V.S.B. ENGINEERING COLLEGE, KARUR
Academic Year: 2017-2018 (Even Semester)
Department of Computer Science and Engineering
Question Bank (2013 Regulations)

COMPUTER NETWORKS
UNIT I
PART A

1. What are the two types of line configuration?
2. What do you mean by error control?
3. Define flow control?
4. What is redundancy?
5. Write short notes on error correction?
6. Mention the types of error correcting methods.
7. What are the steps followed in checksum generator?
8. Define checksum.
9. Write short notes on CRC checker.
10. Write short notes on LRC.
11. List out the available detection methods.
12. Mention the types of errors and define the terms?
13. Distinguish between peer-to-peer relationship and a primary-secondary relationship.
14. What are the ways to address the framing problem?
15. What are the responsibilities of data link layer?
16. What are the functions of Application layer?
17. Define Bit stuffing.
18. What are the features provided by layering?
19. What are header and trailers and how do they get added and removed?
20. Group the OSI layers by function?
21. What are the two types of parity checks? Define it.
22. Draw a neat diagram of Internet protocol graph.

PART B

1. Explain in detail the error detection and error corrections. (16)
2. With a neat diagram explain in detail about the Network architecture. (16)
3. Discuss in detail about HDLC. (16)
4. (i)What is the difference between Internet architecture and OSI architecture? (8)
   (ii) Explain about coaxial cable and fiber optics media for communication. (8)
5. Discuss about the links operated on the physical media in detail. (16)
6. Explain the different approaches of framing in detail. (16)
7. Discuss about different types of Issues in data link layer. (16)
8. (i)Write about channel access on links. (8)
   (ii)Explain about FDMA and TDMA in detail. (8)
9. (i) A block of 32 bits has to be transmitted. Discuss how the thirty two bit
block is transmitted to the receiver using Longitudinal Redundancy Check. (4)
(ii) Consider a 32 bit block of data 11100111 11011101 00111001 10101001 that has to be
transmitted. If Longitudinal Redundancy Check is used what is the transmitted bit stream? (6)
(iii)In the Hamming code, for a data unit of m bits how do you compute
the number of redundant bits „r‟ needed? (6)

10. Discuss in detail about the layers of OSI model. (UQ)
11. Discuss in detail about SONET.
12. Write the Sliding Window Algorithm and explain it in detail.

13. Compare Stop and Wait ARQ scheme with sliding window ARQ scheme.
14. Write in detail about the flow control mechanisms.

UNIT II
PART A

1. What is CSMA?
2. Explain CSMA/CD
3. Mention some of the physical properties of Ethernet.
4. What is the role of VCI?
5. What do you mean by error control?
6. What are the functions of bridges?
7. What is the size of Ethernet address?
8. What is the advantage of FDDI over a basic token ring?
9. List any two functions which a bridge cannot perform?
10. Mention the function of hub.
11. Mention different random access techniques?
12. List the two types of data frames in FDDI
13. What is the purpose of the NAV?
14. Name the four types of S frames.
15. What is the access method used by wireless LANs?

PART B

1. Explain the CSMA/CD algorthims of Ethernet. (8)
2. Explain in details about the access method and frame format used in Ethernet
and token ring. (16)
3. Name the four basic network topologies and explain them giving all the
relevant features (16)
4. (i) Explain the working of carrier sense multiple access protocol.
(3) (ii) How does a Token Ring LAN operates? Discuss. (6)
(iii) List and briefly discuss the two different basic transmission
technologies that can be used to set up wireless LAN"s. (7)
5. Explain the frame format, operation and ring maintenance feature of IEEE
802.5 MAC protocol. (16)
6. Briefly define key requirements for wireless LANs. (16)
7. Describe the FDDI frame format and explain. (16)
8. Discuss the MAC layer functions of IEEE 802.11. (8)
9. Explain in details the types of bridges. (8)
10. Explain the functioning of wireless LAN in detail.(UQ)
11. Explain Ethernet in detail.
12. Differentiate FDDI from token ring
13. Write in detail about Resilient Packet Ring.
14. Write short notes on WI-Fi,Wi-Max.
15. Write short notes on Cellphone technologies.

UNIT III
PART – A
1. List the difference between circuit switching and Packet switching.

2. What are the different kinds of Multicast Routing?
3. Discuss the class field in IP address.
4. What is meant by circuit switching?
5. What is multicasting?
6. What is a hostid and netid?
7. How does a netid differ from a network address?
8. What is the purpose of subnetting?
9. Define Masking.
10. What is the difference between boundary level masking and non-boundary
      level masking.
11. What is the function of router?
12. How does a router differ from a bridge?
13. Find the class of each addresses.
14. Why is adaptive routing superior to non adaptive routing?
15. What are the three main elements of distance vector algorithms.
16. What is address resolution?
17. What are the benefits of subnetting a network?
18. What are the metrics used by routing protocols?

PART B

1. Explain shortest path algorithm with a suitable illustration. (16)
2. Explain the distance vector routing algorithm.(16)
3. Mention the limitations of distance vector routing algorithm.(8)
4. Explain the building and distribution of link state packets in link state
routing algorithm.(8)
5. Mention the limitations of link state routing algorithm.(8)
6. Explain link state routing and discuss its advantages over distance vector routing.(8)
7. Explain in details packet switching.(16)
8. Explain in details Datagram approach.(16)
9. Explain in details IP addressing methods.(16)
11. i. In classful addressing how is an IP address in class A, Class B and Class
C divided? (4)
ii. Given the address 23.56.7.91 and the default class A mask, find the
beginning address (network address). (6)
iii. Given the address 201.180.56.5 and the default class C mask, find the
beginning address (network address). (6)
12. Write notes on the following(UQ)
(i) Internet protocol.
(ii) Routers.
13. Discuss in detail the various aspects of IPV6. (UQ)
14. Write in detail about bridges.
15. Discuss the spanning tree algorithm in detail.
16. What are the limitations of bridges.
17. Explain in detail the ATM cell format.
18. Explain about the different AAL protocols.
19. Discuss DHCP in detail.
20. Explain Distance Vector routing in detail.
21. Explain OSPF in detail.

22. Discuss RIP in detail.
23. Problems in subnetting.
24. Write short notes on the following
i. Broadcasting
ii. Multicasting
iii. ARP
iv. RARP

UNIT IV
PART A
1. What are the services provided by transport layer protocol?
2. What is the difference between network service and transport service?
3. List some of the Quality of service parameters of transport layer
4. What are the functions of transport layers?
5. What is transport entity?
6. What is segmentation?
7. What is the purpose of sequence control?
8. How transport layer performs Duplication control?
9. What are the service primitives in simple transport protocol?
10. What are the methods to improve Qos?
11. What is traffic shaping? Name two methods of shape traffic?
12. What is the use of sequence numbers?

PART B
1. Explain a congestion control algorithm. (16)
2. Explain the duties of Transport layer. (16)
3. Explain the TCP transmission policy, Congestion control. (8)
5. Explain the TCP header and working of the TCP protocol. (16)
6. Explain the various fields of TCP header with the help of a neat diagram.(16)
7. Explain the various steps that are followed in releasing a TCP connection. (16)
8. Explain the three way handshake protocol to establish the transport
level connection. (8)
9. Discuss about congestion control in frame relay. (16)
10. Discuss the various issues of transport layer in details. (16)
11. Explain adaptive flow control in detail and its uses.
12. With neat architecture, explain UDP in detail.
13. Discuss the different Queuing Discipline in detail.
14. Explain the Congestion Avoidance techniques in detail.
15. Explain TCP Congestion control techniques in detail.
16. Explain how QoS is provided through Integrated Services.
17. Explain how QoS is provided through Differentiated Services

UNIT V
PART A
1. Discuss the three main divisions of the DNS.
2. What role does the DNS resolver play in the DNS system?
3. How does a DNS Resolver bootstrap the domain name lookup process?
4. Define SMTP.
5. Define the term domain.

6. What are the two parts of addressing system in SMTP?
7. Discuss MIME.
8. What are the services provided by user agent?
9. What are the four properties of HTTP?
10. What are the four groups of HTTP header?
11. What are categories of web documents?
12. What are basic functions of email system?
13. What is WWW?
14. What is the web browser?
15. What is a post office protocol?
16. Compare the HTTP and FTP.
17. What is mailing list?
18. What are the two main categories of DNS messages?
19. Define cryptography.
20. What are the two categories of cryptography methods? What is the main difference between the categories?
21. What are the advantages of public key encryption/decryption?

PART B

1. Explain DNS with reference to its components and working. (16)
2. Explain the message transfer using simple mail transfer protocol. (8)
3. Explain the final delivery of email to the end user using pop3. (8)
4. Write short notes on email services of the application layer. (8)
5. Explain in details WWW. (8)
6. Explain the architecture and services of e-mailing system. (16)
7. What are the two categories of encryption/decryption methods? What is the main difference between the categories? (8)
8. With a relevant example discuss how the domain space is divided. (6)
ii. Distinguish between a fully qualified domain name and a partially qualified domain name. Give relevant example. (6)
iii. List the various risks faced by messages that are transmitted over the internet.
(4) 9. i. Discuss how simple mail transfer protocol (SMTP) works? Can multimedia messages be transmitted using SMTP? Discuss. (10)
ii. Is common gateway interface a languages. Discuss. (6)
10. Explain the SMTP and HTTP. Give their uses, state strengths and weaknesses.
11. Explain Email protocols in detail.
12. Discuss FTP in detail.
13. Discuss SNMP and Telnet in detail.
14. Write short notes on
i. PGP
ii. SSH

UNIT I OPERATING SYSTEMS OVERVIEW
PART-A
1. What is an Operating system?
2. List out the function of operating systems. Nov/Dec 2013
3. What is PCB? Specify the information maintain in it. Nov/Dec 2012
4. What are the basic elements of Operating system
5. Define interrupt.
6. Write about instruction execution.
7. Why is the Operating System viewed as a resource allocator & control program?
8. List the memory hierarchy available in operating system.
9. Define catch memory.
10. What is Direct Memory Access
11. Define Multiprocessor.
12. Write about Multicore Organization.
13. List Evolution of Operating System
14. What is the Kernel?
15. What are Batch systems?
16. What is the advantage of Multiprogramming?
17. What is an Interactive computer system?
18. What do you mean by Time-sharing systems?
19. What are multiprocessor systems & give their advantages?
20. What are the different types of multiprocessing?
21. What is graceful degradation?
22. .What is Dual-Mode Operation?
23. What are privileged instructions?
24. How can a user program disrupt the normal operations of a system?
25. How is the protection for memory provided?
26. What are the various OS Components?
27. Define system booting
28. What is the use of fork and exec system calls

PART-B
1. Briefly explain in detail the types of systems calls provided by a typical operating. Nov/Dec2012
2. Explain the operating system structure .Nov/Dec 2013
3. Explain the various types of computer systems.
4. Explain how protection is provided for the hardware resources by the operating system.
5. What are the system components of an operating system & explain them?
6. Write about the various system calls.
7. Explain the various memory hierarchies with neat block diagram.
8. Explain the different operations of processes.
9. Differentiate symmetric and asymmetric multiprocessing system.
10. In what ways is the modular kernel approach similar to the layered approaches
11. Explain the facilities provided by the following operating system
12. List out the services provided by operating systems to programs and to the
13. Define operating system and list out the function and component of operating system.

UNIT II PROCESS MANAGEMENT

PART-A

1. Differentiate a thread from a process. Nov/Dec 2012
2. How does real-time scheduling differ from normal scheduling? Nov/Dec 2012
3. Define semaphores. Mention its importance in operating system. Nov/Dec 2012
4. Describe the action taken by a kernel to context-switch between process. Nov/Dec 2013
5. Differentiate pre-emptive and non-preemptive scheduling. Nov/Dec 2014
6. What can the operating system do to recover from deadlock?
7. State the necessary condition for a deadlock situation to arise. Nov/Dec 2013
8. What are the various process scheduling concepts?
9. Explain about inter process communication.
10. Give an overview about threads.
11. Explain in detail about the threading issues.
12. What is a process?
13. What is a process state and mention the various states of a process?
14. What is process control block?
15. What are the use of job queues, ready queues & device queues?
16. What is meant by context switch?
17. What is co-operating process
18. Define a thread. State the major advantages of threads
19. Discuss the differences between symmetric and asymmetric multiprocessing.
20. Define mutex locks.
21. Discuss the critical section problem. State the basic requirements of critical section problem solution
22. What are the benefits of multithreaded programming?
23. Compare user threads and kernel threads.
24. What is User threads
25. Define Kernel threads
26. Define thread cancellation & target thread.
27. What are the different ways in which a thread can be cancelled?
28. Define CPU scheduling.
29. What is a Dispatcher?
30. What is dispatch latency?
31. What are the various scheduling criteria for CPU scheduling?
32. Define throughput?
33. What is turnaround time?
34. Define race condition.
35. What are the requirements that a solution to the critical section problem must satisfy?
36. Define entry section and exit section.
37. Give two hardware instructions and their definitions which can be used for implementing mutual exclusion.
38. Define busy waiting and spinlock.
39. What is bounded waiting in critical region?
40. Define deadlock.
41. Define deadlock prevention, avoidance.
42. What are the four necessary conditions a system should posses in order to avoid deadlock?
43. What is banker's algorithm?

PART-B

1. Explain any three policies for process scheduling tha uses resource consumption information. what is response ratio.(16) Nov/Dec 2014
2. What are semaphores? how do they implement mutual exclusion?(8). Nov/Dec 2014
3. Give a solution for readers-writers problem using condition critical regions (8). Nov/Dec 2014
4. How does a deadlock can be avoided using banker"s algorithm (8). Nov/Dec 2013
5. Discuss in detail the critical section problrms and also write the algorithm for readers-writers problem with semaphores. (8) Nov/Dec 2013
6. Explain the difference in the degree to which FCFS,RR,Non-preemptive SJF scheduling algorithm, discriminate in favour of short process. (16) Nov/Dec 2013
7. Explain the various scheduling criteria in evaluating scheduling algorithm. (8) Nov/Dec 2012
8. What is critical section? specify the requirements, for a solution to the critical section problem. (8) Nov/Dec 2012
9. Explain the banker"s algorithm for deadlock avoidance with illustration.(8) Nov/Dec2012
10. Write about the various CPU scheduling algorithms.
11. Write notes about multiple-processor scheduling and real-time scheduling.
12. What is critical section problem and explain two process solutions and multiple Process solutions?
13. Explain what semaphores are, their usage, implementation given to avoid busy waiting and binary semaphores.
14. Explain the classic problems of synchronization.
15. Write about critical regions and monitors.
16. Give a detailed description about deadlocks and its characterization
17. Write in detail about deadlock avoidance.
18. Give an account about deadlock detection.
19. What is the important feature of critical section? State the dining philosophers problem and How to allocate the several resources among several processes in a deadlock and starvation free manner.
20. Consider the following five processes, with the length of the CPU burst time given in milliseconds.
    Process Burst time P1
    10 P2 29
    P3 3
    P4 7
    P5 12
21. Consider the First come First serve(FCFS),Non Preemptive Shortest Job First(SJF),
22. Round Robin(RR) (quantum=10ms) scheduling algorithms. Illustrate the scheduling using Gantt chart. Which algorithm will give the minimum average waiting time? Discuss. Consider the following page reference string
    7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
23. How many page faults would occur for the following replacement algorithms, assuming three frames that all frames are initially empty?
24. Construct a Resource Allocation Graph for the following scenario. At time"t" ProcessP1 request for a resource X, process P2 requests for a resource Y. Both the resources are Available and they are allocated to the requesting process. At time t1 where t1>t2 both the processes are still holding the resources, however process P1 request for Y which is held by P2, process P2 request for X held by

P1. Will there be a deadlock? f there is a deadlock discuss the four necessary conditions for deadlock, else justify there is no deadlock

25. Consider the following snapshot of a system. Execute Banker's algorithm answer the following.
Allocation Max Available

A B C D A B C D A B C D P0 0 0 1 1 0
0 1 1 1 5 2 2 P1 1 0 0 1 1 7 5 1
P3 1 3 5 1 2 3 5 2
P4 0 0 1 1 5 6 5 1

26. What are the methods involved in recovery from deadlocks?
27. Explain implementation of producers/Consumers problem using monitor.
28. Discuss the critical section problem. State the basic requirements of critical section problem solution

UNIT III STORAGE MANAGEMENT

1. Differentiate local and global page replacement algorithm. Nov/Dec 2012
2. List out the step needed to implement page replacement. Nov/Dec 2014
3. Compare swapping and overlays. Nov/Dec 2013
4. Differentiate eternal fragmentation with internal fragmentation. Nov/Dec 2013
5. What is logical address space and physical address space?
6. What is the main function of the memory-management unit?
7. Define dynamic loading.
8. Define dynamic linking.
9. What are overlays?
10. Define swapping.
11. What are the common strategies to select a free hole from a set of available holes?
12. What do you mean by best fit?
13. What do you mean by first fit?
14. What is segmentation?
15. Why should we use virtual memory?
16. State what is required to support dynamic memory allocation in contiguous memory allocation?
17. What is thrashing?
18. What is Pre-paging?
19. Distinguish logical and physical address space.
20. Define virtual memory.
21. What so you mean by maskable and non maskable interrupt?

PART-B

1. Differentiate local and global page replacement algorithm. Nov/Dec 2012
2. What is virtual memory? Mention its advantages. Nov/Dec 2012
3. What is the maximum file size supported by a file system with 16 direct blocks, single, double, and triple indirection? The block size is 512 bytes. Disk block number can be stored in 4 bytes. Nov/Dec 2014
4. List the steps needed to perform page replacement. Nov/Dec 2014
5. Explain with the help of examples FIFO and LRU page replacement algorithms.(8) Nov/Dec 2014
6. Differentiate external fragmentation with internal fragmentation. Nov/Dec 2013
7. Briefly explain and compare, fixed and dynamic memory partitioning schemes. Nov/Dec 2012

8. Explain with the help of examples FIFO and LRU, optical page replacement algorithms with example reference string. Mention the merits and demerits of each of the above algorithm. Nov/Dec 2012
9. Explain how paging supports virtual memory. With neat diagram explain hoe logical address is translated into physical address. Nov/Dec 2012
10. Explain memory management in Linux operating system. Nov/Dec 2012
11. Explain about contiguous memory allocation
12. Give the basic concepts about paging
13. Write about the techniques for structuring the page table.
14. Explain the basic concepts of segmentation.
15. What is demand paging and what is its use?
16. Explain the various page replacement strategies
17. What is thrashing and explain the methods to avoid thrashing?
18. Write short notes on swapping
19. Discuss the advantages of paging memory management and the conversion of logical address into physical address with necessary
20. Consider the following page reference string: 2, 3, 4, 2, 1, 5, 6, 4, 1, 2, 3, 7, 6, 3, 2, 1 Calculate the number of page faults would occur for the following page replacement algorithm with frame size of 4 and 5. (16)
21. Explain the page fault handling routine with diagram.
22. Explain Contiguous and Non contiguous memory allocation with example.

UNIT IV I/O SYSTEMS
PART-A
1. What is virtual memory?
2. What is file allocation strategy is most appropriate for random access files. Nov/Dec 2014
3. What is Demand paging?
4. Define lazy swapper.
5. What is a pure demand paging?
6. Define effective access time.
7. Define secondary memory.
8. What is the basic approach of page replacement?
9. What are the various page replacement algorithms used for page replacement?
10. What are the major problems to implement demand paging?
11. What is a reference string?
12. What is a file?
13. List the various file attributes.
14. What are the various file operations?
15. What are the information associated with an open file?
16. What are the different accessing methods of a file?
17. What is Directory?
18. What are the operations that can be performed on a directory?
19. Define lazy swapper.
20. What is a pure demand paging?
21. Define effective access time.
22. List out the disadvantages of FAT file system.
23. Define relative block number.
24. Give the example of relative and index file.

PART-B

1. Discuss the different techniques with which a file can be shared among different users. Nov/Dec 2014
2. Explain any two page replacement algorithm. Nov/Dec 2014
3. Explain the concept of demand paging and the performance issue of demand paging. Nov/Dec 2014
4. Explain linked file allocation method. Nov/Dec 2012
5. Explain various file directory structure. Nov/Dec 2012
6. What are files and explain the access methods for files? File definition
7. Explain the schemes for defining the logical structure of a directory.
8. Write notes about the protection strategies provided for files.
9. Explain the allocation methods for disk space.
10. State the various attributes of file and their purpose.
11. Discuss various file operations.
12. Give an example for an application that could benefit from operating system support for random access to indexed files.
13. List and briefly discuss the most common schemes for defining the logical structure of a directory.
14. With necessary diagram explain the different allocation methods of disk space.
15. List and discuss various methods for implementing a directory. Single-Level directory
16. Explain and compare different file access methods.
17. Explain the indexed and linked file allocation methods. Discuss the advantages and Disadvantages in those methods.
18. How are the processes and threads executed in Linux?

UNIT V CASE STUDY
PART-A

1. Define Linux Kernel.
2. What is Linux distribution?
3. How device driver support
4. Differentiate Development kernel and Production kernel.
5. How do you improve symmetric multiprocessor performance
6. Give some examples of Linux OS.
7. Define public domain
8. What are the components of Linux System?
9. What kernel it means?
10. Define System Library.
11. Describe System utilities.
12. Draw the diagram for components of Linux system.
13. Mention the terms of registration table.
14. Elaborate fork () and exec().
15. What are the components of Linux Module?
16. Define Linux system.
17. What are the requirements for Linux System Administrator?
18. Define LINUX Multifunction Server
19. What is Domain Name System?
20. Define Local Network Services.
21. List the available Virtualization
22. What is VMware on Linux Host
23. List the Guest OS.
24. How development kernel operates in Linux OS?

PART-B

1. Explain about Linux system with suitable example.
2. Define Linux system Administrator and list the requirements of linux system administrator
3. Explain detail in Linux multiplication server
4. List local network services with example.
5. Write about Virtualization with example.
6. Briefly Explain about the Layers of Linux Operating System.
7. Explain about the Structure of Linux Kernel with necessary diagram.
8. Discuss in detail about Scheduling in Linux.
9. Illustrate Linux run queue and priority arrays.
10. Explain in detail about Memory Management in Linux.

CS6402 DESIGN AND ANALYSIS OF ALGORITHMS
UNIT – I INTRODUCTION
PART –A

1. State the Euclid"s algorithm for finding GCD of two given numbers.
2. What is Algorithm Design Technique?
3. What do you mean by "Worst case-Efficiency" of an algorithm?
4. Define the term algorithm. Explain the properties of algorithm.
5. How to measure an algorithm"s running time?
6. What do you mean by order of growth?
7. Write any two properties of big – O notation.
8. What is the properties of Asymptotic Notations?
9. Write an algorithm to find factorial of n number.
10. What is Exact and Approximation algorithm?
11. Formally define the notion of algorithm with diagram
12. What are six step processes in algorithmic problem solving?
13. What do you understand by the term algorithmic strategy?
14. Enlist few algorithmic strategies.
15. Write the concept of time and space complexity
16. Define recurrence relation.
17. Write an algorithm to find the number of binary digits in the binary representation of a positive decimal integer.
18. Define big oh notation.
19. Write any two properties of big oh notation.
20. List the asymptotic classes in increasing order.
21. Define breakeven point.
22. What is conditional asymptotic notation?
23. Define algorithm validation.
24. What is average case analysis?

PART –B

1. Describe the steps in analyzing & coding an algorithm.
2. Explain some of the problem types used in the design of algorithm.
3. Discuss the fundamentals of analysis framework.
4. Explain the various asymptotic notations used in algorithm design.
5. Explain the basic efficiency classes.
6. Explain in detail about mathematical analysis of non-recursive algorithms with suitable problem.
7. Explain in detail about mathematical analysis of non-recursive algorithms with suitable problem.

UNIT – II BRUTE FORCE AND DIVIDE-AND-CONQUER

1. Give the control abstraction of divide and conquer technique.
2. What is the time complexity of binary search?
3. What is traveling salesman problem?
4. Define quickhull.
5. What is the difference between Merge sort and Quick sort.

6. What is binary search?
7. Give the recurrence relation for the worst case behavior of merge sort.
8. What is the objective function of knapsack problem?
9. Define Merge Sort
10. What can we say about the average case efficiency of binary search?
11. Explain the Brute Force approach.
12. Name the algorithm strategy that uses the "Just do it!" approach
13. List the applications of Brute Force method.
14. What is exhaustive search?
15. Enlist the problem in which exhaustive search is carried out.
16. What is closest pair problem?
17. What is convex hull problem?
18. What is travelling salesman problem?
19. What is knapsack problem?
20. What is assignment problem?

PART –B

11. Devise an algorithm to sort the following elements using merge sort
   technique 286, 45,278,368,475,389,656,788,503,126
12. Write an efficient and exhaustive search algorithm for the traveling salesman problem.
13. Explain Binary search in detail.
14. Give examples of assignment problems where
    i)   The largest element of cost matrix is not included in the optimal solution   .
    ii)   The largest element of cost matrix is not feasible for optimal solution.
15. Solve the recurrence for the number of additions required by strassen"s algorithm. (Assume
    that n is a power of 2)
16. Implement in C, the divide and conquer closest pair algorithm.
17. Explain the upper and lower hulls in the convex-hull problem, with an example.
18. Give a specific example of inputs that make the quickhull algorithm run in quadratic time.

UNIT – III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE
PART –A

1. State Principle of optimality.
2. What is 0/1 knapsack problem?
3. What are all the applications of dynamic programming?
4. Define optimal binary search tree.
5. Write the general procedure of dynamic programming.
6. Define Binomial Coefficient
7. What is meant by Warshalls algorithm
8. What does Floyd"s algorithm do?
9. Define Memory Function technique.
10. Define spanning tree.
11. What is mean by divide and conquer technique ?
12. What is binary search?
13. What are the applications of binary search?
14. What is the use of recursive calls in merge sort algorithm?
15. Is quick sort stable algorithm?

16. What is the difference between quick sort and merge sort?
17. What is the use of two recursive calls in merge sort algorithm?
18. List out two drawbacks of binary search algorithm.
19. What kind of problems can be solved using divide and conquer method?
20. Explain how merge sort algorithm makes use of divide and conquer?
21. State the formula for multiplying two large numbers using divide and conquer method
22. Give the time efficiency and drawbacks of merge sort algorithm
23. Explain how the key element is searched in binary search algorithm?
24. Write down the recurrence relation used for binary search
25. Write the control abstraction for divide and conquer

PART –B

26. Apply Floyd"s algorithm or obtain all pair shortest path for the following graph. Explain with the algorithm.
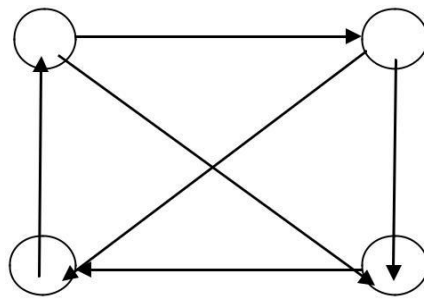
27. Solve the following instance of the 0/1 Knapsack problem for the given knapsack capacity M=5.

tems	Weight	Value
1	2	12
2	1	10
3	3	20
4	2	15

28. Solve the following knapsack problem using the greedy technique.
   N=6,
   (P1,P2,P3,P4,P5,P6) = (W1,W2,W3,W4,W5,W6)=(100,50,20,70,7,3) and m=165

29. Explain Warshall"s & Floyd"s Algorithm.
30. Define optimal binary search trees with example.
31. Describe in detail about prim"s algorithm with suitable example.
32. Explain in detail about kruskal"s algorithm.
33. Define Dijkstra"s algorithm. Explain in detail with example.

UNIT – IV ITERATIVE IMPROVEMENT
PART –A

1. Define Optimal solution
2. Define Feasible Solution
3. What are the requirements of standard form?

4. What are the steps involved in simplex method?
5. Define matching.
6. Define bipartite graph.
7. What is stable marriage problem?
8. Define iterative improvement technique.
9. Define flow network.
10. What is maximum flow problem?
11. Write the general procedure of dynamic programming
12. What are the variants of knapsack problem?
13. What is the principle difference between the two techniques?
14. Give any two properties of dynamic programming approach
15. What is transitive closure?
16. Define travelling salesman problem
17. State how dynamic programming solves the complex problems
18. Define optimal binary search tree
19. State the 0/1 knapsack problem
20. Enlist the applications that makes use of dynamic programming for the solution
21. Explain with an example where the principle of optimality doesnot hold
22. What is weighted graph?
23. What is the formula for binomial coefficient?
24. How dynamic programming approach is used to solve binomial coefficient problem?
25. What is digraph?

PART –B

26. Consider the following linear programming problem in two variables:
$$\text{maximize} \quad 3x + 5y$$
$$\text{subject to} \quad x + y \leq 4$$
$$x + 3y \leq 6$$
$$x \geq 0, \; y \geq 0.$$

27. Explain in detail about an outline of an simplex method with example.

28. Prove the Max-flow Min-cut theorem with example.

29. Write short notes on the following:
    i. Flow conservation requirement
    ii. Augmenting path method
    iii. Shortest augmenting path algorithm
    iv. Forward and Backward edges

30. Explain how the maximum flow problem for a network with several sources and sinks can be transformed into the same problem for a network with a single source and a single link.

31. Define the following: source, sink, capacity, flow network and preflow.
32. Proof a matching M is maximal if and only if there exists no augmenting path with respect to M.
33. Write an algorithm for Maximum Bipartite matching with example.

34. Write an algorithm for stable marriage algorithm with example.

35. Explain the following:
  1. Blocking pair
  2. Man-optimal
  3. Woman-optimal

UNIT – V COPING WITH THE LIMITATIONS OF ALGORITHM POWER PART –A

1. Write the difference between backtracking & branch and bound techniques.
2. What is NP-hard and NP-completeness?
3. Give the formula for finding the upper bound for the knapsack problem.
4. When a decision problem is said to be polynomially reducible?
5. What is meant by decision tree?
6. What is subset-sum problem? When can a node be terminating in it?
7. Define Branch and Bound Technique
8. Define n-Queens problem
9. What is "Traveling salesman problem"?
10. Define Backtracking
11. Compare feasible and optimal solution
12. How to get optimal solution?
13. State the general principle of greedy algorithm
14. State the applications of Huffman"s tree
15. What is the drawback of greedy algorithm?
16. Differentiate between subset paradigm and ordering paradigm
17. What is Spanning tree and its applications?
18. What is minimum spanning tree?
19. What is the purpose of Dijkstra"s algorithm?
20. What is Greedy algorithm?
21. What is objective function?
22. State the general characteristics of greedy algorithm?
23. Difference between prim"s algorithm and kruskal"s algorithm?
24. Write control abstraction for the ordering paradigm?
25. State the time complexity of prim"s algorithm

PART –B

26. Explain the 8-Queen"s problem & discuss the possible solutions.
27. Solve the following instance of the knapsack problem by the branch & bound algorithm.

28. Apply backtracking technique to solve the following instance of subset sum
    problem: S={1,3,4,5} and d=11
29. Solve the following 6 city traveling salesperson problem using the branch and bound algorithm.

$$\begin{pmatrix} \alpha & 21 & 42 & 31 & 6 & 24 \\ & 11 & \alpha & 17 & 7 & 35 & 18 \\ & 25 & 5 & \alpha & 27 & 14 & 9 \end{pmatrix}$$

$$12 \quad 9 \quad 24 \quad \alpha \quad 30 \quad 12$$
$$14 \quad 7 \quad 21 \quad 15 \quad \alpha \quad 48$$

$$40 \quad 15 \quad 16 \quad 5 \quad 20 \quad \alpha$$

30. Explain how branch and bound technique is used to solve 0/1 knapsack problem.
for n=4 , W=10, (p_1,p_2,p_3,p_4) = (40,42,25,12) and (w_1,w_2,w_3,w_4) = (4,7,5,3).

31. Briefly explain NP-Hard and NP-Completeness with examples.
32. Explain about assignment problem using branch and bound with example.
33. Discuss the solution for travelling salesman problem using branch & bound technique.

34. Discuss the decision trees for sorting algorithms.

EC 6504 – MICROPROCESSOR AND MICROCONTROLLER

UNIT I THE 8086 MICROPROCESSOR
PARTA

1. What is microprocessor? What is the difference between a MP and CPU?
2. Why the program counter and stack pointer are registers of 16 bit?
3. List the flags of 8086?
4. Define stack.
5. What is assembler directives?
6. What are the various programmed data transfer methods?
7. How is physical address generated in 8086?
8. What are the 8086 instructions used for BCD arithmetic?
9. List any four program control instructions available in 8086
10. What is an assembler directive? Give two examples?
11. List any two external hardware synchronization instruction of 8086 microprocessor?
12. How will carry and zero flags reflect the result of the instruction CMP BX, CX?
13. Give any four miscellaneous instructions in 16 bit processor?
14. What are the 8086 instructions used for ASCII arithmetic?
15. List the various string instructions available in 8086.
16. What are procedures?
17. What are Macros?
18. What is modular programming?
19. Give any four string instructions?
20. Why string primitives are used?

PART-B

21. (i)Explain the internal hardware architecture of 8086 microprocessor with neat diagram? (ii) Write short note about assembler directives?
22. Explain the various addressing modes of 8086 microprocessor with examples?
23. (i) Explain Data transfer, arithmetic and branch instructions ?
    (ii)Write an 8086 ALP to find the sum of numbers in the array of 10 elements?
    24. Explain modular programming in detail?
    25. Write a note about stack, procedures and macros?
26. Define interrupt and their two classes? Write in detail about interrupt service routine?
27. Explain byte and string manipulation with examples?
28. Write in detail about instruction formats and instruction execution timing?
    29. Write an ALP to find the largest number and smallest number in the array?
30. Write a short note about
    (i) Loop, NOP and HLT instructions
    (ii) Flag manipulation, logical and shift& rotate instructions?

UNIT II 8086 SYSTEM BUS STRUCTURE
PART A

1. Define a Bus.
2. Differentiate External & Internal Bus.
3. What are the two modes of operation in 8086?
4. What is minimum mode and maximum mode?

5. What is bootstrap loades?
6. What is the use of initialization command words and operation command words?
7. Draw the typical sequence of bus cycles?
8. What are the Principal types of I/O.
9. What is direct memory access?
10. Define double buffering and multiple buffering?
11. What are two classes of interrupts?
12. What do you mean by nonmaskable interrupt?
13. Explain bus request, bus rant and cycle stealing?
14. Define system throughput?
15. Draw the process states and state changes in a simple multiprogramming.
16. What is first fit algorithm?
17. How does a fragmentation problem occur in multiprogramming? How can we avoid it?
18. What is coprocessor configuration?
19. What is the difference between closely and loosely coupled configurations?
20. How does a bus access logic help to resolve the bus arbitration problem?

PART B

21.   Explain Minimum mode and maximum mode of operation in 8086 in detail.
22. Explain in detail about the system bus timing of 8086/8088.
23. Write notes on the following

24. Explain in detail about block transfers and DMA.
25. Explain in detail about closely coupled configurations.
26. Explain loosely coupled configurations in detail.
27. Explain the following in detail

28. Explain Numeric data Processor in detail.
29. Explain in detail about I/O Processor.
   30. Explain the following
                    Multiprocessor
                    system Coprocessor
                    Multiprogramming
                    Semaphore

UNIT III I/O INTERFACING
PART A
1. Write the advantage and disadvantage of parallel communication over serial communication?
2. Compare the features of A/D & D/A convertor
3. List the four display modes of 8279 keyboard/display controller

4. List the applications of programmable interval timer.
5. What is interfacing?
6. Give the various modes of 8254 timer?
7. What is the output modes used in 8279?
8. What is the significance of end of conversion signal while interfacing A/D converter to a microprocessor?
9. Name the modes used by the DMA processor to transfer data.
10. What is key bouncing?
11. What is the use of terminal count register?
12. Basic concepts in memory interfacing.
13. What is the use of 8251 chip? .
14. What is an USART?
15. What are the features used mode 1 in 8255?
16. What are the basic modes of operation of 8255?
17. Give the different types of command words used in 8259?
18. Give the operating modes of 8259A?
19. What is the purpose of control word written to control register in 8255?
20. What is meant by polling?

PART B

1. Draw and explain the block diagram of 8254 programmable interval timer. Also explain the various modes of operation.
2. Explain 8279 keyboard /display controller with neat block diagram.
3. (i)Explain how to interface: (i)ADC and
   (ii) DAC (ii)Compare serial and parallel interface?
4. With neat block diagram explain the 8251 and its operating modes.
5. Draw the block diagram of I/O interface &explain in detail.
6. Explain in detail about DMA controller.
7. Explain the format of I/O mode set control and BSR control word of programmable peripheral interface. Explain in detail the operating modes of PPI?
8. Draw and explain the block diagram of traffic light control system.
9. Write short notes on LED display, LCD display,Keyboard display interface.
10. Draw and explain the block diagram of alarm controller.

UNIT IV MICROCONTROLLER

PART A

1. Specify the size of memory systems used in 8051 microcontroller?
2. Mention the different operand types used in 8051
3. List the counters in 8051
4. Mention the register bank of 8051
5. How many ports are bit addressable in 8051
6. What are the hardware and software interrupts of 8051?mention its vector addresses
7. What happens in power down mode of 8051
8. What are the different ways of operand addressing in 8051
9. How do you place a specific value in the DPTR register?
10. Which is called as PSW in 8051
11. List the four siginificant features of 16-bit microcontroller?
12. What is the difference between microprocessor & micro controller?
13. List the addressing modes of 8051?
14. Explain the instructions used to access external RAM.
15. List the features of 8051 microcontroller?
16. Mention the data types of 8051
17. Name the special functions registers available in 805
18. What are the software and hardware interrupts of 8051?Mention its vector addresses.
19. How the selection of particular register bank is done in 8051?
20. Mention any two instruction of data serialization

1. Explain the architecture of 8051 with its diagram.
2. Explain the I/O pins ports and circuit details of 8051 with its diagram.
3. Write an 8051ALP to create a square wave 66%duty cycle on bit3 of port 1.
4. With example explain the arithmetic and logic instruction of 8051 microcontroller.
5. With example explain the different instruction set of 8051 microcontroller.
6. Write a program based on 8051 instruction set to pack array of unpacked BCD digits.
7. Explain the different addressing modes of 8051
8. Write a program to bring in data in serial form and send it out in parallel form using 8051
9. Explain the data types and assembler directives of 8051
10. Explain about the register banks and special function register of 8051 in detail

UNIT V INTERFACING MICROCONTROLLER

PART A

1. State the uses of I2C bus standard?
2. List the advantages of microprocessor based system design.
3. Nane the two classifications of stepper motor.
4. List the applications of stepper motor.
5. What is the use of stepper motor?
6. Differentiate microprocessor from microcontroller in system design.
7. How is stepper motor interfaced with 8051?
8. What are the use of PWM in motor control using microcontroller?

9. What are the features of RTC?
10. What is interrupt service routine
11. What is polling
12. Compare polling and interrupt
13. Mention the interrupt priority in 8051
14. What is signal conditioning
15. Mention the types of memory
16. What is the use of PSEN signal
17. Which registers are associated with timer programming
18. Which registers are associated with counter programming
19. Which registers are associated with serial programming
20. Define baud rate of 8051

PART B

1. Draw the diagram to interface a stepper motor with 8051 microcontroller and explain also write an 8051 ALP to run the stepper motor in both forward and reverse direction with delay.
2. Explain how interrupts are handled in 8051.
3. Write short notes on LCD interface.
4. Write notes on 8051 serial port programming.
5. Explain about external memory interfacing to 8051
6. Write notes on 8051 timer and counter programming.
7. Draw and explain the ADC interfacing using 8051.
8. Draw and explain the DAC interfacing using 8051.
9. Explain the keyboard interfacing using 8051
10. Explain the sensor interfacing using 8051

UNIT-1

2 MARK QUESTIONS:
1. What is software engineering?
2. What is Software?
3. Write out the reasons for the Failure of Water Fall Model.
4. What are the characteristics of the software?
5. What are the various categories of software?
6. What are the challenges in software?
7. Define software process
8. What are the fundamental activities of a software process?
9. What are the umbrella activities of a software process?
10. What are the merits of incremental model?
11 .List the task regions in the Spiral model.
12. What are the drawbacks of spiral model?
13. List out the available software risk.
14. List the process maturity levels in SEIs CMM.
15. What is COCOMO model?
16 .Define Reactive and proactive risk strategies.
17. What is meant by LOC and FP based estimation?
18. Define earned value analysis.
19. What is the difference between the "Known Risks" and Predictable Risks"?
20.What is CASE?

16 MARK QUESTIONS:
1. Explain iterative waterfall and spiral model for software life cycle and various activities.
2. Elaborate COCOMO model?
3. Explain in detail about the software project management.
4. Explain in detail about the life cycle process.
5. Explain in detail about risk projection.
6. Write a note on Taxonomy of CASE tools.
7. what is an ICASE and give the role of repository in ICASE environment?
8. Narrate project scheduling in detail.
9. Explain System Engineering & its Hierarchy.
10. Develop an own application based on any of the life cycle models.

UNIT-2

2 MARK QUESTIONS:
1. What is requirement elicitation?
2. Name the Evolutionary process Models.
3. What are the Objectives of Requirement Analysis?
4. What is requirement engineering?
5. What are the various types of traceability in software engineering?
6. Define Petri Net.
7. What are the Requirements Engineering Process Functions?
8. What are the benefits of prototyping?
9. What are the prototyping approaches in software process?
10.What are the Difficulties in Elicitation?
11.What are the advantages of evolutionary prototyping?
12.What are the various Rapid prototyping techniques?
13.What is the use of User Interface prototyping?

14. What is System Modeling?
15. What are the characteristics of SRS?
16. What are the objectives of Analysis modeling?
17. What is data modeling?
18. What is a data object?
19. What are attributes?
20. What is data dictionary?

16 MARK QUESTIONS:
1. Explain in detail about Functional and non functional user requirements.
2. Explain in detail about Functional and non functional system requirements.
3. Explain in detail about data modeling.
4. Explain about Requirement Engineering.
5. Explain the prototyping approaches in software process.
6. Explain classical analysis.
7. Explain Functional models
8. Explain behavioral models
9. Write note on structured analysis & data dictionary
10. Explain in detail about software document.

UNIT-3
2 MARK QUESTIONS:
1. What are the elements of Analysis model?
2. What are the elements of design model?
3. How the Architecture Design can be represented?
4. Define design process.
5. List the principles of a software design.
6. What is the benefit of modular design?
7. What is a cohesive module?
8. What are the different types of Cohesion?
9. What is coupling?
10. What are the various types of coupling?
11. What are the common activities in design process?
12. What are the benefits of horizontal partitioning?
13. What is vertical partitioning?
14. What are the advantages of vertical partitioning?
15. What are the various elements of data design?
16. List the guidelines for data design.
17. Name the commonly used architectural styles.
18. What is Transform mapping?
19. Differentiate hard real time & soft real time systems
20. Define product Engineering

16 MARK QUESTIONS:
1. Explain in detail the design concepts.
2. Explain the design principles.
3. Explain the design steps of the transform mapping.
4. Explain in detail about the real time systems.
5. Explain in detail about SCM.
6. Explain about user interface design
7. Brief about real time executives
8. Explain about Data acquisition systems

9. Narrate User interface design
10. Write note on monitoring and control system.

UNIT-4

2 MARK QUESTIONS:
1. What is SCM?
2. What is SCI?
3. Define software testing?
4. Define Smoke Testing?
5. What are the objectives of testing?
6. What are the testing principles must be applied while performing the software testing?
7. Define White Box Testing?
8. What are the two levels of testing?
9.What are the various testing activities?
10.Write short note on black box testing.
11.What is equivalence partitioning?
12.What is Regression Testing?
13.What is a boundary value analysis?
14.What are the reasons behind to perform white box testing?
15.What is cyclomatic complexity?
16.Distinguish between verification and validation.
17.What are the various testing strategies for conventional software?
18.Write about drivers and stubs.
19.What are the approaches of integration testing?
20.What are the advantages and disadvantages of big-bang?

16 MARK QUESTIONS:
1. Explain the types of software testing.
2. Explain in detail about Black box testing.
3. Explain about the software testing strategies.
4. Explain in detail about Integration testing.
5. Explain in detail about system testing.
6. Explain on taxonomy of testing and testing boundary condition
7. Explain regression testing
8. Explain system testing and debugging
9. Explain Software implementation techniques
10. Explain structural testing.

UNIT-5

2 MARK QUESTIONS:
1. Define debugging.
2. What are the common approaches in debugging?
3. Write about the types of project plan.
4. Define measure.
5. Define metrics.
6. What is meant by Make/Buy decision?
7. What are the advantages and disadvantages of size measure?
8. Write short note on the various estimation techniques.
9. What is the Objective of Formal Technical Reviews?
10.What is COCOMO II model?
11.Give the procedure of the Delphi method.
12.What is the purpose of timeline chart?
13.What is EVA?

14.What are the metrics computed during error tracking activity?
15.Why software change occurs?
16.Write about software change strategies.
17.Define RFP risk Management.
18.What is risk scheduling and tracking?
19.Define RMMM.
20.What are the types of software maintenance?

16 MARK QUESTIONS:

1. Explain about software cost estimation.
2. Explain in detail about COCOMO II model.
3. Explain in detail about Delphi Method.
4. Explain in detail about software Maintenance.
5. Explain about RMMM.
6. Elaborate FP and Loc based estimation.
7. Explain scheduling and error tracking
8. Explain about project planning
9. Explain about risk management
10. Explain on software configuration management.