



Symbol of Excellence

Attempt any five questions:

- Q.1 (a) Give reasons for using layered protocols architecture for networks. Also explain any one model.
 (b) How does information get passed from one OSI layer to other layer?
- Q.2 Compare following: (a) Connectionless vs. connection oriented (b) Chained vs. end to end layer (c) LAN vs. WAN
- Q.3 Explain different sliding windows protocols for flow control at data link layer.
- Q.4 (a) Differentiate between Nyquist and Shannon's theorem for finding maximum data rate of any channel.
 (b) Explain TDM and FDM for communication.
- Q.5 Explain IEEE 802.3, IEEE 802.4 and IEEE 802.5 protocols for multiple access in computer networks.
- Q.6 Draw and explain protocol architecture for X.25 protocol. Also compare X.25 with Frame relay.
- Q.7 (a) Compare throughput of Aloha, CSMA and CSMA/CD using appropriate graph.
 (b) Explain frame format of HDLC protocol.
- Q.8 Write short notes on the following: (a) ATM (b) ISDN



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Attempt any five questions:

- Q.1 (a) Differentiate time division multiple access system and frequency division multiple access system. Which is more efficient?
 (b) Explain TCP/IP reference model. How does it differ from OSI model?
- Q.2 (a) Explain analysis of signals for source encoding.
 (b) Describe Shannon-Hartley theorem.
- Q.3 (a) What is the maximum data rate of a channel?
 (b) Differentiate Analog Data Transmission and Digital Data Transmission.
 (c) Explain full duplex data transmission and half duplex data transmission methods.
- Q.4 (a) Explain Shortest Path Routing and Bellman Ford Algorithms.
 (b) Explain token ring protocol and its frame structure.
- Q.5 (a) Two networks, each provide reliable connection-oriented service. One of them offers a reliable byte stream and the other offers a reliable message stream. Are these identical? If so, why is the distinction made? If not, give an example of, how they differ?
 (b) Discuss the hardware and software required to setup a network.
- Q.6 (a) Explain the design issues for layers. If the unit exchanged at data link layers is called a frame and the unit exchanged at the network level, a packet, do frames encapsulate packets or packets encapsulate frames? Explain.
- Q.7 (a) Explain High level data link control and synchronous data link control protocols. Give their frame formats.
 (b) Compare transmission through fibre optics and copper wire.
- Q.8 Write short notes on the following: (a) ATM (b) ISDN (c) Routing and Flow Control (d) Switching



Symbol of Excellence

Attempt any five questions:

- Q.1 (a) Explain Shannon's Hartley theorem for finding our maximum data rate of a channel.
 (b) Explain flow control method using sliding window protocol.
- Q.2 Explain in detail ISO's OSI reference model.
- Q.3 Explain in detail header of TCP and IPV4.
- Q.4 (a) What is DQDB? Explain its working.
 (b) Explain bandwidth and frequency spectrum.
- Q.5 Explain the following reference models: (a) TCP/IP (b) ATM
- Q.6 Differentiate between the following: (a) TDM and FDM (b) SDLC and HDLC
- Q.7 Explain the following MAC layer protocols: (a) IEEE 802.3 (b) IEEE 802.4 (c) IEEE 802.5
- Q.8 Write short notes on the following: (a) X.25 Protocol (b) BSC (c) MODEMS



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Attempt any five questions:

- Q.1 (a) Explain the concept of Analog and Digital data. And also explain analog and digital carrier with examples.
 (b) Is Nyquist theorem true for optical fibre or only for copper wire? What is maximum data rate for a noiseless channel 4-kHz is sampled every 1 msec?
- Q.2 (a) Compare simplex, half duplex and full duplex transmission methods with the advantages and disadvantages.
 (b) Compute the fourier coefficients for function $f(t) = t$, ($0 \leq t < 1$).
- Q.3 (a) Explain Shannon Hartley theorem. Why is it used? What signal-to-noise ratio is needed to put T1 carrier on a 50 kHz line?
 (b) Describe about the concept of Bandwidth and frequency spectrum for data transmission.
- Q.4 (a) Explain the concept of Time Division Multiplexing with examples.
 (b) A cable TV system has 100 commercial channels, all of them alternating programs with advertising. Is this like TDM or like FDM? Justify.
- Q.5 Explain about OSI Reference Model with its layers, services, protocols and all other aspects.
- Q.6 (a) Describe about IEEE LAN Standards 802.5 (token ring).
 (b) Explain character oriented protocols with suitable example.
- Q.7 (a) Compare circuit, packet and message switching.
 (b) Discuss the frame structure for X.25 protocol.
- Q.8 (a) Explain Hierarchical and Link State routing algorithms.
 (b) Write short notes on the following: (i) ISDN (ii) TCP/IP



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Attempt any five questions:

- Q.1 What do you mean by programming paradigm? Explain object-oriented programming paradigm in detail.
- Q.2 (a) How abstraction and encapsulation are implemented in C++? Explain with suitable example.
 (b) What is string class? Explain any five methods associated with the string class.
- Q.3 (a) What is a friend function? How can it be declared? Explain its need with the help of an example.
 (b) What is destructor? Give suitable example. Can you overload it? Justify your answer.
- Q.4 (a) What is constructor? How is it different from other member functions? Explain the use of a copy constructor with a suitable example.
 (b) What is static data member? How is it different from non-static data member? Give one example of static data member.
- Q.5 (a) What is operator overloading? Can you overload all operators? Overload '*' operator to multiply two complex numbers.
 (b) What is function overloading? Give one example? How does a compiler resolve a call to the overloaded functions?
- Q.6 (a) Write the rules for public and private derivations in C++.
 (b) Give a suitable example of multiple inheritance. Implement that in C++.
- Q.7 Explain the following terms associated with the I/O streams:
 (a) Manipulators (b) Precision() (c) open() (d) read()
- Q.8 What is concurrent object-oriented system? Give few examples of such systems. Describe all the steps involved in developing a concurrent object-oriented system.



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Attempt any five questions:

- Q.1 Explain the following features of object oriented programming paradigm:
(a) Abstraction (b) Message passing (c) Inheritance (d) Polymorphism
- Q.2 (a) What is information hiding? How is it achieved in C++? Explain.
(b) What is the role of constructors? Explain copy constructor with example.
- Q.3 (a) What is scope resolution operator? Explain its uses with examples.
(b) Explain the role of destructors using an example.
(c) Distinguish between inline function and external function.
- Q.4 (a) Discuss three different ways of passing parameters to a function. Also discuss relative advantages and disadvantages in each case.
(b) What is static data member? Explain its use with a suitable example.
- Q.5 (a) What is operator overloading? What are the rules of overload a unary operator? Write a program to overload ++ operator.
(b) What are the rules to overload a binary operator? Write a program to overload * operator to multiply two complex numbers.
- Q.6 (a) Explain the need of protected access specifier.
(b) What is multiple inheritance? What are the rules to implement multiple inheritance in C++? Give an example.
- Q.7 (a) What are different types of file opening modes? List their names with meanings.
(b) Explain the difference between Binary and ASCII files.
(c) What are the limitations of using put () and get () functions?
- Q.8 (a) Explain the features of concurrent object – oriented systems.
(b) Explain string-handling functions available in C++.



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Attempt any five questions:

- Q.1 (a) Explain the major paradigms of Object Oriented Programming.
(b) What kind of things can become objects?
- Q.2 (a) Explain the scope resolution operator. Give one example showing its utility.
(b) List few user defined and derived data type. What is the difference between the two? What is enumerated data type? Explain its utility.
(c) Write about reference variables and their utility in C++.
- Q.3 (a) Write a note on Inline Functions.
(b) Give an example in C++ involving static data members and static member function. How are these two useful?
(c) What are Friend Functions? Where are they used? Give an example.
- Q.4 (a) What is Dynamic Initialization of Objects? How is it achieved?
(b) What are destructors? Give an example to show the sequence of objects in which they are created and destroyed in block structure.
(c) Overload < and == operators for a string class.
- Q.5 (a) Create a class DM that has distance in metres and centimetres. Create another class DF giving distance in feet and inches. Write a program to convert DF type object into DM type of object.
(b) Explain with the help of examples the effect of inheritance on the visibility of members.
(c) How are constructors handled in inheritance? Give an example.
- Q.6 (a) What is Containership? How does it differ with inheritance?
(b) How does run time polymorphism implemented in C++? How does it differ from compile time polymorphism?
(c) Explain this pointer.
- Q.7 (a) What is the basic difference between manipulators and ios member functions? Give examples. Write a user defined manipulator.
(b) What are input and output streams?
(c) What is the advantage of saving a file in binary form?
(d) Write a program to create a text file and then count the no. of alphabets, no. of spaces and no. of lines from that file.
- Q.8 Explain the following: (a) How is the complexity of real world handled in OOP?
(b) How is OOP a bottom up approach? (c) Life-cycle of Object Oriented System.



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Attempt any five questions:

- Q.1 (a) What is ISP? How does it work? How internet account is access using ISP?
(b) Discuss various web browsers. How many protocols can be used by browsers?
- Q.2 (a) Explain various security mechanism on web.
(b) What is FTP? How many parts are used by FTP? Also explain upload and download process.
- Q.3 (a) What is web publishing? Explain publishing using HTML.
(b) Discuss various tags of HTML which are using for text and lists with the help of examples.
- Q.4 (a) Create an Intractive layousing using frames, with various links is frame pages.
(b) Create a Java Program, show all components of JAVA environment, program structures and tokens.
- Q.5 (a) What do you mean by JVM? How does it make JAVA more useful?
(b) Explain various error message and their management in JAVA.
- Q.6 (a) Create a local applet and show its life cycle.
(b) Create an applet (remote) and use the concept of parameter passing to applets.
- Q.7 (a) Write a CGI program to use any web application.
(b) How is interface package used? What are its advantages?
- Q.8 Write short notes on any two of the following:
(a) E-mail (b) Abstract and Meta class (c) Color model.



Symbol of Excellence

Attempt any five questions:

- Q.1 (a) What do you mean by ISP? How can a user get Internet connection? Discuss various ways for Internet connection? Discuss various ways for Internet connectivity.
(b) How do plug-ins and helpers work? what are their utilities?
- Q.2 (a) What are various ports and commands used in FTP protocols and their utilities?
(b) Discuss architecture of E-mail system. How do user, client, server and database ineract?
- Q.3 (a) How HTML is published? discuss various methods for deploying HTML based website.
(b) Discuss various HTML tags which can be implemented on text and data.
- Q.4 (a) What is meaning of color schemes? discuss CYN color model. How can it be used for background and foreground?
(b) Design the web page using interactive layout with frames.
- Q.5 (a) What do you mean by Applet? Discuss various methods of running applets.
(b) Discuss applications of remote and local applets.
- Q.6 (a) Write a CGI script to communicate between web-client and server.
(b) How is JAVA used for Internet and World Wide Web programming?
- Q.7 (a) How is JAVA extendible language? Explain concept of JAVA Packages.
(b) Create your own exception. Handle this using exception handling of JAVA.
- Q.8 (a) Explain concept of class, object, method. How does JAVA program execute? How does JAVA program take input and give output?
(b) What is JAVA Environment? Discuss concept of JAVA Virtual Machine.



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Attempt any five questions:

- Q.1 (a) Explain why JAVA is important to internet.
(b) Explain the main features of JAVA that support Object Oriented Programming.
- Q.2 (a) Explain boolean data type. Show its use in a JAVA program.
(b) Create a class stack to define a stack to hold 10 values of integer type. Write a driver program to push and pop elements from stack.
(c) Create a class item having name, quantity and price as attribute. Write all possible constructors for this class.
- Q.3 (a) Explain, with the help of examples, the types of inheritances supported by JAVA.
(b) What is an Abstract Class? What is its utility?
- Q.4 Explain the following: (a) Static Data Type (b) Static Member Function (c) Final Method
(d) Inner Class (e) Methods Overriding
- Q.5 (a) What are Packages? How to create a package? Create a small package and then use it in a JAVA Program.
(b) Differentiate between application program and applet. (c) Show a program using multiple catch clauses.
- Q.6 (a) Explain, with the help of example how does JAVA implement run time polymorphism?
(b) Explain all the access specifiers available in JAVA.
- Q.7 (a) Write an applet to display an item name then it prompts user to input quantity and price and then displays total price.
(b) Explain the type of Internet Access? What are the security tools available for Internet?
- Q.8 Write HTML for the following: (a) Text Formatting and Alignment (b) Images on a Webpage
(c) Interactive Layout with Frames (d) Backgrounds and Color Control and Font control.



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Attempt any five questions:

- Q.1 (a) Explain about Internet and Internet account. (b) Describe about web site and web-home page.
- Q.2 (a) Explain about security techniques on web.
(b) What do you mean by E-mail? Explain E-mail server and client working.
- Q.3 (a) Create interactive layout with frames for your department. (b) Explain RGB color model.
- Q.4 (a) What do you mean by CSS? Explain different CSS techniques.
(b) Explain methods to take and link image on a web page.
- Q.5 (a) Explain about JAVA virtual machine in detail.
(b) Explain class and objects in JAVA. Describe about meta, virtual classes.
- Q.6 (a) Explain about JAVA Tokens, operators and expressions.
(b) What do you mean by interface packages? Explain with suitable example.
- Q.7 (a) Explain Applet life-cycle with help of examples.
(b) Differentiate between local and remote applets with examples.
- Q.8 Write short notes on the following: (a) CGI (b) Exception Handling



Symbol of Excellence

M.Sc(CS) 4th Semester, MS – 19 (Computer Based Optimization Methods)**H.K. Hi-Tech**

College of Commerce & Science

Attempt any five questions:

- Q.1 What is meant by Operations Research? Explain the areas of application of operations research.
- Q.2 A caterer known that he will need 40 napkins on a given day and 70 napkins the day after. He can purchase napkins at 20 paise each and after they are purchased, he can have dirty napkins laundered at 5 paise each for use the next day. In order to minimize his cost, how many napkins should be purchase initially and how many dirty napkins should he have laundered?
- Q.3 Solve the following linear programming problem:
 Maximize $Z = 2x_1 + 4x_2 + 3x_3$
 Subject to constraints
 $3x_1 + 4x_2 + 2x_3 \leq 60$
 $2x_1 + x_2 + 2x_3 \leq 40$
 $x_1 + 3x_2 + 2x_3 \leq 80$
 $x_1, x_2, x_3 \geq 0$
- Q.4 What do you mean by software? Explain various software for linear programming along with their salient features.
- Q.5 A patrol service station has two petrol pumps. The service time follows the exponential distribution with a mean of 4 minutes and the vehicles arrive for service as per Poisson distribution at the rate of 10 per hour. The probability that a customer has to wait for service. What is the expected time the petrol pumps will remain idle?
- Q.6 Define a Waiting Line. Give description of various types of queues.
- Q.7 Explain the meaning and significance of 'Critical Path' and 'Critical Activities' in network analysis. How are these activities crashed for reducing the project completion time?
- Q.8 Write notes on the following: (a) Integer Programming (b) Markov Chains



Symbol of Excellence

M.Sc(CS) 4th Semester, MS – 19 (Computer Based Optimization Methods)**H.K. Hi-Tech**

College of Commerce & Science

Attempt any five questions:

- Q.1 (a) What do you mean by O.R.? Give the development of O.R. in India.
 (b) Explain the various phases of O.R. in solving O.R. Problems.
- Q.2 (a) What is Linear Programming? Discuss its various assumptions and limitations.
 (b) Explain the following: (i) Optimal Solution (ii) Surplus Variable
- Q.3 Use Simplex method to solve the following CPP and also draw the flow chart of Simplex Algorithm:
 Maximize $Z = 4x_1 + 10x_2$
 Subject to constraint $2x_1 + x_2 \leq 50$
 $2x_1 + 5x_2 \leq 100$
 $2x_1 + 3x_2 \leq 90$
 $x_1, x_2 \geq 0$
- Q.4 Define Duality and also state the necessities of it. Find the dual of the following problem:
 Max. $Z = x_1 - x_2 + 3x_3$
 Subject to constraint
 $x_1 + x_2 + x_3 \leq 10$
 $2x_1 - x_2 \leq 2$
 $x_1 - 2x_2 - 3x_3 \leq 6$
 $x_1, x_2, x_3 \geq 0$
- Q.5 Discuss the various types of integer programming problem and solve the following LPP:
 Max. $Z = -3x_1 + x_2 + 3x_3$
 Subject to constraint
 $-x_1 + 2x_2 + x_3 \leq 4$
 $2x_2 - \frac{3}{2}x_3 \leq 1$
 $-x_1 + 3x_2 + 2x_3 \leq 4$
 $x_1, x_2, x_3 \geq 0$
- Q.6 Define a queue and also discuss the various policies to deal the customers. Also discuss the behaviour of the customers.
- Q.7 (a) Define PERT and CPM and also explain the difference between them.
 (b) Discuss the discrete and continuous Markov Chains
- Q.8 Write notes on the following: (a) Dummy Activity (b) Forward and Backward pass computation
 (c) Standard Form of LPP (d) Float



Attempt any five questions:

Q.1 (a) Define Operations Research. Give the main characteristics of operations research.

(b) What is a Model? Discuss the various classification schemes of models.

Q.2 (a) Define the following: (i) Basic Solution (ii) Slack Variable
(iii) Unbounded Solution (iv) Degenerate

(b) A company produces two types of hats. Each hat of the first type repairs twice as much labour time as the second type. If all hats are of the second type only, the company can produce a total of 500 hats a day. The market limits daily sales of the first and second types to 150 and 250 hats. Assuming that the profits per hat are Rs.8 for type A and Rs.5 for type B. Formulate the problem as linear programming in order to determine number of hats to be produced of each type so as to maximize the profit.

Q.3 Solve the following LPP by using Simplex method:

Maximize $Z = 3x_1 + 2x_2 + 5x_3$

Subject to $x_1 + 2x_2 + x_3 \leq 430$

$3x_1 + 2x_3 \leq 460$

$x_1 + 4x_2 \leq 420$

and $x_1, x_2, x_3 \geq 0$

Q.4 Write down the dual of the following linear programming problem:

Max. $Z = 4x_1 + 2x_2$

Subject to constraint $x_1 + x_2 \geq 3$

$x_1 - x_2 \geq 2$

$x_1, x_2 \geq 0$

and

Q.5 Find the optimum integer solution to the following all LPP:

Max. $Z = x_1 + 2x_2$

Subject to $2x_2 \leq 7$

$x_1 + x_2 \leq 7$

$2x_1 \leq 11$

Q.6 (a) Define the following terms: (i) Event (ii) Activity (iii) Dangling (iv) Redundancy

(b) A project has the following time schedule:

Activity	Time in Month
1-2	2
1-3	2
1-4	1
2-5	4
3-6	8
3-7	5
4-6	3
5-8	1
6-9	5
7-8	4
8-9	3

(i) Construct PERT Network (ii) Compute Critical Path and its duration.

Q.7 (a) Determine if the following transition matrix is ergodic Markov chain:

		Future States			
		1	2	3	4
Present States	1	$1/3$	$1/3$	0	$1/3$
	2	0	$1/2$	$1/4$	$1/4$
	3	$1/4$	0	$1/2$	$1/4$
	4	0	0	$1/3$	$2/3$

(b) Discuss in brief the main characteristics of Queuing System.

Q.8 Write short notes on the following: (a) Utilization Factor (b) Assumptions in LPP

(c) Software for LP (d) Duality