University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 1

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of taking binary inputs and checks if the given input is divisible by two or not. The inputs should correspond to the binary equivalent of decimal values 0 to 15.

Exp 2:

Using NAND gates design the SR Flip Flop circuit and verify its Truth Table.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 2

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that can convert the inputs corresponding to the octal values into their respective binary equivalents. Use only basic gates for the circuit.

Exp 2:

Design a sequential circuit which acts as a shift register and where the data can be shifted either towards the left or towards the right. An external mode signal M is used, if M is 0 then data is shifted to the left and if M is 1 then data is shifted to the right. Use D flip flop for the implementation.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 3

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit that is capable of translating a given n bit binary input value into the equivalent 2^n unique outputs. Each of the outputs should correspond to one decimal number between 0 to 7. Keep the value of n fixed as 3.

Exp 2:

With the help of the SR flip-flop, design a sequential circuit that counts the binary equivalent of decimal values 15 to 0 in decreasing order. The circuit should be synchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 4

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit that is capable of translating a given n bit binary input value into the equivalent 2^n unique outputs. Each of the outputs should correspond one decimal number between 0 to 7. Keep the value of n fixed as 3.

Exp 2:

With the help of the SR flip-flop, design a sequential circuit that counts the binary equivalent of decimal values 15 to 0 in decreasing order. The circuit should be synchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 5

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a specialized Encoder circuit which can overcome the issue where multiple inputs are high. The circuit should be able to accomodate all 4 bit input combinations.

Exp 2:

With the help of the SR flip flop design a sequential circuit that counts the binary equivalent of decimal values 0 to 15 in increasing order. The circuit should be synchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 6

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit which can conditionally select any one of the 4 given inputs as the output. Consequently design the circuit that conditionally distributes one given input through any of the 4 output lines.

Exp 2:

Using NAND gates design the JK Flip Flop circuit and verify its Truth Table.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 7

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit which can conditionally select any one of the 4 given inputs as the output. Consequently design the circuit that conditionally distributes one given input through any of the 4 output lines.

Exp 2:

Using D flip flop design a shift register where the data is stored in the registers serially and the outputs from the register are retrieved in serial order.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 8

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit which can compare 2 numbers. The circuit should identify whether the first input is greater than lesser than or equal to the second number. Name the circuit Note that each number be of size 2 bits.

Exp 2:

Name and design a sequential counter circuit which can produce outputs for the binary equivalents of decimal vales 0 to 9. Use JK flip flops for the implementation.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 9

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit which can compare 2 numbers. The circuit should identify whether the first input is greater than lesser than or equal to the second number. Name the circuit Note that each number be of size 2 bits.

Exp 2:

Design a sequential circuit which acts as a shift register and where the data can be shifted either towards the left or towards the right. An external mode signal M is used if M is 0 then data is shifted to the left and if M is 1 then data is shifted to the right. Use D flip flop for the implementation

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 10

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that can convert the inputs corresponding to the octal values into their respective binary equivalents. Use only basic gates for the circuit.

Exp 2:

Design a sequential circuit that is able to overcome the race around condition. Use JK Flip Flops for the implementation.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 11

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit which can determine the Excess 3 equivalent of a given Binary Coded Decimal value taken as input.

Exp 2:

Using D flip flop design a shift register where the data is stored in the registers paralelly and the outputs from the register are retrieved in parallel.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 12

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that converts a given Binary value taken as input into an output format where any two successive values differ by only one bit. Note that the input size should be 4 bits.

Exp 2:

Name and implement a sequential counter circuit where the output from the last flip flop is inverted and fed back as input to the first flip flop. Use D flip flops for the implementation.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 13

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit which can determine the Excess 3 equivalent of a given Binary Coded Decimal value taken as input.

Exp 2:

Using D flip flop design a shift register where the data is stored in the registers serially and the outputs from the register are retrieved in parallel.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 14

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit which can determine the Excess 3 equivalent of a given Binary Coded Decimal value taken as input.

Exp 2:

Implement a sequential circuit where the JK flip flops function synchronously and which can produce outputs whose binary equivalents range from 0 to 7. Use a external mode signal M. The circuit should be able to count in either increasing or decreasing order based on the given condition. If M= 1 counter counts upwards and with M= 0 counter counts downwards.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 15

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement a combinational circuit which can determine the Excess 3 equivalent of a given Binary Coded Decimal value taken as input.

Exp 2:

Design a sequential circuit that is able to overcome the race around condition. Use JK Flip Flops for the implementation.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 16

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of determining the difference and borrow outputs using 2 binary inputs. Using two of these sub circuits implement another circuit which can consider a previous borrow as input. An additional OR gate should be used for realising the circuit.

Exp 2:

With the help of the SR flip-flop, design a sequential circuit that counts the binary equivalent of decimal values 0 to 15 in increasing order. The circuit should be asynchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 17

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement the combinational circuit that is capable of calculating the results of binary arithmetic addition using an additional carry value as input. The expression for the carry output can be implemented by basic gates.

Exp 2:

With the help of the SR flip flop design a sequential circuit that counts the binary equivalent of decimal values 15 to 0 in decreasing order. The circuit should be synchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 18

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Implement the combinational circuit that is capable of calculating the results of binary arithmetic subtraction using an additional borrow value as input. The expression for the borrow output can be implemented by basic gates.

Exp 2:

With the help of the SR flip flop design a sequential circuit that counts the binary equivalent of decimal values 15 to 0 in decreasing order. The circuit should be synchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 19

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of taking binary inputs and checks if the given input is prime or not prime. The inputs should correspond to the binary equivalent of decimal values 0 to 15.

Exp 2:

Using NAND gates design the SR Flip Flop circuit and verify its Truth Table.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 20

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of determining the sum and carry output using 2 binary inputs. Using two of these sub circuits implement another circuit which can consider a previous carry as input. An additional OR gate should be used for realising the circuit.

Exp 2:

Using NAND gates design the SR Flip Flop circuit and verify its Truth Table.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 21

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of taking binary inputs and checks if the given input is prime or not prime. The inputs should correspond to the binary equivalent of decimal values 0 to 15.

Exp 2:

Name and design a sequential counter circuit which can produce outputs for the binary equivalents of decimal vales 0 to 9. Use JK flip flops for the implementation.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 22

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of determining the sum and carry output using 2 binary inputs. Using two of these sub circuits implement another circuit which can consider a previous carry as input. An additional OR gate should be used for realising the circuit.

Exp 2:

Using NAND gates design the T Flip Flop circuit and verify its Truth Table.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 23

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of taking binary inputs and checks if the given input is prime or not prime. The inputs should correspond to the binary equivalent of decimal values 0 to 15.

Exp 2:

Using D flip flop design a shift register where the data is stored in the registers serially and the outputs from the register are retrieved in parallel.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 24

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a combinational circuit that is capable of taking binary inputs and checks if the given input is divisible by two or not. The inputs should correspond to the binary equivalent of decimal values 0 to 15.

Exp 2:

With the help of the SR flip flop design a sequential circuit that counts the binary equivalent of decimal values 0 to 15 in increasing order. The circuit should be synchronous in its functioning.

University of Engineering & Management, Kolkata

Even Semester Practical / Sessional, May, 2021

Course: B.Tech.(CS) **Semester: 3**

Paper Name: Digital Electronics Laboratory

Paper Code: ESC-392

Full Marks: 100 **Time: 3 hours**

SET 25

Answer all questions.

Students are instructed to write the following details for each experiment in your answer script:

1. Title
2. Objective
3. Theory
4. Truth Table (or Characteristics & Excitation Table – if applicable)
5. k-map (if required)
6. Logic Expression
7. Logic Diagram / Circuit Diagram
8. Conclusion

Exp 1:

Design a specialized Encoder circuit, which can overcome the issue where multiple inputs are high. The circuit should be able to accomodate all 4-bit input combinations.

Exp 2:

Design a sequential circuit which acts as a shift register and where the data can be shifted either towards the left or towards the right. An external mode signal M is used, if M is 0 then data is shifted to the left, and if M is 1 then data is shifted to the right. Use D flip-flop for the implementation.