C++

1. What is a class?
2. What is an object?
3. What is the difference between an object and a class?
4. What is the difference between class and structure?
5. What is public, protected, private?
6. What are virtual functions?
7. What is friend function?
8. What is a scope resolution operator?
9. What do you mean by inheritance?
10. What is abstraction?
11. What is polymorphism? Explain with an example.
12. What is encapsulation?
13. What do you mean by binding of data and functions?
14. What is function overloading and operator overloading?
15. What is virtual class and friend class?
16. What do you mean by inline function?
17. What do you mean by public, private, protected and friendly?
18. When is an object created and what is its lifetime?
19. What do you mean by multiple inheritance and multilevel inheritance? Differentiate between them.
20. Difference between realloc() and free?
21. What is a template?
22. What are the main differences between procedure oriented languages and object oriented languages?
23. What is R T T I ?
24. What are generic functions and generic classes?
25. What is namespace?
26. What is the difference between pass by reference and pass by value?
27. Why do we use virtual functions?
28. What do you mean by pure virtual functions?
29. What are virtual classes?
30. Does c++ support multilevel and multiple inheritance?
31. What are the advantages of inheritance?
32. When is a memory allocated to a class?
33. What is the difference between declaration and definition?
34. What is virtual constructors/destructors?
35. In c++ there is only virtual destructors, no constructors. Why?
36. What is late bound function call and early bound function call? Differentiate.
37. How is exception handling carried out in c++?
38. When will a constructor executed?
39. What is Dynamic Polymorphism?
40. Write a macro for swapping integers.
41. How do you link a C++ program to C functions?
42. Explain the scope resolution operator.
43. What are the differences between a C++ struct and C++ class?
44. How many ways are there to initialize an int with a constant?
45. How does throwing and catching exceptions differ from using setjmp and longjmp?
46. What is a default constructor?
47. What is a conversion constructor?
48. What is the difference between a copy constructor and an overloaded assignment operator?
49. When should you use multiple inheritance?
50. What is a virtual destructor?
51. Explain the ISA and HASA class relationships. How would you implement each in a class design?
52. When is a template a better solution than a base class?
53. What is a mutable member?

C++

54. What is an explicit constructor?
55. What is the Standard Template Library?
56. Describe run-time type identification.
57. What problem does the namespace feature solve?
58. Write a function of factorial
59. Use recursion to write a function of factorial.
60. Write a function that reverse the words in the sentence ,for example "This is a string " becomes "string a is This".
61. You have a linked list. How can you tell that there is no cycling in it?
62. How would you write a program to find a file on disk.
63. What is the difference between basic building blocks in C and C++?
64. What is virtual destructor and when do you need to use it?"
65. Write code for Reverse linked list.
66. What is the purpose of the preprocessor directive *#error*?
67. How do you code an infinite loop in C ?
68. What are the uses of the keyword *static*?

DATA STRUCTURE

1. What is a data structure?
2. What does abstract data type means?
3. Evaluate the following prefix expression " ++ 26 + - 1324" (Similar types can be asked)
4. Convert the following infix expression to post fix notation ((a+2)*(b+4)) -1 (Similar types can be asked)
5. How is it possible to insert different type of elements in stack?
6. Stack can be described as a pointer. Explain.
7. Write a Binary Search program
8. Write programs for Bubble Sort, Quick sort
9. Explain about the types of linked lists
10. How would you sort a linked list?
11. Write the programs for Linked List (Insertion and Deletion) operations
12. What data structure would you mostly likely see in a non recursive implementation of a recursive algorithm?
13. What do you mean by Base case, Recursive case, Binding Time, Run-Time Stack and Tail Recursion?
14. Explain quick sort and merge sort algorithms and derive the time-constraint relation for these.
15. Explain binary searching, Fibinocci search.
16. What is the maximum total number of nodes in a tree that has N levels? Note that the root is level (zero)
17. How many different binary trees and binary search trees can be made from three nodes that contain the key values 1, 2 & 3?
18. A list is ordered from smaller to largest when a sort is called. Which sort would take the longest time to execute?
19. A list is ordered from smaller to largest when a sort is called. Which sort would take the shortest time to execute?
20. When will you sort an array of pointers to list elements, rather than sorting the elements themselves?
21. The element being searched for is not found in an array of 100 elements. What is the average number of comparisons needed in a sequential search to determine that the element is not there, if the elements are completely unordered?
22. What is the average number of comparisons needed in a sequential search to determine the position of an element in an array of 100 elements, if the elements are ordered from largest to smallest?
23. Which sort show the best average behavior?
24. What is the average number of comparisons in a sequential search?

DATA STRUCTURE

25. Which data structure is needed to convert infix notations to post fix notations?
26. What do you mean by:
    - Syntax Error
    - Logical Error
    - Runtime Error

    How can you correct these errors?

27. In which data structure, elements can be added or removed at either end, but not in the middle?
28. How will inorder, preorder and postorder traversals print the elements of a tree?
29. Parenthesis are never needed in prefix or postfix expressions. Why?
30. Which one is faster? A binary search of an orderd set of elements in an array or a sequential search of the elements.

JAVA

1. What is the difference between an Abstract class and Interface?
2. What is user defined exception?
3. What do you know about the garbage collector?
4. What is the difference between java and c++?
5. In an HTML form I have a button which makes us to open another page in 15 seconds. How will you do that?
6. What is the difference between process and threads?
7. What is update method called?
8. Have you ever used HashTable and Directory?
9. What are statements in Java?
10. What is a JAR file?
11. What is JNI?
12. What is the base class for all swing components?
13. What is JFC?
14. What is the difference between AWT and Swing?
15. Considering notepad/IE or any other thing as process, What will happen if you start notepad or IE 3 times ? Where three processes are started or three threads are started?
16. How does thread synchronization occur in a monitor?
17. Is there any tag in HTML to upload and download files?
18. Why do you canvas?
19. How can you know about drivers and database information ?
20. What is serialization?
21. Can you load the server object dynamically? If so what are the 3 major steps involved in it?
22. What is the layout for toolbar?
23. What is the difference between Grid and Gridbaglayout?
24. How will you add panel to a frame?
25. Where are the card layouts used?
26. What is the corresponding layout for card in swing?
27. What is light weight component?
28. Can you run the product development on all operating systems?
29. What are the benefits if Swing over AWT?
30. How can two threads be made to communicate with each other?
31. What are the files generated after using IDL to java compiler?
32. What is the protocol used by server and client?
33. What is the functionability stubs and skeletons?
34. What is the mapping mechanism used by java to identify IDL language?
35. What is serializable interface?
36. What is the use of interface?

JAVA

37. Why is java not fully objective oriented?
38. Why does java not support multiple inheritance?
39. What is the root class for all java classes?
40. What is polymorphism?
41. Suppose if we have a variable 'I' in run method, if I can create one or more thread each thread will occupy a separate copy or same variable will be shared?
42. What are virtual functions?
43. Write down how will you create a Binary tree?
44. What are the traverses in binary tree?
45. Write a program for recursive traverse?
46. What are session variable in servlets?
47. What is client server computing?
48. What is constructor and virtual function? Can we call a virtual function in a constructor?
49. Why do we use oops concepts? What is its advantage?
50. What is middleware? What is the functionality of web server?
51. When will you use an interface and abstract class?
52. What is the exact difference in between Unicast and Multicast object? Where will it be used?
53. What is the main functionality of the remote reference layer?
54. How do you download stubs from Remote place?
55. I want to store more than 10 objects in a remote server? Which methodology will follow?
56. What is the main functionality of Prepared Statement?
57. What is meant by Static query and Dynamic query?
58. What are Normalization Rules? Define Normalization?
59. What is meant by Servelet? What are the parameters of service method?
60. What is meant by Session? Explain something about HTTP Session Class?
61. In a container there are 5 components. I want to display all the component names, how will you do that?
62. Why there are some null interface in JAVA? What does it mean? Give some null interface in JAVA?
63. Tell some latest versions in JAVA related areas?
64. What is meant by class loader? How many types are there? When will we use them?
65. What is meant by flickering?
66. What is meant by distributed application? Why are we using that in our application?
67. What is the functionality of the stub?
68. Explain about version control?
69. Explain 2-tier and 3-tier architecture?
70. What is the role of Web Server?
71. How can we do validation of the fields in a project?
72. What is meant by cookies? Explain the main features?
73. Why java is considered as platform independent?
74. What are the advantages of java over C++?
75. How java can be connected to a database?
76. What is thread?
77. What is difference between Process and Thread?
78. Does java support multiple inheritance? if not, what is the solution?
79. What are abstract classes?
80. What is an interface?
81. What is the difference abstract class and interface?
82. What are adapter classes?
83. what is meant wrapper classes?
84. What are JVM.JRE, J2EE, JNI?
85. What are swing components?
86. What do you mean by light weight and heavy weight components?
87. What is meant by function overloading and function overriding?
88. Does java support function overloading, pointers, structures, unions or linked lists?
89. What do you mean by multithreading?

JAVA

90. What are byte codes?
91. What are streams?
92. What is user defined exception?
93. Meaning - Abstract classes, abstract methods
94. Difference - Java,C++ . Difference : Java Beans, Servlets . Difference : AWT, Swing
95. Difference between == and equals method Difference between "APPLET" and "APPLICATION"
96. Explain Java security model. Explain working of Java Virtual Machine (JVM)
97. Disadvantages of Java. What gives java it's "write once and run anywhere" nature?
98. Does Java have "goto"? What is the meaning of "final" keyword? Can I create final executable from Java?
99. Explain Garbage collection mechanism in Java. What are interfaces? How to support multiple inhertance in Java?

OPERATING SYSTEM

1. What are the basic functions of an operating system?
2. Explain briefly about, processor, assembler, compiler, loader, linker and the functions executed by them.
3. What are the difference phases of software development? Explain briefly?
4. Differentiate between RAM and ROM?
5. What is DRAM? In which form does it store data?
6. What is cache memory?
7. What is hard disk and what is its purpose?
8. Differentiate between Complier and Interpreter?
9. What are the different tasks of Lexical analysis?
10. What are the different functions of Syntax phase, Scheduler?
11. What are the main difference between Micro-Controller and Micro- Processor?
12. Describe different job scheduling in operating systems.
13. What is a Real-Time System ?
14. What is the difference between Hard and Soft real-time systems ?
15. What is a mission critical system ?
16. What is the important aspect of a real-time system ?
17. If two processes which shares same system memory and system clock in a distributed system, What is it called?
18. What is the state of the processor, when a process is waiting for some event to occur?
19. What do you mean by deadlock?
20. Explain the difference between microkernel and macro kernel.
21. Give an example of microkernel.
22. When would you choose bottom up methodology?
23. When would you choose top down methodology?
24. Write a small dc shell script to find number of FF in the design.
25. Why paging is used ?
26. Which is the best page replacement algorithm and Why? How much time is spent usually in each phases and why?
27. Difference between Primary storage and secondary storage?
28. What is multi tasking, multi programming, multi threading?
29. Difference between multi threading and multi tasking?
30. Define Demand paging, page faults, replacement algorithms, thrashing,.
31. Explain about paged segmentation and segment paging
32. While running DOS on a PC, which command would be used to duplicate the entire diskette?
33. What is MUTEX ?
34. What isthe difference between a 'thread' and a 'process'?
35. What is INODE?
36. Explain the working of Virtual Memory.

OPERATING SYSTEM

37. How does Windows NT supports Multitasking?
38. Explain the Unix Kernel.
39. What is Concurrency? Expain with example Deadlock and Starvation.
40. What are your solution strategies for "Dining Philosophers Problem" ?
41. Explain Memory Partitioning, Paging, Segmentation.
42. Explain Scheduling.
43. Operating System Security.
44. What is Semaphore?
45. Explain the following file systems : NTFS, Macintosh(HPFS), FAT .
46. What are the different process states?
47. What is Marshalling?
48. Define and explain COM?
49. Difference - Loading and Linking ?

MICROPROCESSOR

1. Which type of architecture 8085 has?
2. How many memory locations can be addressed by a microprocessor with 14 address lines?
3. 8085 is how many bit microprocessor?
4. Why is data bus bi-directional?
5. What is the function of accumulator?
6. What is flag, bus?
7. What are tri-state devices and why they are essential in a bus oriented system?
8. Why are program counter and stack pointer 16-bit registers?
9. What does it mean by embedded system?
10. What are the different addressing modes in 8085?
11. What is the difference between MOV and MVI?
12. What are the functions of RIM, SIM, IN?
13. What is the immediate addressing mode?
14. What are the different flags in 8085?
15. What happens during DMA transfer?
16. What do you mean by wait state? What is its need?
17. What is PSW?
18. What is ALE? Explain the functions of ALE in 8085.
19. What is a program counter? What is its use?
20. What is an interrupt?
21. Which line will be activated when an output device require attention from CPU?

ELECTRONICS

1. What is meant by D-FF?
2. What is the basic difference between Latches and Flip flops?
3. What is a multiplexer?
4. How can you convert an SR Flip-flop to a JK Flip-flop?
5. How can you convert an JK Flip-flop to a D Flip-flop?
6. What is Race-around problem? How can you rectify it?
7. Which semiconductor device is used as a voltage regulator and why?
8. What do you mean by an ideal voltage source?
9. What do you mean by zener breakdown and avalanche breakdown?
10. What are the different types of filters?
11. What is the need of filtering ideal response of filters and actual response of filters?
12. What is sampling theorem?
13. What is impulse response?
14. Explain the advantages and disadvantages of FIR filters compared to IIR counterparts.
15. What is CMRR? Explain briefly.

ELECTRONICS

16. What do you mean by half-duplex and full-duplex communication? Explain briefly.
17. Which range of signals are used for terrestrial transmission?
18. What is the need for modulation?
19. Which type of modulation is used in TV transmission?
20. Why we use vestigial side band (VSB-C_3F) transmission for picture?
21. When transmitting digital signals is it necessary to transmit some harmonics in addition to fundamental frequency?
22. For asynchronous transmission, is it necessary to supply some synchronizing pulses additionally or to supply or to supply start and stop bit?
23. BPFSK is more efficient than BFSK in presence of noise. Why?
24. What is meant by pre-emphasis and de-emphasis?
25. What do you mean by 3 dB cutoff frequency? Why is it 3 dB, not 1 dB?
26. What do you mean by ASCII, EBCDIC?

VISUAL BASIC

1. 3 main differences between flexgrid control and dbgrid control
2. ActiveX and Types of ActiveX Components in VB
3. Advantage of ActiveX Dll over Active Exe
4. Advantages of disconnected recordsets
5. Benefit of wrapping database calls into MTS transactions
6. Benefits of using MTS
7. Can database schema be changed with DAO, RDO or ADO?
8. Can you create a tabletype of recordset in Jet - connected ODBC database engine?
9. Constructors and distructors
10. Controls which do not have events
11. Default property of datacontrol
12. Define the scope of Public, Private, Friend procedures?
13. Describe Database Connection pooling relative to MTS
14. Describe: In of Process vs. Out of Process component. Which is faster?
15. Difference between a function and a subroutine, Dynaset and Snapshot,early and late binding, image and picture controls,Linked Object and Embedded Object,listbox and combo box,Listindex and Tab index,modal and moduless window, Object and Class,Query unload and unload in form, Declaration and Instantiation an object?
16. Draw and explain Sequence Modal of DAO
17. How can objects on different threads communicate with one another?
18. How can you force new objects to be created on new threads?
19. How does a DCOM component know where to instantiate itself?
20. How to register a component?
21. How to set a shortcut key for label?
22. Kind of components can be used as DCOM servers
23. Name of the control used to call a windows application
24. Name the four different cursor and locking types in ADO and describe them briefly
25. Need of zorder method, no of controls in form, Property used to add a menus at runtime, Property used to count number of items in a combobox,resize a label control according to your caption.
26. Return value of callback function, The need of tabindex property
27. Thread pool and management of threads within a thread pool
28. To set the command button for ESC, Which property needs to be changed?
29. Type Library and what is it's purpose?
30. Types of system controls, container objects, combo box
31. Under the ADO Command Object, what collection is responsible for input to stored procedures?
32. VB and Object Oriented Programming
33. What are the ADO objects? Explain them.
34. What are the different compatibility types when we create a COM component?

VISUAL BASIC

35. What do ByVal and ByRef mean and which is the default?
36. What does Option Explicit refer to?
37. What does the Implements statement do?
38. What is OLE and DDE? Explain.
39. What is the difference between Msgbox Statement and MsgboxQ function?
40. What keyword is associated with raising system level events in VB?
41. What methods are called from the ObjectContext object to inform MTS that the transaction was successful or unsuccessful?
42. What types of data access have you used.
43. What was introduced to Visual Basic to allow the use of Callback Functions?
44. Which controls can not be placed in MDI?
45. Which controls have refresh method, clear method
46. Which Property is used to compress a image in image control?
47. Which property of menu cannot be set at run time?
48. Which property of textbox cannot be changed at runtime and What's the maximum size of a textbox?
49. Which tool is used to configure the port range and protocols for DCOM communications?
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VISUAL BASIC

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OBJECT-ORIENTATION CONCEPTS, UML

1. What is inheritance?
2. Difference between Composition and Aggregation.
3. Difference: Sequence Diagrams, Collaboration Diagrams.
4. Difference: 'uses', 'extends', 'includes'
5. What shall I go for Package Diagram?
6. What is Polymorphism?
7. Is class an Object? Is object a class?
8. Comment: C++ "includes" behavior and java "imports"
9. What do you mean by "Realization"?
10. What is a Presistent, Transient Object?
11. What is the use of Operator Overloading?
12. Does UML guarantee project success?
13. Difference: Activity Diagram and Sequence Diagram.
14. What is association?
15. How to resolve many to many relationship?
16. How do you represent static members and abstract classes in Class Diagram?
17. Can we use UML for user interface (UI) design?
18. Every object has : state, behavior and identity - explain
19. How to reverse engineer C++ code in UML?
20. What are the tools you used for OOAD?
21. Difference: Object Oriented Analysis (OOA) and Object Oriented Design (OOD)?
22. What are the four phases of the Unified Process ?
23. How do you convert uses cases into test cases?
24. Explain Class Diagram in Detail.
25. What are the Design Patterns you know.
26. When do you prefer to use composition than aggregation?
27. UML: IS it a process, method or notation?
28. Does a concept HAVE to become a class in Design?
29. What are the good practices to use while designing for reuse?
30. Can you think of some nice examples where *multiple* actors are associated with a use case ?
31. How to use CRC Cards for Class Design?
32. What is the difference between static and dynamic Classificaition.Give some examples.
33. Explian following terms: Constraint Rules, Design by contract.
34. What is Object Constraint Language (OCL)?
35. Difference Between Attribute and Association.

WWW

1. What is HTTP? Explain its working?
2. What is DNS?

WWW

3. Why do I need a domain name like 'OneSmartClick.Com'?
4. What happens when I type in some url and press enter?
5. How does CGI work? Can I use 'C' language to write a CGI?
6. Working of Proxy Server, Cookies, types of cookies?
7. What is Firewall?
8. How to redirect to another page?
9. Some questions on web servers.
10. What is DOM?
11. Connection Pooling in IIS 3.0 and 4.0
12. What is Code Base, Style Sheets?
13. Need for CSS
14. DHTML: Difference between FontSize and Font Size?
15. Layers in TCP/IP
16. Explain "URL Encoding",HTML "entity", GET method, POST method
17. How does DTD work?
18. Difference between ASP and DHTML?
19. How to create virtual directory in IIS?
20. Can I host muliple sites on same machine?
21. Administration of IIS.
22. What is ODBC
23. XML and propritory databbases.
24. Working of ping, telnet, gopher.

DATABASE

1. What is normalization? Explain different levels of normalization?
2. What is denormalization and when would you go for it?
3. How do you implement one-to-one, one-to-many and many-to-many relationships while designing tables?
4. What's the difference between a primary key and a unique key?
5. What are user defined datatypes and when you should go for them?
6. What is bit datatype and what's the information that can be stored inside a bit column?
7. Define candidate key, alternate key, composite key.
8. What are defaults? Is there a column to which a default can't be bound?
9. What are the different types of joins?
10. Explain normalization with examples.
11. What cursor type do you use to retrieve multiple recordsets?
12. Diffrence between a "where" clause and a "having" clause
13. What is the difference between "procedure" and "function"?
14. How will you copy the structure of a table without copying the data?
15. How to find out the database name from SQL*PLUS command prompt?
16. Tadeoffs with having indexes
17. Talk about "Exception Handling" in PL/SQL?
18. What is the diference between "NULL in C" and "NULL in Oracle?"
19. What is Pro*C? What is OCI?
20. Give some examples of Analytical functions.
21. What is the difference between "translate" and "replace"?
22. What is DYNAMIC SQL method 4?
23. How to remove duplicate records from a table?
24. What is the use of ANALYZing the tables?
25. How to run SQL script from a Unix Shell?
26. What is a "transaction"? Why are they necessary?
27. Explain Normalizationa dn Denormalization with examples.
28. When do you get contraint violtaion? What are the types of constraints?
29. How to convert RAW datatype into TEXT?
30. Difference - Primary Key and Aggregate Key

DATABASE

31. How functional dependency is related to database table design?
32. What is a "trigger"?
33. Why can a "group by" or "order by" clause be expensive to process?
34. What are "HINTS"? What is "index covering" of a query?
35. What is a VIEW? How to get script for a view?
36. What are the Large object types suported by Oracle?
37. What is SQL*Loader?
38. Difference between "VARCHAR" and "VARCHAR2" datatypes.
39. What is the difference among "dropping a table", "truncating a table" and "deleting all records" from a table.
40. Difference between "ORACLE" and "MICROSOFT ACCESS" databases.
41. How to create a database link ?
42. What is RAID and what are different types of RAID configurations?
43. What are the steps you will take to improve performance of a poor performing query?
44. What is a deadlock and what is a live lock? How will you go about resolving deadlocks?
45. What are the steps you will take, if you are tasked with securing an SQL Server?
46. What is blocking and how would you troubleshoot it?
47. Explain CREATE DATABASE syntax
48. How to restart SQL Server in single user mode? How to start SQL Server in minimal configuration mode?
49. As a part of your job, what are the DBCC commands that you commonly use for database maintenance?
50. What are statistics, under what circumstances they go out of date, how do you update them?
51. What are the different ways of moving data/databases between servers and databases in SQL Server?
52. Explian different types of BACKUPs avaialabe in SQL Server? Given a particular scenario, how would you go about choosing a backup plan?
53. What is database replicaion? What are the different types of replication you can set up in SQL Server?
54. What are cursors? Explain different types of cursors. What are the disadvantages of cursors? How can you avoid cursors?
55. Write down the general syntax for a SELECT statements covering all the options.
56. What is a join and explain different types of joins.
57. Can you have a nested transaction?
58. What is an extended stored procedure? Can you instantiate a COM object by using T-SQL?
59. What is the system function to get the current user's user id?
60. What are triggers? How many triggers you can have on a table? How to invoke a trigger on demand?
61. What is a self join? Explain it with an example.]
62. Given an employee table, how would you find out the second highest salary?

COMPUTER ARCHITECTURE

1. What is pipelining?
2. What are the five stages in a DLX pipeline?
3. For a pipeline with 'n' stages, what's the ideal throughput? What prevents us from achieving this ideal throughput?
4. What are the different hazards? How do you avoid them?
5. Instead of just 5-8 pipe stages why not have, say, a pipeline with 50 pipe stages?
6. What are Branch Prediction and Branch Target Buffers?
7. How do you handle precise exceptions or interrupts?
8. What is a cache?
9. Explain advantages and disadvantages of Write-Through and Write-Back Caches?
10. Cache Size is 64KB, Block size is 32B and the cache is Two-Way Set Associative. For a 32-bit physical address, give the division between Block Offset, Index and Tag.

COMPUTER ARCHITECTURE

11. What is Virtual Memory?
12. What is Cache Coherency?
13. What is MESI?
14. What is a Snooping cache?
15. What are the components in a Microprocessor?
16. What is ACBF(Hex) divided by 16?
17. Convert 65(Hex) to Binary
18. Convert a number to its two's compliment and back
19. The CPU is busy but you want to stop and do some other task. How do you do it?
20. For a single computer processor computer system, what is the purpose of a processor cache and describe its operation?
21. Explain the operation considering a two processor computer system with a cache for each processor.
22. What are the main issues associated with multiprocessor caches and how might you solve it?
23. Explain the difference between write through and write back cache.
24. Are you familiar with the term MESI?
25. Are you familiar with the term snooping?

HARDWARE DESIGN

1. Give two ways of converting a two input NAND gate to an inverter
2. Given a circuit, draw its exact timing response. (I was given a Pseudo Random Signal Generator; you can expect any sequential ckt)
3. What are set up time & hold time constraints? What do they signify? Which one is critical for estimating maximum clock frequency of a circuit?
4. Give a circuit to divide frequency of clock cycle by two
5. Design a divide-by-3 sequential circuit with 50% duty circle. (Hint: Double the Clock)
6. Suppose you have a combinational circuit between two registers driven by a clock. What will you do if the delay of the combinational circuit is greater than your clock signal? (You can't resize the combinational circuit transistors)
7. What are the different Adder circuits you studied?
8. Give the truth table for a Half Adder. Give a gate level implementation of the same.
9. Draw a Transmission Gate-based D-Latch.
10. Design a Transmission Gate based XOR. Now, how do you convert it to XNOR? (Without inverting the output)
11. How do you detect if two 8-bit signals are same?
12. How do you detect a sequence of "1101" arriving serially from a signal line?
13. Design any FSM in VHDL or Verilog.

VLSI

1. Explain why & how a MOSFET works
2. Draw Vds-Ids curve for a MOSFET. Now, show how this curve changes (a) with increasing Vgs (b) with increasing transistor width (c) considering Channel Length Modulation
3. Explain the various MOSFET Capacitances & their significance
4. Draw a CMOS Inverter. Explain its transfer characteristics
5. Explain sizing of the inverter
6. How do you size NMOS and PMOS transistors to increase the threshold voltage?
7. What is Noise Margin? Explain the procedure to determine Noise Margin
8. Give the expression for CMOS switching power dissipation
9. What is Body Effect?
10. Describe the various effects of scaling

VLSI

11. Give the expression for calculating Delay in CMOS circuit
12. What happens to delay if you increase load capacitance?
13. What happens to delay if we include a resistance at the output of a CMOS circuit?
14. What are the limitations in increasing the power supply to reduce delay?
15. How does Resistance of the metal lines vary with increasing thickness and increasing length?
16. You have three adjacent parallel metal lines. Two out of phase signals pass through the outer two metal lines. Draw the waveforms in the center metal line due to interference. Now, draw the signals if the signals in outer metal lines are in phase with each other
17. What happens if we increase the number of contacts or via from one metal layer to the next?
18. Draw a transistor level two input NAND gate. Explain its sizing (a) considering Vth (b) for equal rise and fall times
19. Let A & B be two inputs of the NAND gate. Say signal A arrives at the NAND gate later than signal B. To optimize delay, of the two series NMOS inputs A & B, which one would you place near the output?
20. Draw the stick diagram of a NOR gate. Optimize it
21. For CMOS logic, give the various techniques you know to minimize power consumption
22. What is Charge Sharing? Explain the Charge Sharing problem while sampling data from a Bus
23. Why do we gradually increase the size of inverters in buffer design? Why not give the output of a circuit to one large inverter?
24. In the design of a large inverter, why do we prefer to connect small transistors in parallel (thus increasing effective width) rather than lay out one transistor with large width?
25. Given a layout, draw its transistor level circuit. (I was given a 3 input AND gate and a 2 input Multiplexer. You can expect any simple 2 or 3 input gates)
26. Give the logic expression for an AOI gate. Draw its transistor level equivalent. Draw its stick diagram
27. Why don't we use just one NMOS or PMOS transistor as a transmission gate?
28. For a NMOS transistor acting as a pass transistor, say the gate is connected to VDD, give the output for a square pulse input going from 0 to VDD
29. Draw a 6-T SRAM Cell and explain the Read and Write operations
30. Draw the Differential Sense Amplifier and explain its working. Any idea how to size this circuit? (Consider Channel Length Modulation)
31. What happens if we use an Inverter instead of the Differential Sense Amplifier?
32. Draw the SRAM Write Circuitry
33. Approximately, what were the sizes of your transistors in the SRAM cell? How did you arrive at those sizes?
34. How does the size of PMOS Pull Up transistors (for bit & bit- lines) affect SRAM's performance?
35. What's the critical path in a SRAM?
36. Draw the timing diagram for a SRAM Read. What happens if we delay the enabling of Clock signal?
37. Give a big picture of the entire SRAM Layout showing your placements of SRAM Cells, Row Decoders, Column Decoders, Read Circuit, Write Circuit and Buffers
38. In a SRAM layout, which metal layers would you prefer for Word Lines and Bit Lines? Why?
39. How can you model a SRAM at RTL Level?
40. What’s the difference between Testing & Verification?
41. For an AND-OR implementation of a two input Mux, how do you test for Stuck-At-0 and Stuck-At-1 faults at the internal nodes? (You can expect a circuit with some redundant logic)
42. What is Latch Up? Explain Latch Up with cross section of a CMOS Inverter. How do you avoid Latch Up?

HR INTERVIEW

1. Tell me about yourself.
2. What do you know about our company?
3. Why do you want to work for us?
4. What would you do for us? What can you do for us that someone else can't?
5. What about our position do you find the most attractive? Least attractive?
6. Why should we hire you?
7. What do you look for in a job?
8. How long would it take you to make a meaningful contribution to our firm?
9. How long would you stay with us?
10. You may be overqualified or too experienced for the position we have to offer.
11. What is your management style? Are you a good manager? Give an example.
12. Why do you feel you have top managerial potential?
13. What do you see as the most difficult task in being a manager?
14. What do your subordinates think of you?
15. What is your biggest weakness as a manager?
16. What important trends do you see in our industry?
17. Why are you applying to us?
18. What did your course or vacation work involve?
19. What other jobs or employers have you applied to?
20. Where do you see yourself in five years time?
21. What qualities or skills do you have which make you suitable for this job?
22. Tell me about a situation where you had to deal with awkward people?
23. What do you know about our organisation? What do you know about our industry
24. What are your strengths and weaknesses?