal has orientation of <100>,the value of threshold will go to half as compared to the previous one.

2.Instead of SiO2, a layer of Si3N4 and sio2 is used .It makes the dielectric constant twice as that of SiO2 alone. This cause Vgst to come down to half.

3. Instead of aluminium as gate electrode polycrystalline silicon doped with boron is used as the gate electrode. This causes reduction in contact potential between gate electrode and gate dielectric resulting in reduction of VGST.

Q.34. Why MOSFET are never connected or disconnected in the circuit when power is ON?

A. If a MOSFET is connected or disconnected in the circuit when power is ON, transient voltages caused by inductive kickback and other effects may exceed Vgs(max) and thus wipe out the MOSFET.

Q.35. Name the factors which make the JFET superior to BJT?

A. The high impedance, low output impedance and low noise level make JFET far superior to the BJT.

Q.36.In communication electronics ,why JFET RF amplifier is used in a receiver instead of BJT amplifier?

A.The reasons for using JFET RF amplifier in receiver instead of BJT amplifier?

1.The noise level of JFET is very low.

2.The antenna of the receiver receives a very weak signal that has an extremely low amount of current. Since JFET is a voltage controlled device, it will respond to low current signal provided by the antenna.

Q.37.What is unijunction transistor?

A. Unijunction transistor (UJT) is a two-layer, three-terminal solid-state(silicon) switching device.

Q.38. Give the special features of a UJT.

A. T he special features of a UJT are:

1.A stable triggering voltage (Vp)- a fixed fraction of applied interbase voltage Vbb.

2.A very low value of triggering current.

3.A high pulse current capability.

4. A negative resistance characteristic.

5.Low cost.

Q.39. Which are the members of "thyristor family"?

A.The member of thyristor family are SCR,triac,Shockley diode, SCS,SBS,SUS,CSCR,LASCR,LAS,LASCS,GCS,GTO,etc.

Q.40.How is current limited in conducting state of an SCR?

A.The current in conducting state of an SCR is controlled by external impedance.

Q.41. What is the effect of negative gate current on a normal SCR?

A. Negative gate current will increase the holding current of the SCR.

Q.42. What is false triggering?

A. False triggering is unintended turn-on of an SCR either through gate due to noise pick-up or excessive anode voltage.

Q.43.What are the factors on which 'turn-off time' of an SCR depends?

A. Turn-off time of an SCR depends upon doping densities, recombination time, junction temperature, on-state current, rate of decay of on-state current.

Q.44. How the forced turn-off of an SCR is different from natural turn-off?

A.In forced turn-off of an SCR current is brought below the holding current by an additional delicated circuit employing energy storage elements while in natural turn-off,it is the natural voltage/current variation.

Q.45. Why 'pulse triggering' is preferred and when does it fail?

A.Pulse trigerring is preferred as it is effective to turn-on an SCR keeping the device gate dissipation low and ensures a fast turn-on keeping the Di/Dt stress on the device low.

Pulse triggering shall fail if the pulse is of short duration and the load circuit contains large inductance. With highly inductive load, the device current builds up slowly. If the pulse duration is small and the anode current in not able to build up to latching current,IL, the device turns off on removal of gate pulse.

Q.46.Why is it necessary to keep supply voltage much less than breakover voltage of an SCR?

A.The supply voltage is kept much less than breakover voltage of an SCR otherwise the device will get damaged.

Q.47.What is meant by breakover voltage of an SCR?

A. The minimum forward voltage,with gate open,at which SCR starts conducting heavily (i.e. turns on) is called the breakover voltage.

Q.48. What is maximum on-state voltage in reference to an SCR?

A. Maximum on-state voltage is the maximum value of the voltage appearing across the SCR during conduction.

Q.49. What is meant by forward current rating of an SCR?

A. The maximum value of anode current,that an SCR can handle safely(without any damage) is called the forward current rating of the SCR.

Q.50. What is holding current in an SCR?

A.Holding current is the maximum on-state current required to keep the SCR in conducting state without any gate drive.

Q.51. Define latch current of an SCR?

A.Latching current is the minimum device current, which must be attained by the device,before the gate drive is removed.

Q. 52. Give the typical values of current ratings of SCR?

A.Forward breakover current-less than a few hundred micro-amperes.

Peak forward current 30 A to over 100 A.

Holding current-a few Ma to few hundred mili-amperes.

Q. 53.What is triac?

A.The traic is a three terminal,four layer bidirectional semiconductor device. It incorporates two SCRs connected in inverse parallel with a common gate terminal in a single chip. Triac is an abbreviation for a triode ac switch.

Q.54. What is diac?

A. A diac is a P-N-P-N structured four-layer,two-terminal semiconductor device. This is just like a triac but without gate terminal. Diac is an abbreviation for a diode ac switch.

Q.55. What is drift velocity?

A. The average velocity of a free electron is known as the drift velocity.

Q.56 What is the mobility of a free electron?

A. Drift velocity per unit electric field.

Q.57 What is meant by a fuse and on what principle does it operate?

A. Fuse is a device used in an electrical circuit for protecting electrical equipment against short circuits or overloads.

The action of fuse is based upon the heating effect of electric current.

Q.58 Is it possible to make a pure metal a superconductor?

A. Not all metals can be converted into the superconductors because superconductors occur between well defined limits of atomic volume.

Q.59 What is superconductivity?

A. The phenomenon that electrical resistivity of some metals e.g. mercury disappears completely at very low temperature is known as superconductivity

Q60. What is energy gap in semiconductors?

A. In the super conducting state an energy gap $E_g=3.5KT$ separates superconducting electrons below from normal electrons above the gap.

Q61. Define critical magnetic field of a superconductors

    A. Maximum field that can be applied to the superconductors without destroying the superconducting behaviour.

Q62. What is meant by electrostriction?

A . In most materials dielectric polarization develops a mechanical distortion,but a mechanical distortion does not produce polarization.this electromechanical effect ,which is present in all material is called electrostriction.

Q.63 What is orientational polarisation?

A . The polarisation due to the alignment of electrical dipole moments is called the orientational polarization.

Q.64 What is electric susceptibility of a dielectric?

A . Electrical susceptibility of a dielectric medium is defined as the ratio of bound charge density to free charge density .

Q. 65 What is polarisation ?

A . The sum of dipole moments per unit volume in a material is called the polarization vector or the dielectric polarization,P.

Q .66 What is curie point?

A . At a temp higher than a critical value ,called the curie point, ferromagnetic material lose their magnetic properties.

Q.67 what are ferrites ?

A . Ferrites is a special group of ferromagnetic materials ,that occupy an intermediate position between ferromagnetic and non-ferromagnetic materials.

Q. 68 what is the value of the permeability if free space?

Q.69 What is magnetostriction?

A . When a ferromagnetic material is magnetised ,its dimensions change slightly and the sample being magnetised either expands or contracts in the direction of the magnetisation.this magnetically induced reversible electrical strain is called the magnetostricton.

Q.70. what is villari effect?

A . The converse of the magnetostriction is known as the villari effect.

Q 71. What are eddy currents?

A . if the magnetic circuit is made up of iron and if the flux in the circuit is variable,currents will be induced by induction in the iron circuit itself.all such currents are called eddy current.

Q 72. What is magnetic hysteresis?

A . the phenomenon of lagging of magnetization or induction flux density behind the magnetization is known as magnetic hysteresis.

Q 73. Define a hole in a semiconductor?

A . vacancy left in the valence band because of lifting of electron from valence band to conduction band is known as hole.

Q 74. What is a hole current?

A . the movement of the hole from positive to the negative terminal constitutes hole current.

Q 75. Why silicon and germanium are the most widely used semiconductor materials?

A . because the energy required to release an electron from their valence band is very small.

Q 76. What is the main factor for controlling the thermal concentration of the free electrons and the holes?

A . temperature.

Q77 . define mean life time of a carrier.

A . the amount of time between the creation and disappearance of free electron is called the life time.

Q78.in which bands do the movement of electrons and holes take place?

A . free electrons move in the conduction band and the holes move in the valence band.

Q 79 . what is Fermi level in a semiconductor?

A .fermi level in a semiconductor can be defined as the maximum energy that an electron in a semiconductor have at zero degree absolute.

Q 80. What is doping?

A . a small amount of impurity added to improve the conductivity of semiconductor.

Q 81. What are the impurities that make a semiconductor N-type?

A . the pentavalent donor such as arsenic ,antimony,bismuth etc.

Q 82.what are the impurities that make a semiconductor P-type?

A . trivalent impurities such as the boron ,gallium,indium.

Q 83 . what is a hall effect ?

A . when a specimen is placed in a transverse magnetic field and a direct current is passed through it,then an electric field is induced across its edges in the perpendicular direction of current as well as magnetic field .this phenomenon is known as hall effect.

Q 84. What is a step graded junction?

A . A junction is said to be step graded if there is an abrupt change from the acceptor ion concentration on the P-side to donor ion concentration on the N-side such as alloyed or fused junction.

Q 85. What is linear graded junction?

A .   A junction is said to be linear graded if the charge concentration varies gradually with the distance in its transition region such as a growth junction.

Q 86. What is reverse saturation current of a diode?

A . The current due to the minority carriers in reverse biased is called reverse saturation current.

Q 87. What are the two mechanism of breakdown in p-n junction diode?

A. Avalanche and zener breakdown.

Q 88.name the breakdown in the lightly doped p-n junction under reverse biased condition?

A . Avalanche breakdown.

Q 89. Name the breakdown in the heavily doped p-n junction under reverse biased condition?

A . Zener breakdown.

Q 90. Is reverse saturation current of a junction diode independent of reverse bias voltage?

A . Yes.

Q 91. Germanium is more temperature dependent than silicon why?

A .Because the reverse saturation current in case of germanium is 1,000 times larger.

Q 92. Define dynamic resistance of a P-N junction diode in the forward biased condition.

A. The resistance offered by a P-N junction diode to the changing forward current is defined as the dynamic resistance .

Q 93. Is 'reverse recovery time' due to majority carriers or the minority carriers?

A . Reverse recovery time is due to the large number of the minority carriers present in both of the P and N regions.

Q 94. What is a zener diode?

A . Zener diode is a P-N junction diode specially designed for operation in its breakdown region.

Q 95. What is zener voltage?

A . The voltage at which zener diode breaks down is called the zener diode.

Q 96. What is tunnelling?

A . The mechanism of conduction in a semiconductor diode in which charge carriers punch through a barrier directly instead of climbing over it is called tunnelling.

Q 97. What is varactor diode?

A . A varactor diode is a special fabricated P-N junction impurity P-N junction with proper impurity concentration profile and operated under reverse-biased mode so as to give a variable junction capacitance.

Q 98. What are photo-detectors?

A .photo detectors are devices that provide a change in the electrical characteristics in the presence of a change in light output.e.g. LDR

Q 99. Why LCDs are not operated from ac supply of frequency lower than 25Hz and higher than 50Hz?

A . if the frequency of the supply to LCDs is lower than 25Hz,a visible flicker would be produced and if it exceeds 50Hz ,the current drawn will be more.

Q 100. Why an ordinary transistor is called bipolar?

A . Because the transistor operation is carried out by two types of charge carriers .

Q 101. Why transistor is called current controlled device?

A . the output voltage, current,or power is controlled by the input current in a transistor so it is called the current controlled device.

Q 102. Why emitter is always forward biased?

A . to supply majority charge carriers.

Q 103. What is early effect?

A. the modulation of the effective base width by the collector voltage is known as early effect.

Q 104. What is quiescent point?

A . it is a point on the DC load line which represents Vce and Ic in the absence of AC signal and variations in Vce and Ic take place around this point when AC signal is applied.