

2107070

**SECTION -B (ESSAY TYPE QUESTIONS)**  
(5x5=25 Marks)

**BACHELOR OF VOCATION**  
**Automotive Mechatronics (Captive)**  
**Subject: Digital and Power Electronics**  
**Subject Code: ABCE-201**  
**Semester: Fifth**  
**July 2021**  
**Theory (External): 35 Marks**  
**Time: 03 Hours**

1. Implement AND, OR and XOR gates using NAND gate.
2. Design full adder circuit and implement it on NAND gate.
3. How will you convert R-S flip flop into J-K flip flop? Also discuss characteristic table of J-K Flip flop.
4. Solve the function  $F(A,B,C,D) = \sum m(0, 1, 2, 3, 5, 7, 8, 10, 14, 15)$  using K-map method.
5. Draw VI characteristics of a TRIAC and explain the principle of working of TRIAC.
6. Draw and explain the circuit of single to single phase cyclo converter along with waveforms.
7. Explain the various types of PWM methods employed in inverters.
8. Discuss the followings:
  - a) Snubber Circuit
  - b) Current Source Inverter

==END OF PAPER==

**Instructions to the Students**

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

**Roll Number**

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**SECTION –A (SHORT/OBJECTIVE TYPE QUESTIONS)**  
(10x1=10 Marks)

- A. The following hexadecimal number  $(1E.43)_{16}$  is equivalent to
- $(36.506)_8$
  - $(36.206)_8$
  - $(35.506)_8$
  - $(35.206)_8$
- B. Which of these sets of logic gates are known as universal gates?
- XOR, NAND, OR
  - OR, NOT, XOR
  - NOR, NAND, XNOR
  - NOR, NAND
- C. In Digital electronics (Boolean algebra), the OR operation is performed by which of the given properties
- Distributive properties
  - Commutative properties
  - Associative properties
  - All of these
- D. De Morgan's Law states that
- $(A+B)' = A'*B'$
  - $(AB)' = A' + B'$
  - $(AB)' = A' + B$
  - $(AB)' = A + B$
- E. A basic S-R flip-flop can be constructed by cross-coupling of which basic logic gates?
- AND or OR gates
  - XOR or XNOR gates
  - NOR or NAND gates
  - AND or NOR gates

- F. The logic circuits whose outputs at any instant of time depends only on the present input but also on the past outputs are called
- Combinational circuits
  - Sequential circuits
  - Latches
  - Flip-flops
- G. The two-transistor model of the SCR is obtained by
- Bisecting the SCRs top two and bottom two layers
  - Bisecting the SCRs top two layers
  - Bisecting the SCRs bottom two Layers
  - Bisecting the SCRs diagonally
- H. The inverter can be classified as
- Power Inverter
  - Voltage source Inverter
  - Current source Inverter
  - Both option b and c
- I. The single phase mid-point type cyclo-converter uses \_\_\_\_\_ number of SCRs.
- 4
  - 8
  - 6
  - none of the mentioned
- J. Choose the correct statement
- MOSFET is a unipolar, voltage controlled, two terminal device
  - MOSFET is a bipolar, current controlled, three terminal device
  - MOSFET is a unipolar, voltage controlled, three terminal device
  - MOSFET is a bipolar, current controlled, two terminal device