

11. Simplify the logic function using Quine MacClusky minimization technique :

$$F(A, B, C, D) = \Sigma m (1, 3, 5, 8, 9, 11, 15) \\ + d (2, 13).$$

12. Implement the following function using a 3 line to 8 line decoder :

$$S(A, B, C) = \Sigma m (1, 2, 4, 7)$$

$$C(A, B, C) = \Sigma m (3, 5, 6, 7)$$

13. Explain BCD to 7-segment decoder, with circuit, equation, truth table in detail.

BCA-03

June – Examination 2024

BCA (Part-I) Examination

BASIC ELECTRONICS

Paper : BCA-03

Time : 3 Hours]

[Maximum Marks : 70

Note :- The question paper is divided into three Sections A, B and C. Write answers as per the given instructions.

Section-A

7×2=14

(Very Short Answer Type Questions)

Note :- Answer all questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 2 marks.

1. (i) What are universal gates ?
- (ii) Write Kirchhoff's first law.
- (iii) What are the different types of earthing ?
- (iv) What is BJT ?
- (v) What is the significance of reactive power ?
- (vi) What is race around condition ?
- (vii) Define sequential circuit.

Section-B **4×7=28**

(Short Answer Type Questions)

Note :- Answer any *four* questions. Each answer should not exceed **200** words. Each question carries 7 marks.

2. Explain about star and delta connected 3-phase balanced circuits.
3. Explain in detail the construction, working principle and EMF equation of a single phase transformers.
4. What is the difference between Avalanche breakdown and Zener breakdown ?
5. Explain the basic concept of bipolar transistor.

6. What is ripple factor ? Show that the ripple factor of a full wave rectifier is 0.48.
7. State and prove DeMorgan's theorem for :
 - (i) 2 Variables
 - (ii) 3 Variables
 - (iii) 4 Variables
8. Explain the half adder circuit.
9. Simplify the given Boolean equation :

$$Y = (A + \bar{B})(CD + E)$$

and realize using NAND gates only.

Section-C **2×14=28**

(Long Answer Type Questions)

Note :- Answer any *two* questions. You have to delimit your each answer maximum up to **500** words. Each question carries 14 marks.

10. With a neat diagram, explain the input, output and current gain characteristics of a transistor in common base (CB) and in common emitter (CE) configurations.