



SCHOOL OF ELECTRICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

SLOT: A2

Programme Name & Branch : B. Tech (CSE & IT)
 Course Code and Course Name : BEEE102L
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 Class Number(s) : VL2024250106423, VL2024250106424, VL2024250106426, VL2024250106427, VL2024250106446, VL2024250106447, VL2024250106448, VL2024250106562, VL2024250106564, VL2024250106646, VL2024250106648, VL2024250106971, VL2024250107071, VL2024250107111, VL2024250109148

Date of Examination : 13/10/2024
 Exam Duration : 90 minutes
 Maximum Marks: 50

General instruction(s):

- Answer All Questions

Q. No	Questions	Marks
1.	Simplify the below digital function using Boolean algebra and implement the reduced expression with NAND gates. $Y = AC + ABC + \bar{A}BC + AB + D$	10
2.	a. Obtain the Boolean expression for the circuit shown in Fig.1 (2 marks) b. Bring the Boolean expression to canonical form (3 marks) c. Minimize the obtained expression using K-Map and design the logic circuit with minimum number of gates. (3+2 marks)	10

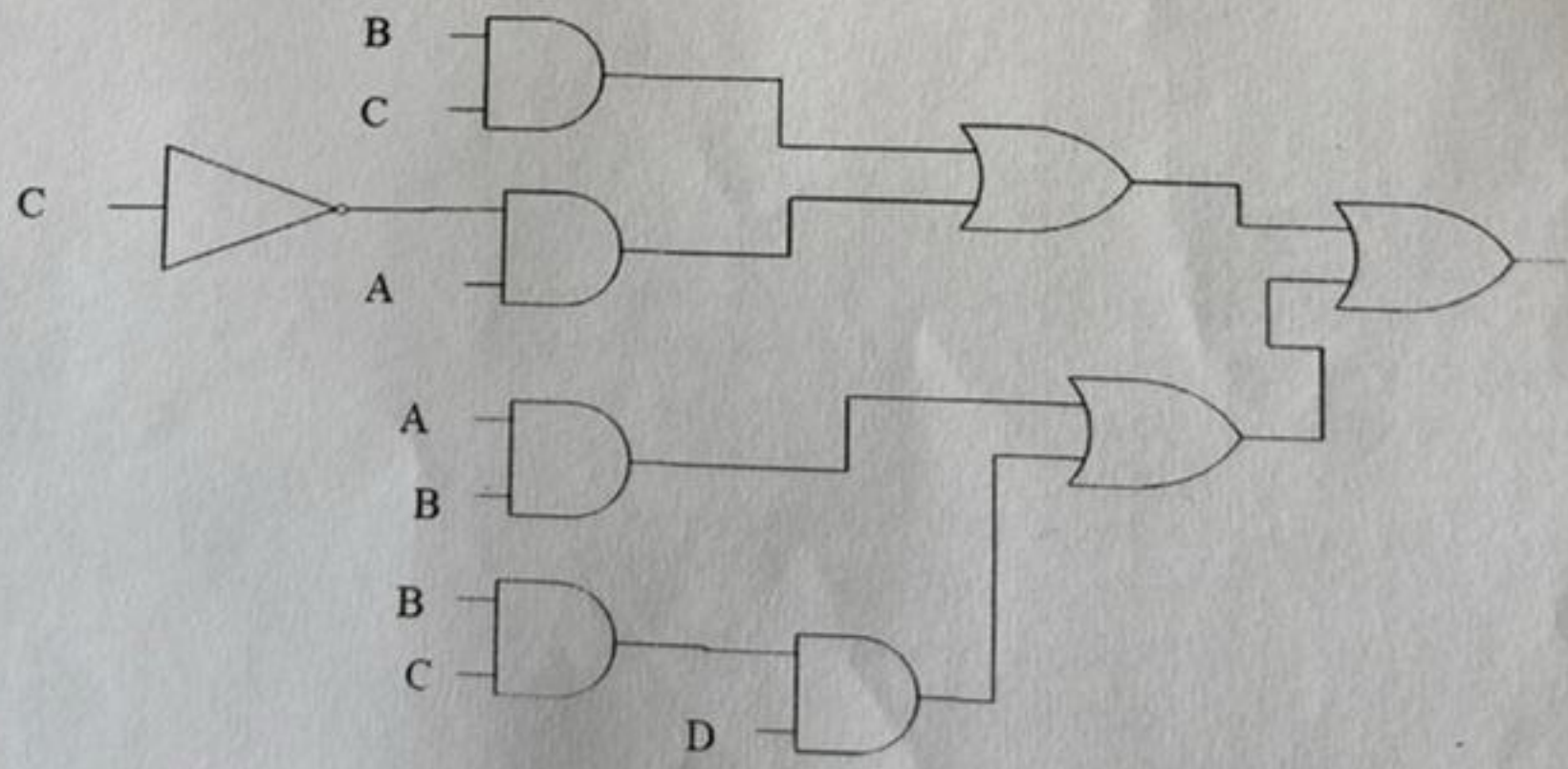


Fig. 1



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3.

a. The logic diagram of Fig. 2 performs the function of a very common arithmetic building block. Identify the logic function.

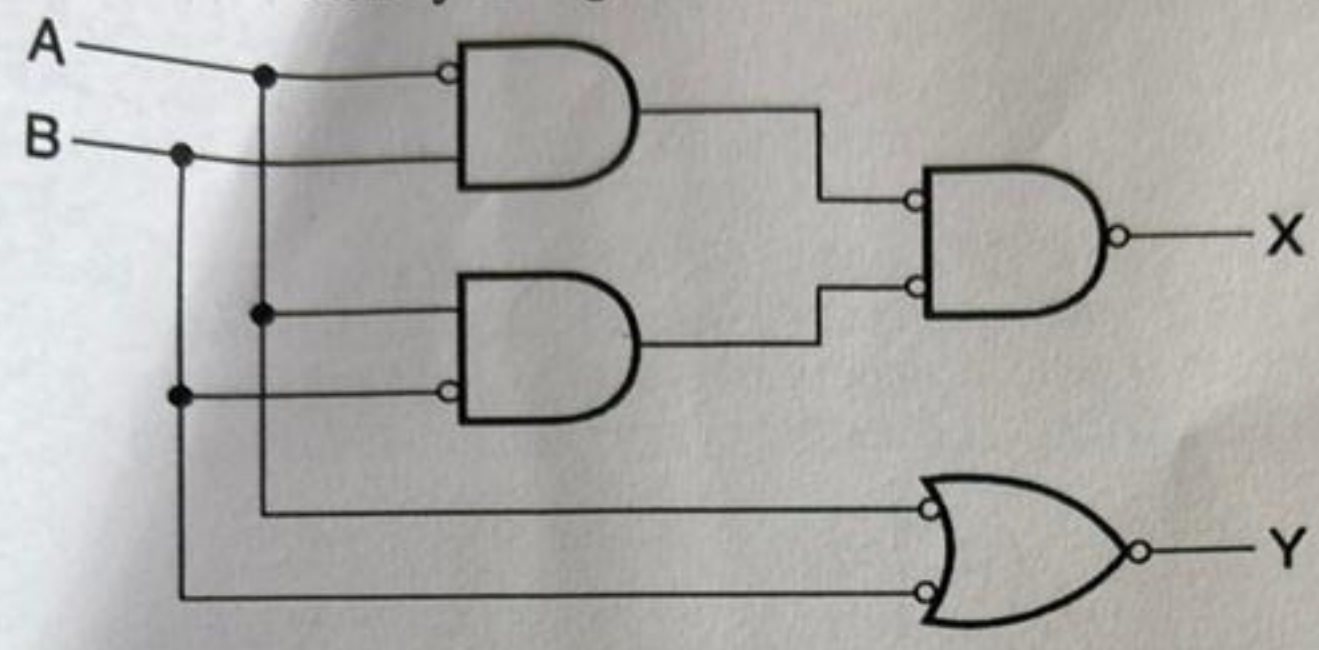


Fig. 2

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b. What is a data selector? Give the detailed logical implementation of a data selector with 4 inputs with necessary logic circuit and truth table.

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4.

A ring of 30-cm mean diameter is made using a cylindrical iron rod of diameter 2.5 cm as shown in Fig. 3. A saw-cut 1-mm wide is made through the ring to create an air-gap. A coil with 500 turns of wire is wound on the ring. Calculate the current required in the exciting coil to produce a flux of 4 mWb in the ring. Assume the relative permeability of iron at this flux density as 800. Neglect any leakage or fringing of the magnetic field.

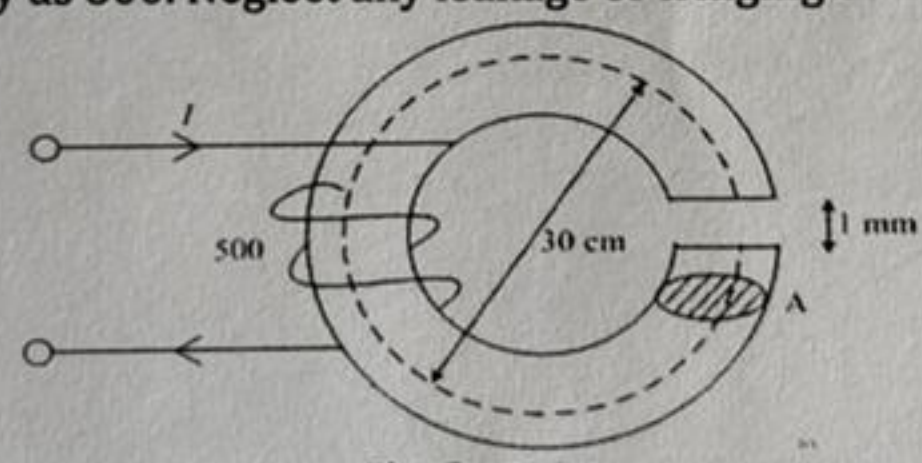


Fig. 3

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5.

The total inductance of two coils, A and B, when connected in series, is 0.5 H or 0.2 H, depending on the relative directions of the current in the coils. Coil A, when isolated from coil B, has a self-inductance of 0.2 H. Calculate

- (a) the mutual inductance between the two coils
- (b) the self-inductance of coil B
- (c) the coupling factor between the coils.
- (d) the two possible values of the induced e.m.f. in coil A when the current is decreasing at 1000 ampere per second

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