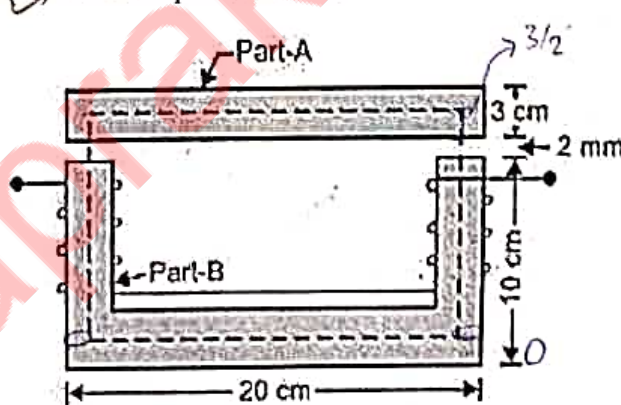
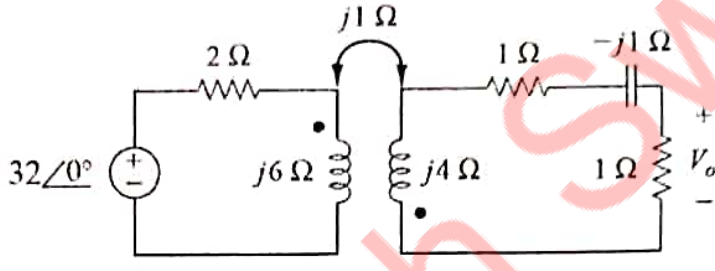


Answer ALL the Questions

| Q. No. | Sub-division | Question Text | Marks |
|---------|--------------|--|-------|
| 1. E | | Three coils are connected in delta to a 3-phase, 3-wire, 415V, 50Hz supply and draws a line current of 5A at 0.8 pf lagging. Calculate the resistance and inductance of the coils. If the coils are star-connected to the same supply, calculate the line current and the total power. | 10 |
| 2. A | | <p>The magnetic frame shown in Figure 1 is built-up of iron of square cross-section, 3 cm side. Each air gap is 2 mm wide. Each of the coils is wound with 1000 turns and the exciting current is 1 A. The relative permeability of part A and part B may be taken as 1000 and 1200 respectively. Calculate, (i) reluctance of part A; (ii) reluctance of part B; (iii) reluctance of two air gaps; (iv) total reluctance of the complete magnetic circuit; (v) mmf produced and (vi) flux set-up in the circuit.</p>  <p style="text-align: center;">Figure 1</p> | 10 |

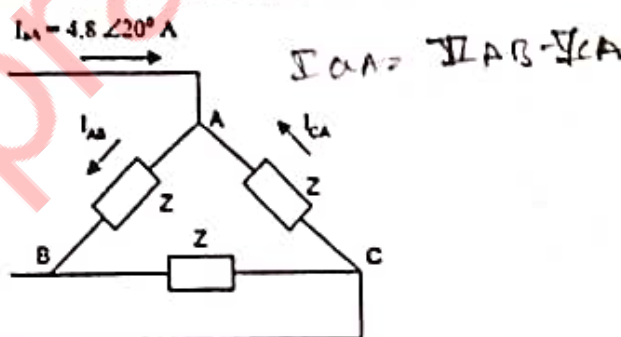
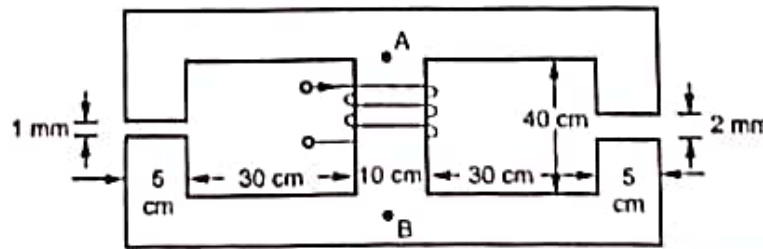
| | | |
|--|--|----|
| 3. B | For the circuit given in Figure 2, find the voltage V_o . | 10 |
|  <p style="text-align: center;">Figure 2</p> | | |
| 4. C | (i) $64171_s = 140655_r$. Find r . (3 Marks) (ii) Minimize the boolean expression $F = ABC + \bar{A}B\bar{C} + AB\bar{C} + A\bar{B}C$ (3 marks) (iii) If $X = 1$ in the logic equation $[X + Z(\bar{Y} + (\bar{Z} + XY))][\bar{X} + \bar{Z}(X + Y)] = 1$, then $Z = ?$ (4 marks) | 10 |
| 5. D | A share market decision model works based on four parameters of the stock price. They are Inflation (A), Trade balance (B), Interest rate (C) and moving average (D). These four parameters are set to '1' or reset to '0' based on the market behaviour. A person can sell the stock, if any of the following conditions are satisfied. a) If all four parameters are '1'. b) If the Trade balance alone is '0'. (13) c) If the Interest rate is '0' and the moving average is '1'. 01 CD d) If inflation is '1', Trade balance and rate of interest are complementary to each other. A=1 Design a digital circuit to work as a stock decision model. Obtain the minimized expression using K map and realize the logic circuit using the 2 input gates. | 10 |

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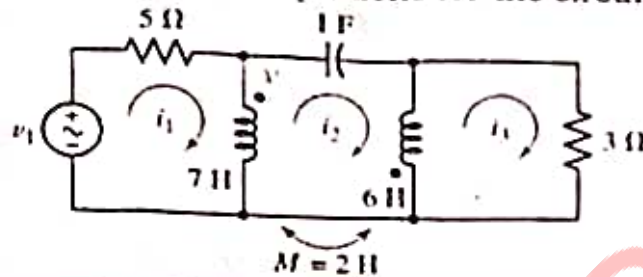
A B C
1 1 0
1 0

Continuous Assessment Test - 2 (CAT 2) – December 2022

| | | | |
|-----------|--|--------------|---|
| Programme | : B.Tech. | Semester | : FALL 2022 - '23 |
| Course | : Basic Electrical and Electronics Engineering | Code | : BEEE102L |
| | | Slot | : B1 |
| Faculty | : Dr. D. R. Binu Ben Jose Dr. S. Kuruseelan Prof. AN. Abhirami Dr. P. Sri Ramalakshmi Prof. V. Ananthakrishnan Dr. K. Iyswarya Annaporani Dr. Rupa Mishra Dr. D. Subbulekshmi Dr. G. Kanimozhi | Class Number | : CH2022231700078 CH2022231700076 CH2022231700070 CH2022231700080 CH2022231700084 CH2022231700068 CH2022231700072 CH2022231700074 CH2022231700082 |
| Time | : 1 hour, 30 minutes | Max. Marks | : 50 |

| Q. No. | Question Description | Marks |
|--------|---|-------|
| 1. | <p>In a simple three phase balanced 3 wire system, the phase sequence is abc and the source voltage is $V_{AB} = 120 \angle 30^\circ$ V (lead by 30°). The supply is connected to a three phase delta load. If the line current is $4.8 \angle 20^\circ$ A (lead by 20°), find the power factor and the per phase resistance and reactance of the delta load.</p>  <p style="text-align: right;">$I_{CA} = V_{AB} - V_{CA}$</p> | 10 |
| 2. | <p>For the magnetic circuit shown below has a coil of 1000 turns with the core thickness of 5 cm and exciting current of 0.5 A. Find the flux density and flux in each of the outer limbs and the central limb. Assume the relative permeability for iron of the core to be infinity (∞).</p>  <p style="text-align: right;">$\mu_r = \infty$ $R_1 = R_2 = R_3 = 0$</p> | 10 |

3. Write a complete set of phasor mesh equations for the circuit shown below



10

4. Simplify the expression

- i. $Y = \bar{A}B + ABD + A\bar{B}C\bar{D} + BC$
 ii. $f = \bar{x}z + y\bar{z} + \bar{y}z + xyz$
 iii. $f = \bar{A}B + AB + A\bar{B}$

10

5. Use K-map to reduce the function given below as $F(A, B, C, D)$ by the SOP representation and draw the logic diagram for the reduced expression using basic gates.

$$F(A, B, C, D) = \Sigma(2, 5, 7, 8, 10, 12, 13, 15).$$

10

$$\bar{x}z + \bar{x} + yxz.$$

$$\bar{x}z + yxz.$$

$$(1-z)(1-y) + yz$$

$$1 - x - z + xz + yz$$

$$1 - x - z + yxz.$$

$$\bar{x}z + yxz$$

$$\bar{x}z + yz +$$

$$A\bar{B} + \bar{A}BD + B\bar{D}C + \bar{A}BD + BD +$$

$$A\bar{B} + \bar{A}BD + B\bar{C}\bar{D} + A\bar{B}D$$

$$BD + D(B + A\bar{C})$$

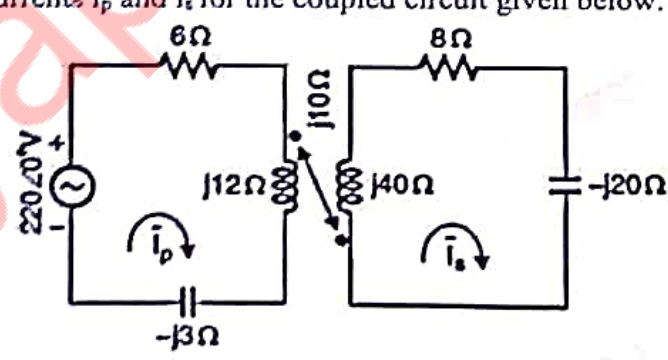
$$B\bar{D} + B\bar{D}C + A\bar{B}D$$



Continuous Assessment Test (CAT-2) – December 2022

| | | | |
|-----------|--|------------|--|
| Programme | B.Tech CSE | Semester | Fall 22 - 23 |
| Course | Basic Electrical and Electronics Engineering | Code | BEEE102L |
| | | Slot | F2+TF2 |
| Faculty | 1. Dr. T.Deepa 2. Ms. Hemavathy S 3. Ms. Deepa M 4. Mr. Pravanna Kumar 5. Ms. Jacily Jemila S 6. Ms. Divya J 7. Mr. Ajeypresaath K B | Class Nbr | 1. CH2022231700982 2. CH2022231700385 3. CH2022231700583 4. CH2022231700596 5. CH2022231700372 6. CH2022231700598 7. CH2022231700600 |
| Time | One and half Hours | Max. Marks | 50 |

Answer All Questions

| Q.No. | Question Description | Marks |
|-------|--|-------|
| 1. | Three identical coils each of resistance 30 ohms and inductance 127.3 mH are connected (i) in star and (ii) in delta to a 440 V, 50 Hz, 3-phase supply. Calculate for each connection (a) the line and phase voltages and (b) the phase and line currents. | 10 |
| 2. | Determine the loop currents i_p and i_s for the coupled circuit given below.  | 10 |
| 3. | Two coupled coils with $L_1 = 0.08$ H, $L_2 = 0.14$ H and $K = 0.9$ are connected in four different ways. What are the values of equivalent inductances? | 5 |

$$K = \frac{M}{\sqrt{L_1 L_2}}$$

| | | |
|----|--|----|
| 4. | <p>For the Boolean function,</p> $F = xy'z + x'y'z + xyz' + x'yz + xyz$ <p>(a) Obtain the truth table of F.</p> <p>(b) Draw the logic diagram, using the original Boolean expression.</p> <p>(c) Use K-map to simplify the function to a minimum number of literals.</p> <p>(d) Obtain the truth table of the function from the simplified expression and show that it is the same as the one in part (a).</p> <p>(e) Draw the logic diagram from the simplified expression, and compare the total number of gates with the diagram of part (b).</p> | 15 |
| 5. | Implement a full adder circuit using 4:1 multiplexer. (Provide necessary Boolean expressions for sum and carry, logic diagram, and truth table) | 10 |

| | | | |
|---------|----------------------|------------|------|
| Faculty | : S.Rani | Slot | : B2 |
| Time | : A.N.Abhirami | Max. Marks | : 50 |
| | : One and half Hours | | |

Answer ALL the Questions

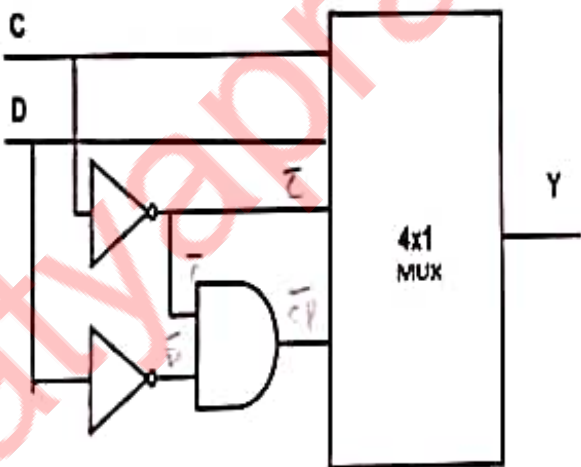
| Q.No | Question Description | Ma |
|------|---|----|
| 1. | A star connected three phase source of phase voltage $V_{an} = 180 \angle 0^\circ V$ (RMS) and the star connected load impedance per phase is $Z_p = (3 + j9) \Omega$. Find the phase voltage, line voltage, phase current, line current, apparent power, real and reactive power. Draw the phasor diagram. | 10 |
| 2. | Using a Karnaugh map, reduce this POS expression and find the SOP expression for the same, then draw the logic circuit for the simplified SOP expression. $F = (\bar{A} + \bar{B} + C + D)(A + \bar{B} + C + D)(A + B + C + \bar{D})(A + B + \bar{C} + \bar{D})(\bar{A} + B + C + \bar{D})(A + B + C + D)$. | 10 |
| 3. | A. $F(A, B, C, D) = \sum m(0, 2, 3, 7, 11, 13, 14, 15)$ find the simplified expression using K-map B. Find out the Boolean expression for the logic circuit shown in  | 10 |

Fig. 1

4. Consider the magnetic core with an airgap as shown in the Fig 2. The core material has a relative permeability of 6000 and a rectangular cross section 2cm by 3cm. The coil has 500 turns. Determine the current required to establish a flux density of $B_{gap} = 0.25 \text{ T}$ in the air gap.

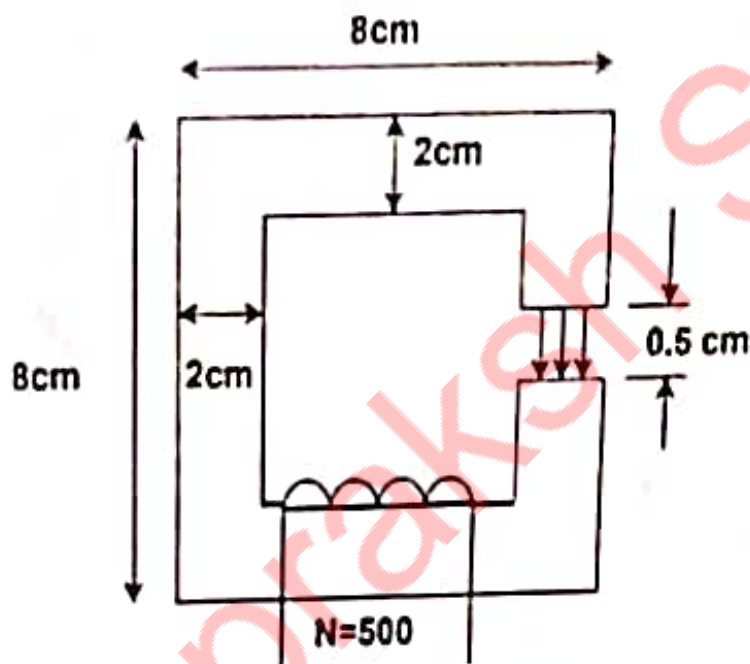


Fig 2

5. Consider a logic circuit with three inputs X, Y and Z. Output F is high 1 (high) for the following conditions:

- i) X is false and Y is true
- ii) Y is true and Z is false
- iii) Y and Z is true
- iv) X is true, Y and Z is false

Minimize the output function F.