Hall Ticket Number :										

R-15

Code: 5G131

II B.Tech. I Semester Supplementary Examinations October 2020

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 is the significance of constructors in class
   b) Explain defining friend Functions in C++ with example.

OR

2. a) Why memory is required while running an application dynamically?
   b) Explain dynamic memory allocation and de allocation in C++ with example.

UNIT–II

3. What is inheritance? Explain the different types of inheritance with examples.

OR

4. a) Explain in detail about operator and function overloading with an example.
   b) Define the notations below.
      i) Big Oh ii) Omega iii) Theta

UNIT–III

5. a) What is stack? Write the applications of Stack.
   b) Illustrate an implementation of stack ADT in C++ with example.

OR

6. a) What are the uses of hash functions?
   b) Explain linear probing and quadratic probing.

UNIT–IV

7. a) Explain multi-way merge sort with example
   b) Discuss the model for external sorting

OR

8. a) Discuss deletion operation on Binary Search Tree with example
   b) Discuss how elements are inserted into the AVL trees with example

UNIT–V

9. a) Write and explain Boyer-Moore pattern matching algorithm
   b) Write short note on compressed tries

OR

10. a) Give the application of B-Trees and mention the advantages and disadvantages of it.
    b) Write short note on splay trees

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Hall Ticket Number :										

R-15

Code: 5G432

II B.Tech. I Semester Supplementary Examinations October 2020

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) Which parts of the computers influences the performance of a computer system. Explain how while detailing the term "memory bus bottleneck"?

   b) Convert the following decimal numbers to base indicated.

   i. 7163 to octal

   ii. 1762 to hex decimal

UNIT–II

3. a) What are universal gates? Why they are called as universal gates? Explain with example?

   b) Simplify the Boolean function using three variable map F(X, Y, Z) = $\sum$(0,1,5,7)

OR

4. a) Elaborate the process of designing a 3-bit binary Counter with an example?

   b) Illustrate the design of a 4-bit shift register with example?

UNIT–III

5. a) What is instruction? Explain basic machine instructions used in a computer?

   b) Describe the general format of instructions with relevant examples.

OR

6. a) Explain Register Addressing Mode with an example.

   b) Devise an algorithm for fixed point addition representation?

UNIT–IV

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

   b) Explain about Register Transfer Language?

OR

8. a) Define Memory? With a neat diagram explain memory hierarchy and explain the need of cache memory?

   b) Elaborate about Virtual Memory in detail?

UNIT–V

9. Write short notes on program driven I/O.

OR

10. Explain the following
    a) Interrupts
    b) Standard I/O interfaces.

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Hall Ticket Number :										

R-15

Code: 5G431

II B.Tech. I Semester Supplementary Examinations October 2020

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) Define converse, contrapositive and inverse of an implication with examples. 5M

   b) Construct truth table for $((P \rightarrow R) \wedge (Q \rightarrow R)) \rightarrow ((P \vee Q) \rightarrow R)$ 9M

OR

2. a) Obtain PDNF for $(P \wedge Q) \vee (\tilde{P} \wedge R) \vee (Q \wedge R)$ using substitution method 7M

   b) Show that $R \rightarrow S$ can be derived from the premises $P \rightarrow (Q \rightarrow S)$, $\tilde{R} \vee P$, and Q by using rules of inference 7M

UNIT–II

3. a) Define Relation. Explain the properties of binary relations with examples. 7M

   b) Let x= { 2,3,6,12,24,36} and the relation :s be such that x :s y if x divides y. Draw the Hasse diagram. 7M

OR

4. a) Define and explain semi groups and monaids with examples 7M

   b) Define homomorphism and Explain the properties of Homomorphism. 7M

UNIT–III

5. If o is an operation on Z defined by xoy=x+y+1, Prove that <Z,o> is an abelian group. 14M

OR

6. a) Define Principle of Inclusion and Exclusion 7M

   b) Suppose that 200 faculty members can speak French and 50 can speak Russian, while any 20 can speak both French and Russian. How many faulty members can speak either French or Russian? 7M

UNIT–IV

7. a) Find the generating function of $(n-1)^2$ 7M

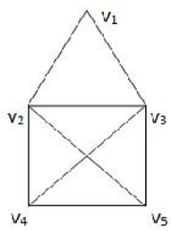
   b) Find co-efficient of x^{20} in $x^3+x^4+x^5+\ldots)^5$ 7M

OR

8. Solve the recurrence relation $a^n-4a^{n-1}+3a^{n-2}=0$ for $n \geq 2$ with initial conditions $a_0=2$ and $a_1=4$ by using generating functions. 14M

UNIT–V

9. a) Find the Chromatic number of following graph.



7M

   b) Define isomorphism with example. 7M

OR

10. Define the following terms with suitable examples.
    i) Euler Path
    ii) Euler Circuit
    iii) Multi Graph
    iv) Hamiltonian Cycle 14M

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Hall Ticket Number :										

R-15

Code: 5G236

II B.Tech. I Semester Supplementary Examinations October 2020

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 terms
   i) Electric Current ii) Potential Difference iii) Electric Power iv) Energy
   b) Three capacitors of 2 mF, 5 mF and 10 mF are connected in series. Find the equivalent capacitance.

OR

2. a) Define the Ohm's Law and its applications.
   b) State and explain Kirchoff's laws using neat diagrams.

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) Derive the emf equation of DC generator.
   b) A 4-pole, lap wound, DC generator has a useful flux of 0.07Wb per pole, armature consists of 440 numbers of conductors. Calculate the generated emf when it is rotated at a speed of 900 rpm with the help of prime mover.

UNIT–III

5. a) Explain the principle of operation of single phase Transformer with neat sketch.
   b) Explain Torque-Slip Characteristics of a Three phase induction motor.

OR

6. a) Derive the expression for E.M.F equation of a transformer.
   b) Explain the principle operation of a three phase induction motor with relevant diagrams

UNIT–IV

7. Explain the operation of Half wave 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. Describe how phase and frequency are measured by using Lissajous figures.

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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Hall Ticket Number :										

R-15

Code: 5GC34

II B.Tech. I Semester Supplementary Examinations October 2020

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) List and explain the four conceptual spheres in the earth's environment.
   b) Summarize the need for public awareness about environment.

OR

2. Explain the scope and importance of environmental studies.

UNIT–II

3. a) What are renewable and nonrenewable natural resources? Give examples.
   b) Summarize the causes of deforestation.

OR

4. Discuss the merits and demerits of traditional agriculture and modern agriculture.

UNIT–III

5. Identify and explain the major threats to the biodiversity.

OR

6. Define ecosystem. Explain the characteristics, structure and function of forest ecosystem.

UNIT–IV

7. a) Give an account of adverse effects of air pollution.
   b) Discuss the adverse effects and control of water pollution.

OR

8. a) Describe the management of solid waste.
   b) Discuss the various effects and control measures of thermal waste.

UNIT–V

9. a) What are the greenhouse gases? Discuss the potential and contribution of these gases to global warming phenomenon.
   b) Define pollution as per water (Prevention and Control of pollution) Act? What are the salient features of this act?

OR

10. a) What is meant by population explosion? Discuss the Indian scenario?
    b) Describe the value based environmental education.

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Hall Ticket Number :										

R-15

Code: 5G433

II B.Tech. I Semester Supplementary Examinations October 2020

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. a) Explain the various types of system calls with an example for each? 7M

   b) Discuss about the functionality of system boot with respect to operating system? 7M

OR

2. Describe evolution of operating system. 14M

UNIT–II

3. a) Describe the differences among short-term, medium-term and long-term scheduling with suitable example? 7M

   b) Discuss how deadlocks could be detected in detail 7M

OR

4. What is a race condition? Explain how a critical section avoids this condition. What are the properties which a data item should posses to implement a critical section? Describe a solution to the dining philosopher problem so that no races arise? 14M

UNIT–III

5. Draw the diagram of segmentation memory management scheme and explain its principle? 14M

OR

6. a) Describe about free space management on I/O buffering and blocking? 7M

   b) Discuss the concept of buddy system allocation with neat sketch? 7M

UNIT–IV

7. What are the various disk space allocation methods? Explain any two in detail? 14M

OR

8. a) Discuss about the various file access methods 6M

   b) With neat sketch explain about the
      i. Directory structure
      ii. File sharing 8M

UNIT–V

9. Write short notes on LINUX kernel and virtualization with neat sketch? 14M

OR

10. a) Write the various system administrator roles in LINUX OS? 8M

    b) Describe the benefits of virtualization in LINUX OS? 6M

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