Hall Ticket Number :

R-15

Code: 5GC33

II B.Tech. I Semester Supplementary Examinations May 2019

Probability & Statistics

(Computer Science and Engineering)

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) Determine (i) $P(\frac{E}{A})$ (ii) $P(\frac{A}{B^c})$ if A and B are events with $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$, $P(A \cup B) = \frac{1}{2}$

    b) Calculate expectation and variance of X, if the probability distribution of the random variable X is given by

X	-1	0	1	2	3
F	0.3	0.1	0.1	0.3	0.2

OR

2. Let X denote the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution (ii) Expectation (iii)Variance

UNIT–II

3. a) A die is thrown 6 times. If getting an even number is a success, find the probabilities of (i) at least one success (ii) 3 successes (iii) 4 successes

    b) If a random variable has a poisson distribution such that $P(1) = P(2)$ find
        (i)   Mean of the distribution
        (ii) P(4)
        (iii) $P(x \geq 1)$
        (iv) $P(1<x<4)$

OR

4. a) The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Find $P(x \geq 1)$ and $P(x > 2)$

    b) A hospital switch board receives an average of 4 emergency calls in a 10 minute interval. What is the probability that
        (i)   There are at most 2 emergency calls in a 10 minute interval
        (ii) There are exactly 3 emergency calls in a 10 minute interval

UNIT–III

5. a) The mean height of students in a college is 155cms and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157cms

    b) If we can assert with 95% that the maximum error is 0.05 and P = 0.2 find the sample size

OR

6. a) What is the effect on standard error, if a sample is taken from an infinite population of sample size increased from 400 to 900

    b) What is the maximum error one can expect to make with the probability 0.90 when using the mean of a random sample of size n = 64 to estimate the mean of population with $\sigma^2 = 2.56$

UNIT–IV

7. The mean yield of wheat from a district A was 210 pounds with S.D 2.5 inches per acer from a sample of 100 plots. In another district the mean yield was 220 pounds with S.D 12 pounds from a sample of 150 plots. Assuming that the S.D of yield in the entire state was 11 pounds. Test whether there is any significant difference between the mean yield of crops in the two districts

OR

8. If two large populations there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations

UNIT–V

9. The number of automobile accidents per week in a certain community are as follows 12, 8, 20, 2, 14, 10, 15, 6, 9, and 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period

OR

10. The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, Test whether the two populations have the same variance

Unit-A	14.1	10.1	14.7	13.7	14.0
Unit-B	14.0	14.5	13.7	12.7	14.1

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II B.Tech. I Semester Supplementary Examinations May 2019
Principles of Programming Languages
(Computer Science and Engineering)

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) List and explain various factors that influences on Language design?

    b) Describe the approach of using Axiomatic semantics to prove the correctness of a given program?

OR

2. a) Explain different aspects of the costs of a Programming Language?

    b) Explain syntax of a "for" statement in PASCAL using BNF Notation and Syntax graphs?

UNIT–II

3. a) Briefly explain about Assignment statements and Mixed-mode assignments?

    b) What are the design issues of Union?

OR

4. a) How does C support Relational and Boolean expressions?

    b) Define Named constant. What are the uses of Named constants?

UNIT–III

5. a) What is the general problem with Static Scoping? What are the advantages and disadvantages of Dynamic Scoping?

    b) Define Subprogram. What are the general characteristics of Subprograms?

OR

6. a) List out the design issues for Functions? In what ways are Co- routines different from Conventional Subprograms?

    b) What are three Semantic models of Parameter Passing? Illustrate with an Example?

UNIT–IV

7. a) What is Semaphore? Give the solution for Producer-Consumer Problem using Semaphores?

    b) What are the differences between a C++ **throw** specification and a Java **throws** clause?

OR

8. a) Write and explain about Exception handling in C++ with examples?

    b) Define Concurrency? What are the three possible levels of Concurrency in Programs?

UNIT–V

9. a) Write and explain about various features and functions used in ML?

    b) Explain the difference between a Depth-first search and a Breadth-first search when discussing how multiple goals are satisfied?

OR

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

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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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Code: 5G431

R-15

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 $\daleth (P \wedge Q) \to (\daleth P \vee (\daleth P \vee Q)) \Leftrightarrow (\daleth P \vee Q)$ 7M

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

OR

2. a) Obtain the principal conjunctive normal form of the statement
      $(\daleth P \to R) \wedge (Q \leftrightarrow P)$ 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
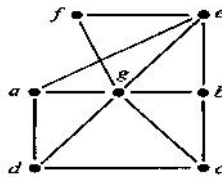
UNIT–V

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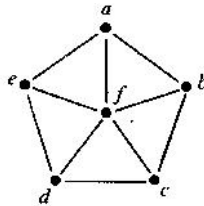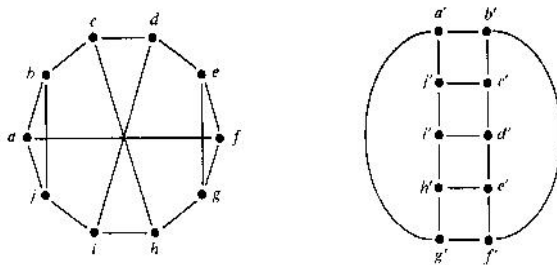

     7M

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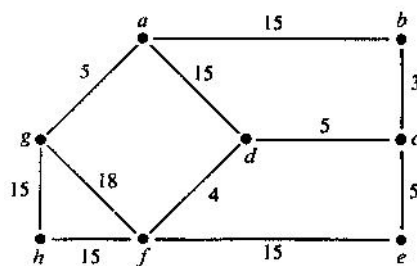

     7M

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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II B.Tech. I Semester Supplementary Examinations May 2019
Digital Logic Design
(Computer Science and Engineering)

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) i) Convert $(4057.06)_8$ to binary code.
        ii) What is reflection code? Give Example   7M

    b) i) Perform the subtraction in Excess-3 code using the 10's complement method: 597-239.
        ii) State De Morgan's theorem for three variables   7M

OR

2. a) i) Prove that $\left(\overline{A + \overline{\overline{BC}}}\right)\left(A\overline{B} + \overline{ABC}\right) = \overline{A}BC$.
        ii) Implement OR Gate using NAND Gates   7M

    b) i) Reduce the following Boolean expression to 3 literals. [CD' +A]'+ A+CD+AB
        ii) Perform subtraction using 2's complement: 1100010 - 1100111   7M

UNIT–II

3. a) Simplify the following expression into sum of products using Karnaugh map:
        F(A, B, C, D) =   (1, 3, 4, 5, 6, 7, 9, 12, 13)   10M

    b) Show that the dual of the exclusive-OR is equal to its complement   4M

OR

4. a) Simplify the following Boolean expressions using K-map and implement them using NAND gates:
        F(W, X, Y, Z) = XZ + WXY + WXY + WYZ + WYZ.   7M

    b) Minimize the function f = Σ m(0,2,4,6,7,8,10,12,13,15) using K-Map and obtain SOP form of it   7M

UNIT–III

5. a) Design 4-bit binary to Gray code converter.   7M

    b) Implement the function f(A,B,C)= $\Sigma m(0,2,5,7)$ using 4x1 MUX.   7M

OR

6. a) Implement a full-adder circuit with a decoder and two OR gates.   7M

    b) Realize the function $\Sigma m(0,3,5,6,7)$ using 8:1 multiplexer   7M

UNIT–IV

7. a) With the help of conversion table, K-map and the logic diagram explain the steps used to convert a J-K flip-flop to a D flip-flop.   7M

    b) What is difference between latch and flip flop? Explain about clocked RS flip flop using NAND gates   7M

OR

8. a) With a neat diagram, explain master slave JK Flip Flop   7M

    b) Explain the operation of universal shift register.   7M

UNIT–V

9. a) Draw and explain the operation of 4 bit ring counter.   7M

    b) i) Compare PLA with PROM.
        ii) What is ROM? List the different types of ROMs   7M

OR

10. a) Draw and explain 4-bit Johnson counter using D-flip flop.   7M

    b) Implement the following functions using PLA.
        A (x,y,z)=   m (1,2,4,6)
        B (x,y,z) =   m (0,1,6,7)
        C (x,y,z) =   m (2,6)   7M

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Code: 5G236

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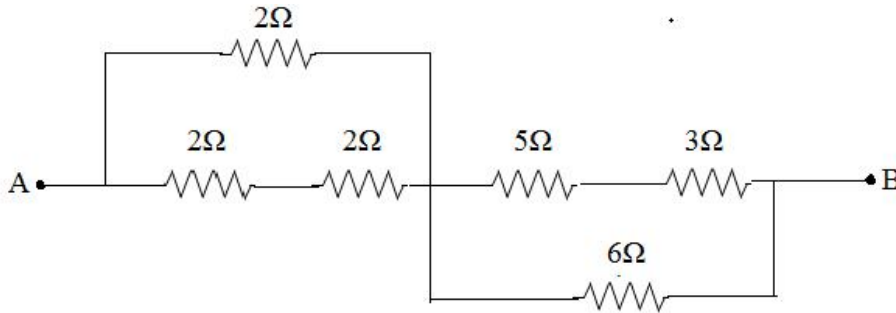## Electrical Engineering and Electronics Engineering
(Common to CSE & IT)

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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