UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: DEE 1113
COURSE	: ELECTRICAL TECHNOLOGY 1
SEMESTER/SESSION	: 2-2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 4 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 8 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) List three (3) parts in a battery. (3 marks)

b) State two functions of a resistor. (4 marks)

c) Explain the difference between direct current (DC) and alternating current (AC) in terms of a voltage source. (4 marks)

d) Express the following numbers in engineering notation:

i) 0.0007484 (1 mark)

ii) 6 346 000 000 (1 mark)

e) State the definition of:

i) Current (2 marks)

ii) Voltage (2 marks)

iii) Electrical Charge (2 marks)

f) State the function of a transformer. (2 marks)

QUESTION 2

a) List three (3) factors affecting resistance at a fixed temperature. (3 marks)

b) Figure 1 shows a 4 band resistor;

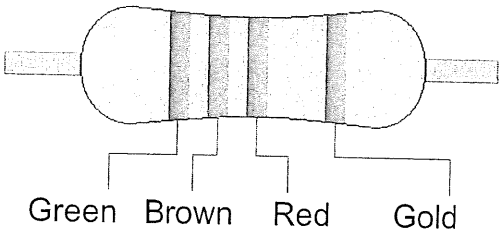

Figure 1

i) Determine the resistance values and tolerance for the following 4-band resistor. (2 marks)

ii) Find the minimum and the maximum resistance within the tolerance limits for the resistor in b) (i). (4 marks)

c) Describe how opposition to the flow of electrons (resistance) across a conductor can happened. (5 marks)

d) Compute the unknown **current value, I** in the circuit in Figure 2. (3 marks)

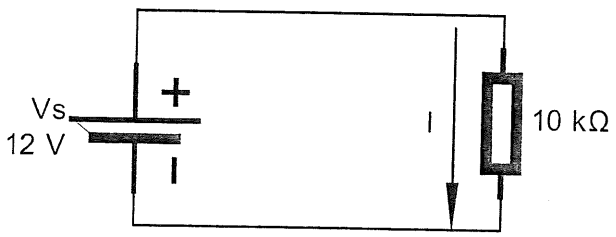

Figure 2

QUESTION 3

a) For the circuit in Figure 3, calculate:

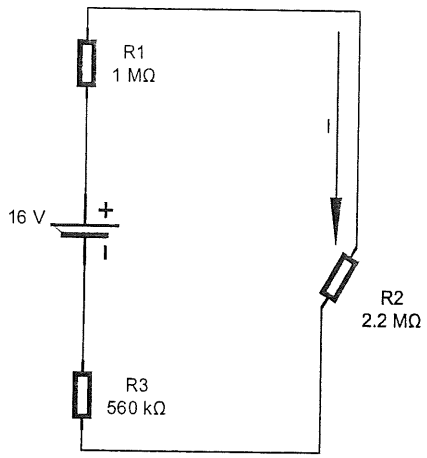

Figure 3

i) The total resistance of the circuit. (3 marks)

ii) The current, I flow in the circuit. (3 marks)

iii) The voltage across R2. (3 marks)

b) Determine voltage drop at V2 in Figure 4 using Kirchhoff's Voltage Law. (2 marks)

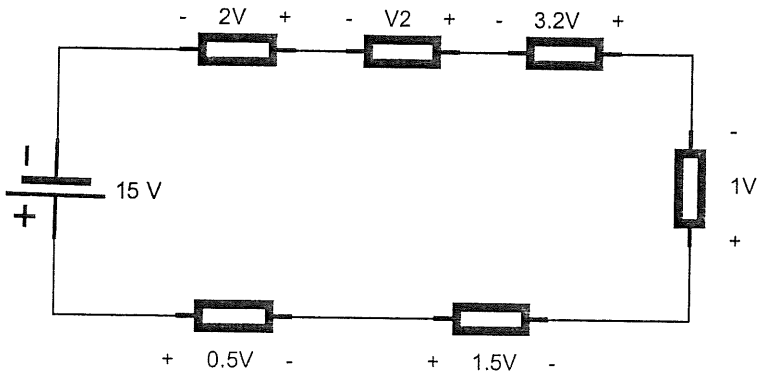

Figure 4

c) For the voltage divider circuit shown in Figure 5;

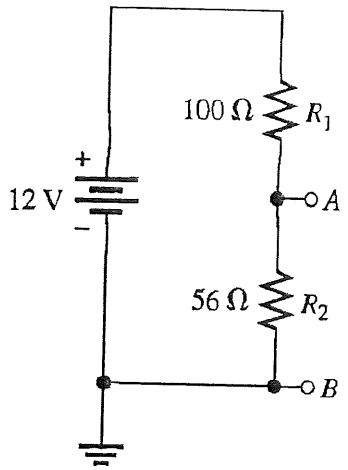

Figure 5

i) Express the voltage between points A and B using the voltage divider formula. (4 marks)

ii) Calculate the total power in the circuit. (4 marks)

d) Based on the circuit shown in Figure 6;

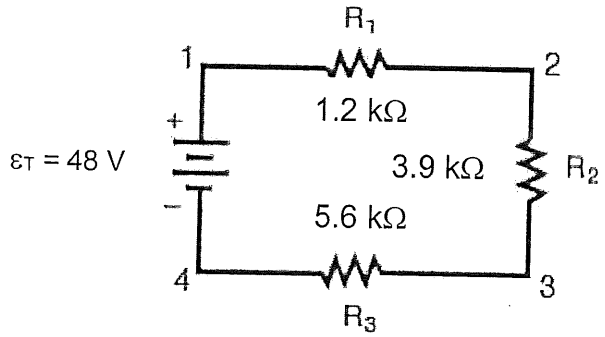

Figure 6

i) Determine the total resistance, R_T. (3 marks)

ii) Determine the total current, I_T. (3 marks)

iii) Determine voltage drop at R_2, V_{R2}. (3 marks)

e) Determine the total resistance of the the circuit in Figure 7. (5 marks)

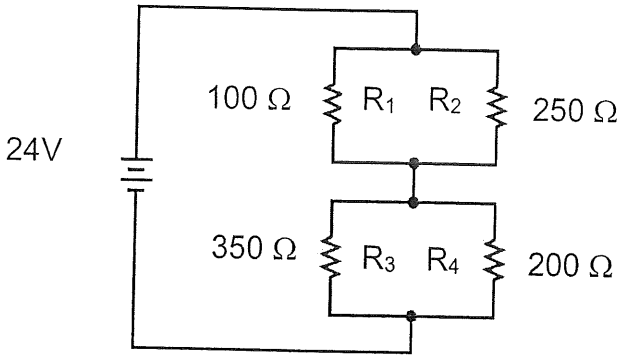

Figure 7

QUESTION 4

a) Find the capacitance when Q = 50 μC and V = 10 V. (3 marks)

b) Based on Figure 8;

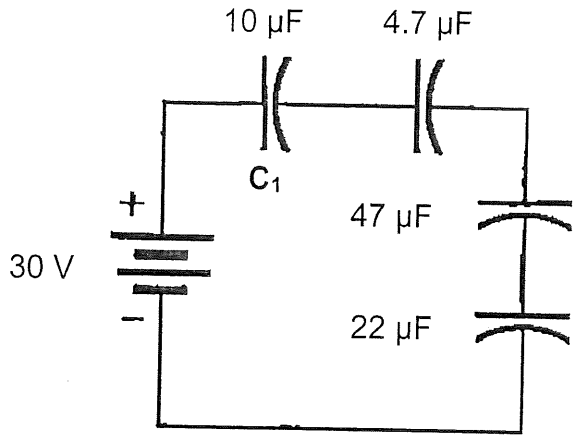

Figure 8

i) Compute the total capacitance for the circuit, C_T. (3 marks)

ii) Calculate the voltage across C_1. (3 marks)

c) Given the parallel capacitor circuit in Figure 9,

i) Determine the total capacitance, C_T. (3 marks)

ii) Determine the charge, Q. (3 marks)

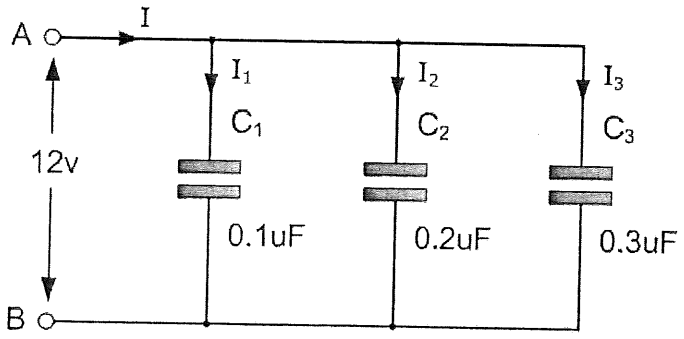

Figure 9

d) How many turns are required to produce 30 mH with a coil wound on a cylindrical core having a cross-sectional area of 10×10^{-5} m^2 and a length of 0.05 m? The core has a permeability of 1.2×10^{-6}H/m. (3 marks)

e) Draw the common symbol for iron core inductors. (2 marks)

f) Compute the total inductance, L_T of the circuit in Figure 10. (3 marks)

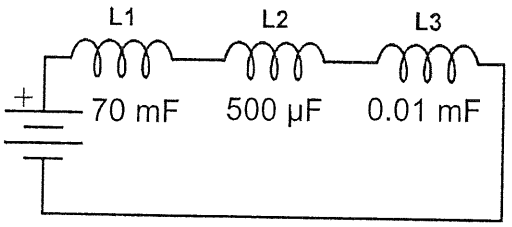

Figure 10

g) Compute the total inductance, L_T of the circuit in Figure 11. (6 marks)

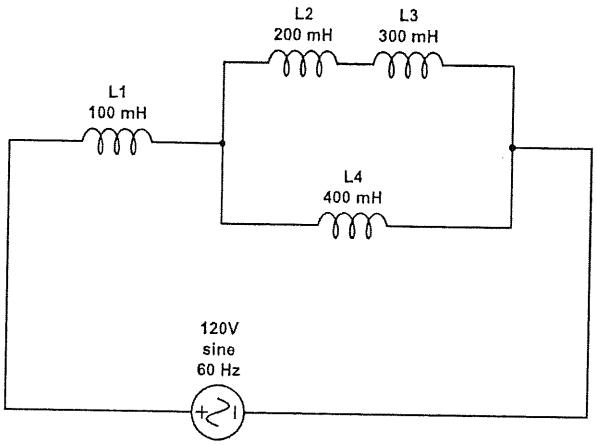

Figure 11

----------**End of question**----------