II B.Tech. I Semester Supplementary Examinations May 2019
Digital Logic Design and Computer Organization
(Information Technology)

Max. Marks: 70

Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Elaborate the basic functional units of a computer system.

   b) Demonstrate n's complement and n-1's complement of a number? Explain it with an example?

OR

2. a) What is a bus? Briefly explain various types of buses used in modern computers?

   b) Discuss different types of computers?

UNIT–II

3. a) Outline different Combinational circuits present in the logic design process?

   b) Convert the following into another canonical form $F(A,B,C,D)= \sum(0,2,6,11,13,14)$

OR

4. Implement the following multi output combinational logic circuit using a 4-to-16 line decoder.
   F1 = (1,2,4,7,8,11,12,13)
   F2 = (2,3,9,11)

UNIT–III

5. a) What is instruction set architecture? What are controlling factors of ISA?

   b) Elaborate the instruction cycle with a neat flow chart.

OR

6. What is an Addressing mode? What are the various addressing modes used by computer system? Explain them with example instructions?

UNIT–IV

7. a) Define ROM? Describe about Read-Only memory with its types?

   b) Explain about Register Transfer Language?

OR

8. a) Explain the organization of CPU registers which are connected to common busses with a neat diagram.

   b) Compile the organization of a 8M x 32 memory module using 512K x 8 memory chips

UNIT–V

9. a) What are interrupts? How interrupts are commonly handled? Explain?

   b) Examine how devices are addressed on the universal serial bus?

OR

10. What is DMA Transfer? Explain the use of DMA controllers in a computer system and illustrate distributed arbitration with necessary diagram?

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II B.Tech. I Semester Supplementary Examinations May 2019
Electrical Engineering and Electronics Engineering
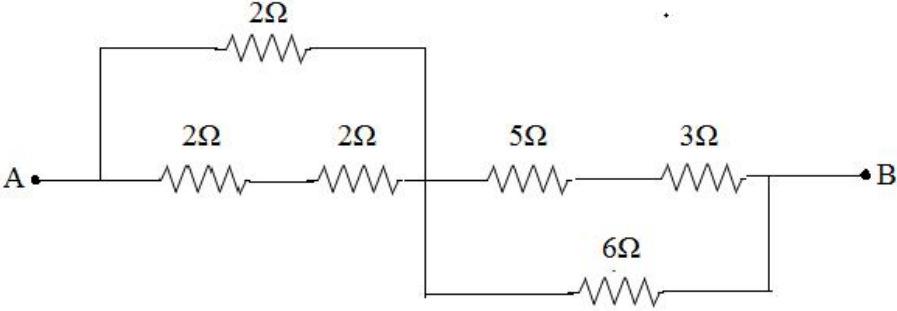(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Define the following i) Resistance ii) Inductance iii) Capacitance. Also give the V-I relationship for the above elements.

   b) Find the equivalent resistance between A & B terminals.

OR

2. a) Derive the expression for star to delta transformation.

   b) Two resistors of each 4 and 2 are connected in parallel across a 10V DC supply. Find the current through each resistor by current division technique.

UNIT–II

3. a) Explain the operation of principle of DC generator.

   b) Derive the expression for Torque in a DC Motor.

OR

4. a) Explain the speed control methods of a DC shunt motor.

   b) Elaborate about Swinburne's test on dc machine.

UNIT–III

5. A 400V, 10KVA, 3- alternator with star connected stator winding has an effective armature resistance per phase of 1.0 . The alternator generates an open circuit voltage per phase is 90V with a field current of 1.0A. During the short circuit test, with 1.0A of field current the short circuit current flowing in the armature is 15A. Calculate

   The synchronous impedance   B) Synchronous reactance

OR

6. a) Explain the principle of operation of single phase Transformer with neat sketch.

   b) Explain Torque-Slip Characteristics of a Three phase induction motor.

UNIT–IV

7. Explain the operation of Bridge rectifier with relevant diagrams.

OR

8. a) Explain the operation of P-N junction diode mentioning its applications.

   b) Explain the input and output characteristics of transistor in CE configuration.

UNIT–V

9. Enumerate the applications of dielectric heating and induction heating.

OR

10. a) Describe how voltage, current and time period are measured by using CRO.

    b) List the applications of CRO.

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Code: 5GC34

II B.Tech. I Semester Supplementary Examinations May 2019
Environmental Science
(Common to ECE & IT)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a)   Define Environment? What are the components of the environment?

    b)   Discuss the role of people in protecting the environment with respect to loss of biodiversity.

OR

2. a)   What is the necessity for the people to know about environment?

    b)   What are the causes and effects of over exploitation of natural resources?

UNIT–II

3. a)   What are the effects of deforestation? Suggest some conservation measures.

    b)   What are the environmental hazards associated with mineral extraction?

OR

4. a)   Define and write a note on soil erosion and preventive measures.

    b)   Write a note on renewable and nonrenewable energy resources.

UNIT–III

5. a)   Write a short note on food chain and food web with examples.

    b)   Write a note on energy flow in the ecosystem.

OR

6. a)   Describe the various methods of ex-situ conservation of biodiversity.

    b)   What are the major threats to biodiversity?

UNIT–IV

7. a)   Explain the various factors responsible for soil pollution.

    b)   What are the various methods of control to reduce water pollution?

OR

8.   Write a note on causes, effects and control measures of urban solid wastes?

UNIT–V

9.   Write a short note on
         i) Global warming
         ii) Ozone layer depletion
         iii) Acid rain

OR

10. a)   Write a note on population explosion and consequences.

    b)   Explain the family welfare programmes.

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II B.Tech. I Semester Supplementary Examinations May 2019
Operating Systems and Linux Administration
(Information Technology)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1.   State and explain the Data types and Structures used in LISP?

OR

2.   a)   Describe the differences between symmetric and asymmetric multiprocessing. What are three advantages and one disadvantage of multiprocessor systems?

   b)   Distinguish between the client-server and peer-to-peer models of distributed systems?

UNIT–II

3.   a)   What is a process? Discuss components of process and various states of a process with the help of a process state transition diagram?

   b)   Write the difference between user thread and kernel thread?

OR

4.   What is a race condition? Explain how a critical section avoids this condition. What are the properties which a data item should possess to implement a critical section? Describe a solution to the dining philosopher problem so that no races arise?

UNIT–III

5.   When do page fault occurs? Consider the reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults and page fault rate occur for the FIFO, LRU and optimal replacement algorithms, assuming one, two, three, four page frames?

OR

6.   a)   Consider a system that allocates pages of different sizes to its processes. What are the advantages of such a paging scheme? What modifications to the virtual memory system provide this functionality?

   b)   What is the copy-on-write feature, and what circumstances is its use beneficial? What hardware support is required to implement this feature?

UNIT–IV

7.   What are the various disk space allocation methods? Explain any two in detail?

OR

8.   State and explain the FCFS, SSTF and SCAN disk scheduling with examples?

UNIT–V

9.   a)   Briefly discuss about the requirements to become a Linux System Administrator?

   b)   Explain the concepts of Domain Name System?

OR

10.   Explain the step-by-step procedure for setting up a Linux multifunction server?

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Code: 5G131

II B.Tech. I Semester Supplementary Examinations May 2019
Advanced Data Structures Through C++
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) What are the static class members? Explain each in detail.   9M
    b) How access control is provided in C++.   5M

OR

2. a) Define class scope. Explain this concept with an example.   7M
    b) C++ provides a mechanism in which non-member can have access to private member of a class. Justify?   7M

UNIT–II

3. a) Identify the purpose of operator overloading and demonstrate operator overloading for Unary operator.   7M
    b) Define Polymorphism. How virtual function avoids ambiguity in multipath inheritance.   7M

OR

4. a) Compare Time and Space complexity. Explain with suitable examples.   7M
    b) Demonstrate an abstract class with a suitable C++ program.   7M

UNIT–III

5. a) Demonstrate ADT implementation of Stack using C++ program.   9M
    b) Define Hashing. Explain about hash functions.   5M

OR

6. a) Explain the operations performed on Linear list with suitable examples.   8M
    b) Compare Double Hashing and Extendable Hashing.   6M

UNIT–IV

7. a) Define BST. Demonstrate its operations with suitable examples.   7M
    b) Demonstrate Binary Tree Traversal Techniques with algorithms.   7M

OR

8. a) Demonstrate Priority Queue implementation using Heaps.   7M
    b) Define AVL Tree. Demonstrate its operations with suitable examples   7M

UNIT–V

9. a) Demonstrate insertion and deletion operations in B-Tree with example.   8M
    b) What is a Red-Black Tree? List its properties.   6M

OR

10. a) What is the role of Tries in pattern Matching? What are the different Tries? Explain Applications of Tries.   9M
    b) Create a Red-Black Tree by inserting the following sequence of numbers:
        8, 18, 5, 15, 17, 25, 40 and 80.   5M

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R-15

Code: 5G431

II B.Tech. I Semester Supplementary Examinations May 2019
Discrete Mathematics
(Common to CSE & IT)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) show that $\neg(P \wedge Q) \to (\neg P \vee (\neg P \vee Q)) \Leftrightarrow (\neg P \vee Q)$ 7M

    b) show that $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$ 7M

OR

2. a) Obtain the principal conjunctive normal form of the statement
        $(\neg P \to R) \wedge (Q \leftrightarrow P)$ 7M

    b) Show that SvR is a valid conclusion of the premises $(P \vee Q), (P \to R), (Q \to S)$
        using rules of Inference.   7M

UNIT–II

3. a) Define the following and give suitable examples for each
        i. Lattice
        ii. Sub lattice
        iii. Complemented lattice   6M

    b) Let n be a positive integer and S_n be the set of all divisors of n. Let D denote
        the relation of "division". Draw the diagrams of lattices (S_n, D) for n=6,8, 24
        and 30.   8M

OR

4. a) Give an example of a relation which is symmetric, antisymmetric, compatibility
        and transitive.   7M

    b) Let Z={-2,-1,0,1,2,3,…..} and Relation R is defined as
        R={(x,y)/x-y is divisible by 3} find the relations on Z.   7M

UNIT–III

5. a) Let ({a,b},*) be a semi group where a*a=b show that i) a*b=b*a ii) b*b=a.   7M

    b) Show that every cyclic group is abelian group.   7M

OR

6. a) How many arrangements are there of the set{8a,6b,7c} in which 'a' is an at
        least one side of another 'a'.   7M

    b) Prove by pigeon hole principle that in a group of 61 people, at least 6 people
   were born in the same month.   7M

UNIT–IV

7. a) Find the coefficient of x^{18} in the following product

$(x+x^2+x^3+x^4+x^5)(x^2+x^3+x^4+\ldots\ldots)^5$ 7M

   b) Find a generating function for the recurrence relation

$a_{n+2} - 5a_{n+1} + 6a_n = 2$ where n 0 and $a_0=3, a_1=7$. Hence solve the relation.   7M

OR

8. a) Solve the Recurrence Relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ where $a_0 = 1$ and $a_1 = 41$.   7M

   b) Solve the Recurrence Relation $a_n - 6a_{n-1} + 8a_{n-2} = 3^n$ where $a_0 = 3$ and $a_1 = 7$.   7M
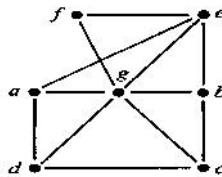
UNIT–V

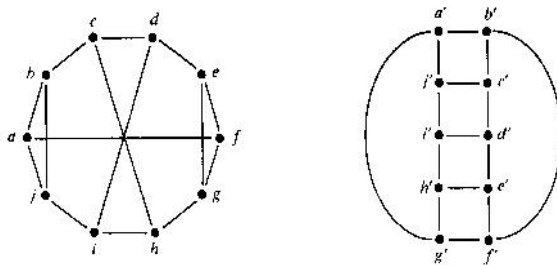9. a) Define chromatic number. Find the chromatic number of the following graph.
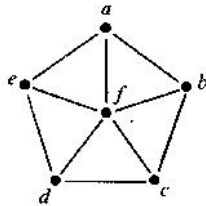
7M

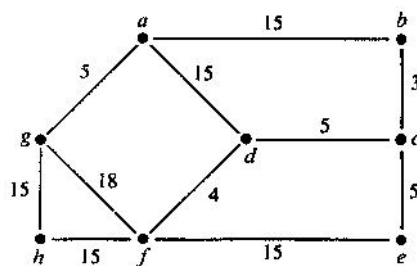   b) Explain the DFS algorithm. Using DFS find the spanning tree of the following graph.

7M

OR

10. a) Define Isomorphism. Verify whether the following graphs are isomorphic or not.

7M

   b) Illustrate Prim's algorithm to find a minimal spanning tree for the weighted graph given below.

7M

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