Question Paper Code : 8390

B.Tech. (CSE) (Semester-VI) Examination, 2021-22

COMPUTER NETWORK

[Paper : CS-602]

Time : Three Hours] **[Maximum Marks : 70**

Note : Attempt **all sections** as per given direction.

SECTION-A

1. Attempt **any nine** of the following : [9×1=9]

(a) Define hub.

(b) Define router.

(c) Define firewalls.

(d) Define HTTP.

(e) State two reasons for having network security.

(f) Define FDDI.

(g) Mention layers in OSI Model.

(h) Describe LAN.

(i) State applications of computer networks.

(j) Define multicasting.

SECTION-B

2. Attempt **any two** of the following : [2×4=8]

(a) Explain the different topologies of the network.

(b) Explain the ISO/OSI reference model.

(c) Compare guided and unguided transmission media.

3. Attempt **any two** of the following : [2×4=8]

(a) Explain about ALOHA and CDMA.

(b) Find maximum length sequence of continuous ones (Using Sliding Window).

(c) A bit stream 1101011011 is transmitted using the standard CRC method. The generator polynomial is $X^4 + X + 1$. What is the actual bit string transmitted?

4. Attempt **any two** of the following : [2×4=8]

(a) Elaborate point-to-point protocol components and frame.

(b) Compare leaky bucket and token bucket algorithm for congestion control.

(c) Explain layers of TCP/IP in detail.

5. Attempt **any two** of the following : [2×4=8]

(a) Elaborate transport layer design issues in detail.

(b) Compare the two types of data compression techniques-Lossless Data Compression Lossy Data Compression.

(c) Explain the process of window management in TCP.

6. Attempt **any two** of the following : [2×4=8]

(a) Explain mechanism and types of FTP.

(b) Describe TELNET. Explain various modes of operation for telnet.

(c) Describe internet and public networks.

SECTION-C

Note: Attempt any three questions from this section :

[3×7=21]

7. Explain the significance of Switching. What are different switching techniques used in computer networks? Compare.

8. Explain various classes of IEEE 802.X Standard Ethernet.

9. Explain the TCP/IP model.

10. Explain the working of DNS.

11. Write about Electronic mail in detail. Also explain ATM AAL Layer Protocol.

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Question Paper Code : 8391

B.Tech. (Semester-VI) Examination, 2021-22

COMPUTER ARCHITECTURE

[Paper : CS-603]

Time : Three Hours] **[Maximum Marks : 70**

Note : Attempt all sections as per given direction.

Section - A

1. Attempt **any nine** parts of the following : [9×1=9]

   (a) What is need to implement memory as a hierarchy?

   (b) Define Computer Architecture.

   (c) Define cache coherence.

   (d) Differentiate DRAM and SRAM.

   (e) Give the difference between auto increment and auto decrement addressing mode.

   (f) What are the functions of control unit?

   (g) How to merge two sorted list?

(h) What is parallel computing?

(i) What are the components of runtime library routines?

(j) Differentiate between computer organization and computer architecture.

Section - B

2. Attempt **any two** parts of the following : [2×4=8]

(a) Briefly explain flynn's classification of parallel computers.

(b) What do you mean by Feng's classification of parallel computers? Explain.

(c) What do you mean by simultaneous execution of thread? Also explain about creating and deleting a thread with suitable example.

3. Attempt **any two** parts of the following : [2×4=8]

(a) A five-stage pipeline has stage delays of 150, 120, 150, 160 and 140 nanoseconds. The registers that are used between the pipeline stages have a delay of 5 nanoseconds each. What is the total time to execute 100

independent instructions on this pipeline, assuming there are no pipeline stalls (in nanoseconds)?

(b) Explain Pipeline with complete derivation.

(c) A direct mapped cache memory of 1 MB has a block size of 256 bytes. The cache has an access time of 3 ns and a hit rate of 94%. During a cache miss, it takes 20 ns to bring the first word of a block from the main memory, while each subsequent word takes 5 ns. The word size is 64 bits. What is the average memory access time in ns (round off to 1 decimal place)?

4. Attempt **any two** parts of the following : [2×4=8]

(a) Define array processing and explain the operations of a SIMD array processor.

(b) What is a vector pipeline? Explain your answer using suitable schematic diagram.

(c) Consider a two-level cache hierarchy with L1 and L2 caches. An application incurs 1.4 memory accesses per instruction on average.

For this application, the miss rate of L1 cache is 0.1; the L2 cache experiences, on average, 7 misses per 1000 instructions. What is the miss rate of L2?

5. Attempt **any two** parts of the following : [2×4=8]

(a) Define cost and speed in parallel algorithm.

(b) Write down the design strategies of parallel algorithm.

(c) A certain processor uses a fully associative cache of size 16 kB. The cache block size is 16 bytes. Assume that the main memory is byte addressable and uses a 32-bit address. How many bits are required for the Tag and the Index fields respectively in the addresses generated by the processor?

6. Attempt **any two** parts of the following : [2×4=8]

(a) Explain with the block diagram the DMA transfer in a computer system.

(b) Give comparison between memory mapped I/O and I/O mapped I/O.

(c) Write short notes on the following :

(i) Magnetic disk drive

(ii) Optical drives

Section - C

Note : Attempt **any three** questions from this section : [7×3=21]

7. Explain instruction set Architecture. Give examples. Briefly explain Primary storage and secondary storage.

8. Draw and explain typical hardware control unit. What is meant by hardwired control? What are the differences between hardwired and micro-programmed control units?

9. Give the difference between RISC and CISC. Explain about set associative cache.

10. What are the types of pipeline hazards? What are the types of dependencies?

11. Explain OpenMP implementation in 'C' and its execution model in detail.

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Question Paper Code : 8389

B.Tech. (Semester-VI) Examination, 2021-22

DESIGN AND ANALYSIS OF ALGORITHM

[Paper : CS-601]

Time : Three Hours] **[Maximum Marks : 70**

Note : Attempt all sections as instructed in each section.

SECTION - A **[Total Marks 9]**

1. *Attempt **any nine** parts of the following :* [1x9=9]

(a) Write the time complexity of Merge Sort in all the 3 cases (worst, average and best).

(b) What do you mean by stable sort algorithms?

(c) Write the time complexity of n node Red-Black Tree for search, insert and delete operation.

(d) Consider a B-tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node?

(e) List three example of divide and conquer algorithm.

(f) Dijkstra does not work for graphs with negative weights, Bellman-Ford works for such graphs. True or False.

(g) List three applications of backtracking algorithm.

(h) When dynamic programming approach is applicable?

(i) Define NP problems.

(j) What is the difference between approximation and deterministic algorithm?

SECTION - B **[Total Marks 40]**

Note : Attempt **all** the questions form this section.

2. Attempt **any two** parts of the following : [2×4=8]

(a) Differentiate between the Big-O and Little-o notation with suitable example.

(b) Find the time complexity of following recurrence relation.

$T(n)=T(n/4)+T(n/2)+cn^2$

(c) Sort the following list in increasing order using Heap sort technique and argue its running time : 37, 56, 61, 2, 38, 66, 69, 4, 30, 71.

3. Attempt **any two** parts of the following : [2×4=8]

(a) Describe the properties of binomial tree. Construct the binomial heap for the following sequence : 8, 2, 4, 17, 1, 11, 6, 9, 15, 10, 20.

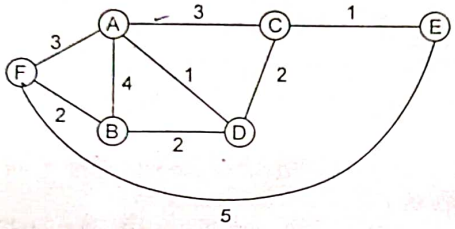
(b) List the advantages of Red Black Tree over Binary Search Tree. Insert the following sequence of keys in an empty Red Black Tree : 1, 2, 3, 4, 5, 6.

(c) Write short note on Fibonacci heap.

4. Attempt **any two** parts of the following : [2×4=8]

(a) Define minimum spanning tree, Find the minimum

cost spanning tree by Prim's algorithm of following graph :



(b) What is 0/1 Knapsack problem? Explain with a suitable example.

(c) Discuss the Dijkstra's algorithm for single source shortest path with a suitable example.

5. Attempt **any two** parts of the following : [2×4=8]

(a) Write a short note on n-queen problem.

(b) Explain Floyd-Warshall algorithm with a suitable example.

(c) Discuss travelling salesman problem with a suitable example.

6. Attempt **any two** parts of the following : [2×4=8]

(a) Explain NP-Hard and NP-Complete problems with suitable examples.

(b) Describe approximation algorithm. What is the approximation ratio?

(c) Write short note on randomized algorithm.

SECTION - C [Total Marks 21]

Note : Attempt **any three** questions from this section. [3×7=21]

7. Discuss the best case, average case and worst case complexities of quick sort algorithm in detail.

8. Discuss How B-Tree differ with binary search tree? Insert the following keys into an empty B-Tree with degree 2 : S, O, K, C, L, V, W, M, R, N, P, A, D, Y, Z, E.

9. Write an algorithm for chain matrix multiplication. Calculate the minimum number of multiplication required to compute the chain A1A2A3A4A5 of matrix where A1=2×3, A2=3×4, A3=4×5, A4=5×3, A5=3×4.

10 Compare Backtracking and Branch and Bound techniques with an example

11 Using Knuth-Morris Pratt algorithm to find whether the pattern P=<0010> is in text T=<1000110100010100> or not?

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Question Paper Code : 8393

B. Tech. (Semester-VI) Examination, 2021-22

SOFTWARE PROJECT MANAGEMENT

[Paper : CS-6051]

Time : Three Hours] [Maximum Marks : 70

Note : Answer **all** questions. The question paper contains **three sections** as follows :

Section-A

1. Attempt **any nine** parts of the following : [9×1=9]

(a) Define Software Project Management.

(b) Mention the characteristics of Software Project.

(c) What are the different types of Project Plans? Explain.

(d) Discuss Work Breakdown structure (WBS) and its type.

(e) Explain Project life cycle and Product life cycle.

(f) Give an example to distinguish small scale project and large scale project.

(g) What is Schedule Performance Index. Explain.

(h) Differentiate between Verification and Validation.

(i) Mention some of the major activities covered by Software Project Management tools.

(j) Explain Risk Management Process. Also describe different types of Risk.

Section-B

2. Attempt **any two** parts of the following : [2×4=8]

(a) What do you mean by Software Cost Estimation? Write the name of different method that can be used to estimate the cost.

(b) Explain different agendas for the life cycle architecture milestones.

(c) What are the major components of Software Cost. Explain.

3. Attempt **any two** parts of the following : [2×4=8]

(a) Explain Milestone Chart and Gantt Chart.

(b) What are the different ways to organize the Personnel? Explain.

(c) How Project Schedule are build? Explain the terms related to Schedule.

4. Attempt **any two** parts of the following : [2×4=8]

(a) Explain the different dimensions of Project Monitoring and Control.

(b) How Earned Value Indicator Works? Explain.

(c) What is Software Review? Explain the different types of Review Techniques.

5. Attempt **any two** parts of the following : [2×4=8]

(a) Explain the term testing Principle. Write and explain different types of testing.

(b) What is meant by Capability Maturity Model (CMM). Explain.

(c) What do you mean by Software Quality Metrics and its indicator?

6. Attempt **any two** parts of the following : [2×4=8]

(a) State and discuss Software Configuration Management (SCM) in detail.

(b) What is Risk Breakdown Structure? Explain.

(c) Write the benefits of using Software Project tools. Also write application of Software Project Management.

Section-C

Note : Attempt **any three** questions from this section : [3×7=21]

7. Explain Project Planning. State and explain different terms related to Project Planning.

8. What is Network Diagram? Explain PERT Technique.

9. Explain Project Monitoring and Control Process. How management tools are used to Monitor and Control the Project?

10. Define Software Quality. State and explain different attribute used in Software Quality Measurement.

11. Write the importance of Project Management tools. Also explain short note on CASE-tools.

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Question Paper Code : 8392

B.Tech. (Semester-VI) Examination, 2021-22

GRAPH THEORY

[Paper : CS-604]

Time : Three Hours] **[Maximum Marks : 70**

Note : Answer **all** sections as per given direction.

SECTION-A

1. Attempt **any nine** of the following : [9×1=9]

(a) Differentiate between walk and path.

(b) Give an example of abelian group.

(c) Define pendent vertex.

(d) How a graph is different from a tree?

(e) What do you mean by crossing number?

(f) Write the criterion of planarity.

(g) Define path matrix.

(h) Give an example of isomorphic graphs.

(i) List five applications of graph coloring.

(j) What is the chromatic number for a complete graph having n vertices?

SECTION-B

Note: Attempt all the questions from this section :

2. Attempt **any two** parts of the following : [2×4=8]

(a) Prove that an Euler graph cannot have a cut set with an odd number of edges.

(b) Prove that in a complete graph with n vertices there are (n-1)/2 edge disjoint Hamiltonian circuit, if n is an odd number>=3.

(c) Calculate the number of edges in the graph G if G has

(i) 16 vertices, each of degree 4.

(ii) 3 vertices of degree 4, 2 vertices of degree 3, and other 4 vertices of degree 1.

3. Attempt **any two** parts of the following : [2×4=8]

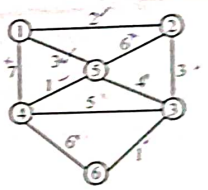
(a) Explain diameter and radius of a tree with example. Find the condition under which the diameter of a tree is equal to twice the radius.

(b) Write short notes on :

(i) Binary Tree

(ii) Fundamental Circuit

(c) Use Prim's algorithm to determine Minimal Spanning Tree for the graph given below :



4. Attempt **any two** parts of the following : [2×4=8]

(a) State properties of cut-sets and discuss their applications.

(b) Show that a graph has a dual if and only if it is planar.

(c) Show that a complete graph of four vertices is self-dual.

5. Attempt **any two** parts of the following : [2×4=8]

(a) Prove that every vertex of degree greater than one is a cut vertex.

(b) Define incidence matrix of a graph with an example. Also prove that the rank of an incidence matrix of a graph with n vertices is n-1.

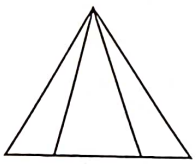
(c) Write a short note on cut-set matrix.

6. Attempt **any two** parts of the following : [2×4=8]

(a) Write a short note on chromatic partitioning.

(b) Explain covering of a graph G.

(c) Define the chromatic number and chromatic polynomial of a graph. Find the chromatic number and the chromatic polynomial of the following graph :

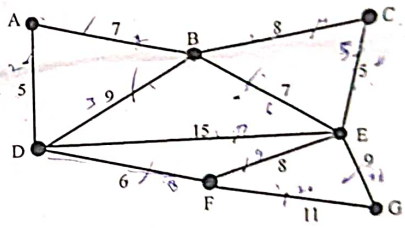


SECTION-C

Note: Attempt **any three** questions from this section : [3×7=21]

7. Check whether the graphs $K_{3,3}$ and $K_{2,4}$ has Hamiltonian circuit.

8. What is Minimal Spanning Tree? Find minimal spanning tree for the following graph using Kruskal's algorithm.



9. Using Kuratowski's theorem, show that Petersen's graph is non-planar.

10. Discuss the matrix representation of graph.

11. State and prove four color conjecture.

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