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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022**

COURSE NAME : BASIC ELECTRIC AND ELECTRONIC
COURSE CODE : DAM13503 / DAM21403
PROGRAMME CODE : DAM
EXAMINATION DATE : JANUARY / FEBRUARY 2022
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER **FIVE (5)** QUESTIONS ONLY.
2. THIS FINAL EXAMINATION IS AN **ONLINE ASSESSMENT** AND CONDUCTED VIA **CLOSE BOOK**.

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

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- Q1** (a) Explain the characteristic of series circuit and parallel circuit in terms of voltage and current. (4 marks)
- (b) Refer to **Figure Q1(b)**, calculate;
- (i) The total resistance, R_T (4 marks)
- (ii) The voltage drop across resistance R_3 (V_{R3}), resistance R_5 (V_{R5}) and resistance R_6 (V_{R6}) (6 marks)
- (iii) The current flow through resistance R_3 (I_{R3}), resistance R_5 (I_{R5}) and resistance R_6 (I_{R6}) (6 marks)
- Q2** (a) Explain briefly Kirchhoff Current Law (KCL) and Kirchhoff Voltage Law (KVL). (4 marks)
- (b) Based on **Figure Q2(b)**, by using the principle of KCL and KVL, show;
- (i) The current, I at each junction of the circuit. (8 marks)
- (ii) The voltage drop, V at each resistor. (4 marks)
- (iii) The power distribution at each resistor. (4 marks)
- Q3** **Figure Q3** shows a magnetic circuit with a 10 V battery coupled to a 50-turn coil with a 20 cm iron core.
- (a) Determine the magneto-motive force (mmf). (5 marks)
- (b) Define the magnetic field intensity. (5 marks)
- (c) Compute the flux density, B in a core with μ_r of 600. (5 marks)
- (d) Evaluate total flux, Φ at each pole with a 4cm^2 surface area. (5 marks)

- Q4** (a) Explain **THREE (3)** factors that determine the capacitance of a capacitor. (6 marks)
- (b) Determine the amount of charge, Q , stored by a capacitor if;
- (i) $C = 15 \mu\text{F}$ and $V = 15 \text{ V}$ (2 marks)
- (ii) $C = 250 \text{ pF}$ and $V = 120 \text{ V}$ (2 marks)
- (iii) $C = 0.56 \mu\text{F}$ and $V = 50 \text{ V}$ (2 marks)
- (c) Calculate the capacitance, C , of a capacitor for each set of physical characteristics listed below;
- (i) $A = 0.1 \text{ cm}^2$, $d = 0.005 \text{ cm}$, $K\epsilon = 1$ (4 marks)
- (ii) $A = 1 \text{ cm}^2$, $d = 5 \times 10^{-6} \text{ cm}$, $K\epsilon = 6$ (4 marks)
- Q5** (a) State **THREE (3)** types of non-sinusoidal wave and explain its use in application circuit. (3 marks)
- (b) State the angle for sine wave in alternating voltage;
- (i) When reach its maximum positive value. (1 mark)
- (ii) When reach its maximum negative value. (1 mark)
- (iii) When its cross the zero axis. (1 mark)
- (c) If a sine wave has a peak value of 50 V, calculate;
- (i) Peak to peak value. (2 marks)
- (ii) The average value. (2 marks)
- (iii) The root mean square value, RMS. (2 marks)

- (d) Find the instantaneous value of alternating voltage, $v = 10 \sin (3\pi \times 10^4 \times t \times 57.3)$ volt at;
- (i) $t = 15 \mu\text{s}$ (2 marks)
 - (ii) $t = 50 \mu\text{s}$ (2 marks)
 - (iii) $t = 75 \mu\text{s}$ (2 marks)
 - (iv) $t = 100 \mu\text{s}$ (2 marks)

- Q6** (a) Explain briefly **TWO (2)** ways to increase inductance. (2 marks)
- (b) Calculate the inductance of long coil if this coil has an air core with a diameter of 3 cm. It has 50 turns wire and build to 20 cm long coil. (2 marks)
- (c) 2 Inductors of 1 H and 2 H are connected to a 240 V, 50 Hz power supply. Determine;
- (i) The total current flow for the circuit if the 2 inductor is connected in series. (2 marks)
 - (ii) The total current flow for the circuit if the 2 inductor is connected in parallel. (2 marks)
- (d) Referring **Figure Q6(d)**, calculate:
- (i) Secondary Power 1, P_1 (2 marks)
 - (ii) Secondary Power 2, P_2 (2 marks)
 - (iii) Primary Power, P_P (2 marks)
 - (iv) Secondary Load 1, R_1 (2 marks)
 - (v) Secondary Voltage 2, V_2 (2 marks)
 - (vi) Secondary number of turn 2, N_2 (2 marks)

- END OF QUESTIONS -

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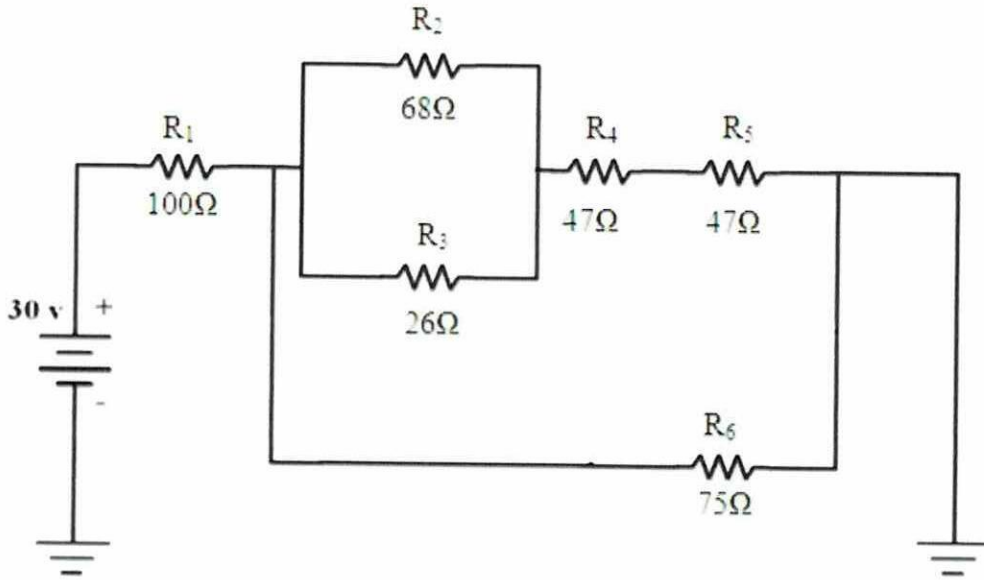


Figure Q1(b)

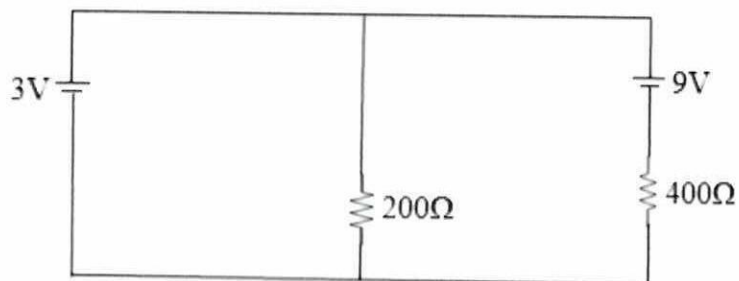


Figure Q2(b)

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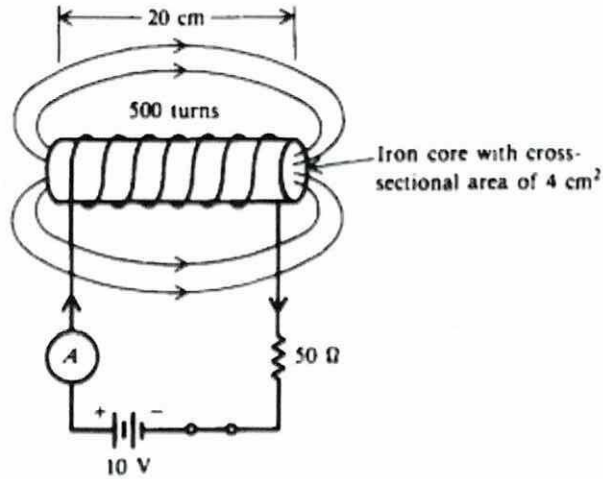


Figure Q3

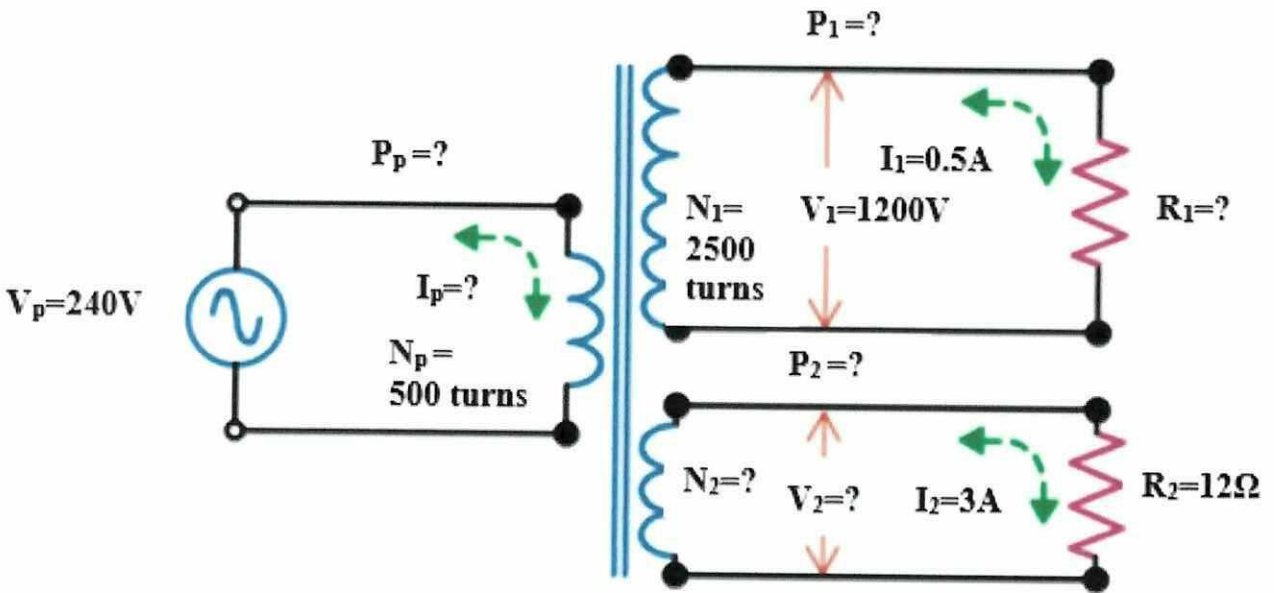


Figure Q6(d)