

**Q1. What is the law of contradiction?**

Ans. It means that a proposition cannot be true and false at the same time. It can never be that "x is y" and also "x is not y".

**Q2. What is the Law of excluded middle?**

Ans. It means that a statement is either true or false. There is no middle ground between being true and being false.  $P \wedge \neg P = 0$

**Q3. What is a majority circuit?**

Ans. Selecting the output (f) from a truth table and forming a circuit using maxterms or minterms from the out column. I.e. – Voting machine, Train on tracks etc.

**Q4. What are internal and external nodes in a tree?**

Ans. An internal node or inner node is any node of a tree that has child nodes.

An external node (outer node, leaf node, or terminal node) is any node that does not have child nodes.

**Q5. Design a half adder using only (i) NAND gates (ii) NOR gates.**

Ans.: Half Adder using NAND

| A | B | Sum | Carry |
|---|---|-----|-------|
| 0 | 0 | 0   | 0     |
| 0 | 1 | 1   | A'B   |
| 1 | 0 | 1   | AB'   |
| 1 | 1 | 0   | 1     |

Sum:  $A'B + AB' = ((A'.B)' . (A.B')')' =$

$(A' \text{ NAND } B) \text{ NAND } (A \text{ NAND } B')$

Carry:  $AB + AB = ((A.B)' . (A.B)')' =$

$(A \text{ NAND } B) \text{ NAND } (A \text{ NAND } B)$

**Q6. What are side effects in a function?**

When a function is not returning a value (i.e. is void) but changing something. E.g. set() functions, functions maintaining counts etc.

**Q7. (i) Name the three types of scopes. (ii) What is a class variable**

Ans: (i) 1-Block scope, 2-Function Scope, 3- Class scope

A static instance variable is called a Class variable.

**Q8. Give 3 features of static members.**

Ans: (i) Can be accessed without objects (ii) Have only one copy in the memory (iii) Cannot access non-static members directly.

**Q9. What is a concrete class?**

Ans: A class which can be instantiated. (as opposed to an abstract class)

**Q10. With respect to inheritance, define (i) Subclass polymorphism (ii) Dynamic Binding**

Ans. Subclass (or Baseclass) polymorphism: Overriding

Dynamic (or Late) Binding: Declaring an object using the base class, but instantiating it using a subclass during the program run. E.g Shape obj; obj=new circle();

**Q11. Mention the three ways polymorphism can be implemented in Java.**

Ans. Overloading, Overriding, Dynamic-Binding.

**Q12. How does a file obtain an extension .class?**

Ans. – After compilation by the javac command.

**Q13. Show an example of using the command line arguments in a Java program.**

Ans.: java a 1 2, will store 1 and 2 in args[0] and args[1].

**Q14. How is the word interface different from the Java language construct interface?**

Ans.: Interface refers to the prototypes of public functions of a class.

**Q15. State some applications of a Queue. What is a Priority Queue? Give an algorithm for a scheduling process/priority queue.**

Ans.: Queue: Any algorithm requiring "first come - first served" basis in processing, utilizes a Queue. For example, jobs in a printer queue, or scheduling processes for execution in the central processing unit, the allocation of tickets for a cricket match, or to passengers for an airline flight, or patients needing medical attention.

Priority Queue: Sometimes there may be a need to prioritise a task so that it can jump to the front or at least towards it. This is attained by ranking the items, or making a prioritize() function.

Algorithm: prioritize() { temp=q[rear], a[rear]=q[rear-1]; q[rear-1]=temp; },

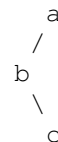
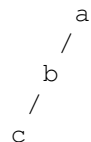
ranking() { cur=rear; while( p[cur]<p[cur-1] ) { swap p[cur] & p[cur-1]; cur--; } }

**Q16. Can we read file or a String Tokenizer in reverse? Can we re-read a String tokenizer?**

Ans.: There is no library function available. We need to program this. (Using String/Arrays)

**Q17. The preorder traversal output of a Binary tree is "a b c". Display the different possibilities the tree may look like in linked representation.**

Ans.



**Q18. Mention some important Wrapper class functions.**

Ans: parseXXX(String), toString(), valueOf(diff data type)

Q19. B l a n k.

Q20. B l a n k.

[ END ]