UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2010 / 2011

COURSE NAME	:	BASIC ELECTRIC AND ELECTRONICS
COURSE CODE	:	DKE 3273
PROGRAMME	:	3 DDT / DDM
EXAMINATION DATE	:	APRIL / MAY 2011
DURATION	:	3 HOUR
INSTRUCTION	:	ANSWER **FIVE (5)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF TEN (10) PAGES

Q1 By refering to Figure Q1, show all the calculation to find the value for :

(a) Total resistance R_T

(4 marks)

(b) The voltage drop across resistance R_2 (V_{R2}), resistance R_3 (V_{R3}), resistance R_4 (V_{R4}) and resistance R_6 (V_{R6})

(8 marks)

(c) The current flow through resistance R_2 (I_{R2}), resistance R_3 (I_{R3}), resistance R_4 (I_{R4}) and resistance R_6 (I_{R6})

(8 marks)

Q2 (a) Determine the amount of charge, Q, stored by a capacitor if

(i) C = 10μF and V = 5V
(ii) C = 680 pF and V = 200V
(iii) C = 0.22 μF and V = 50 V

(6 marks)

(b) Determine the voltage, V, across a capacitor if

(i) Q = 2.5 μC and C = 0.01 μF
(ii) Q = 10 mC and C = 1000 μF
(iii) Q = 188 nC and C = 0.0047 μF

(6 marks)

(c) Calculate the capacitance, C, of a capacitor for each set of physical characteristics listed below :

(i) A = 0.1 cm^2, d = 0.005 cm, Kε = 1
(ii) A = 1 cm^2, d = 5 x 10^{-6} cm, Kε = 6

(8 marks)

Q3 By refering to Figure Q3, assume a charging current of 2.4 mA flows for 1 ms, determine :

(a) Total equivalent capacitance, C_{EQ}

(4 marks)

(b) The charge stored in each capacitor C_1 (Q_{C1}), C_2 (Q_{C2}) and C_3 (Q_{C3})

(6 marks)

(c) The voltage across each capacitor C_1 (V_{C1}), C_2 (V_{C2}) and C_3 (V_{C3})

(6 marks)

(d) The total charge, Q_T stored by the equivalent capacitor, C_{EQ}

(4 marks)

Q4 (a) Refer to Figure Q4(a), two coils connected in series have a self-inductance of L_1 = 20mH and L_2 = 60mH respectively. The total inductance of the combination was found to be L_T =100mH. Determine the amount of mutual inductance (L_T) that exists between the two coils assuming that they are aiding each other.

(10 marks)

(b) Refer to Figure Q4(b), calculate the equivalent inductance, L_{EQ} of the following inductive circuit, if given L_1 = 20mH, L_2 = 40mH, L_3 = 30mH, L_4 = 20mH, L_5 = 50mH, L_6 = 40mH and L_7 = 100mH

(10 marks)

Q5 Refer to Figure Q5, calculate;

(a) The secondary voltage , V_S

(4 marks)

(b) The secondary current, I_S

(4 marks)

(c) The secondary power, P_S

(4 marks)

(d) The primary power, P_P

(4 marks)

(e) The primary current, I_P

(4 marks)

Q6 Refer to Figure Q6, determine;

(a) The total equivalent resistance, R_{EQ}

(4 marks)

(b) The branch currents, I_1 and I_2

(4 marks)

(c) The total current, I_T

(4 marks)

(d) The power dissipated at each resistors, P_1 and P_2

(4 marks)

(e) The total power supplied by the source, P_T

(4 marks)

Q7 (a) Figure Q7(a) shows a transistor biasing circuit do the following :

(i) Calculate the collector saturation current ($I_{C(sat)}$)

(1 mark)

(ii) Calculate the collector–emitter cut-off voltage ($V_{CE\,(off)}$)

(1 mark)

(iii) Calculate the collector current at the Q-point (I_{CQ})

(3 marks)

(iv) Calculate the voltage at the Q-point (V_{CEQ})

(1 mark)

(v) Draw the DC load line for the transistor circuit

(4 marks)

(b) Figure Q7(b) shows a n-channel JFET circuit. What is the value of R_S?

(2 marks)

(c) Referring to Figure Q7(b), for the values of R_S calculated in question Q7(b), determine:

(i) gate voltage (V_G)

(2 marks)

(ii) source voltage (V_S)

(2 marks)

(iii) gate-source voltage (V_{GS})

(2 marks)

(iv) drain voltage (V_D)

(2 marks)

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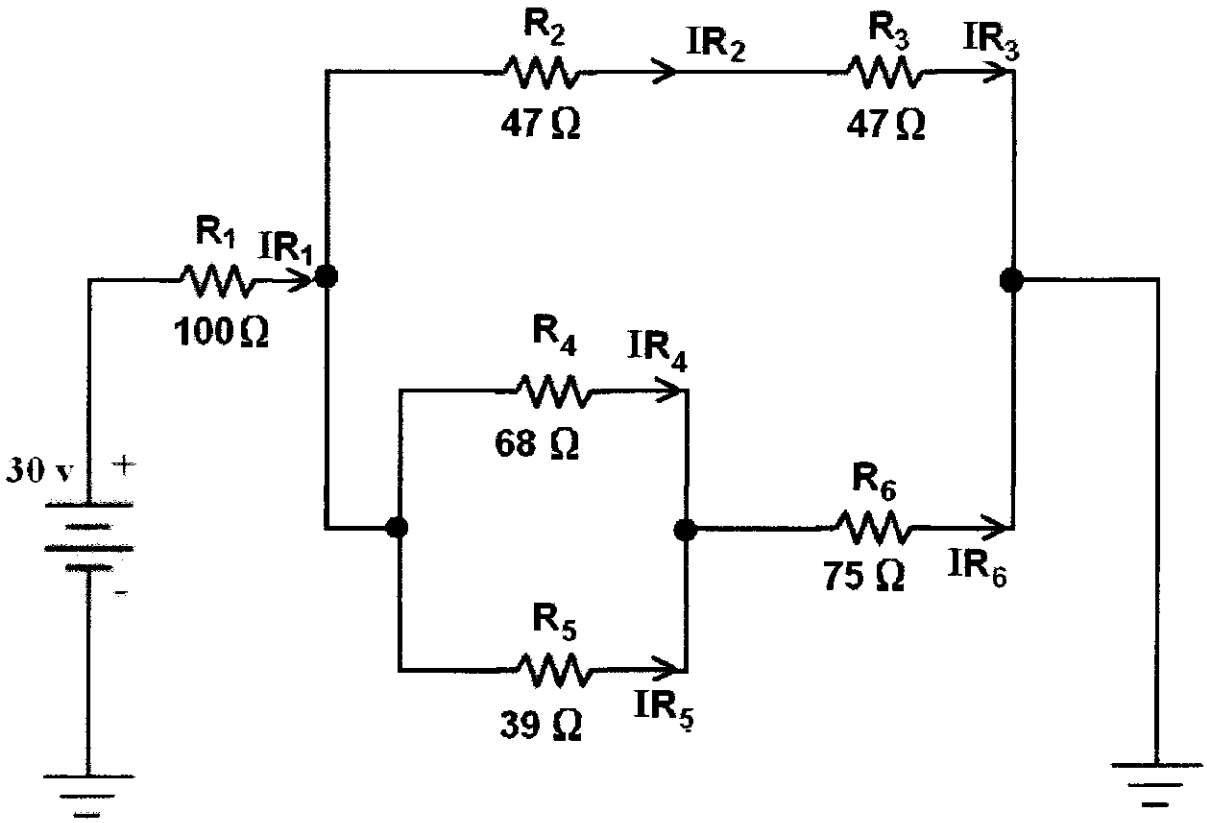

Figure Q1

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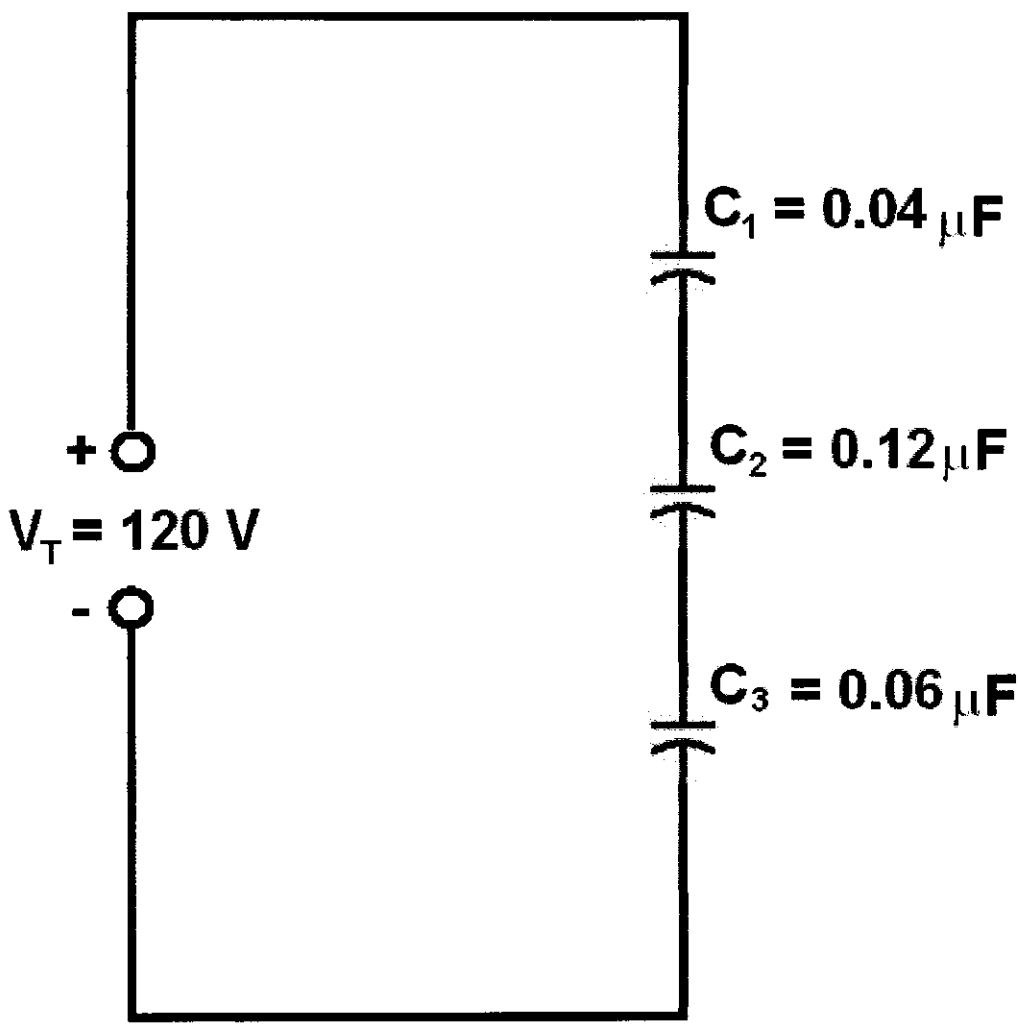

Figure Q3

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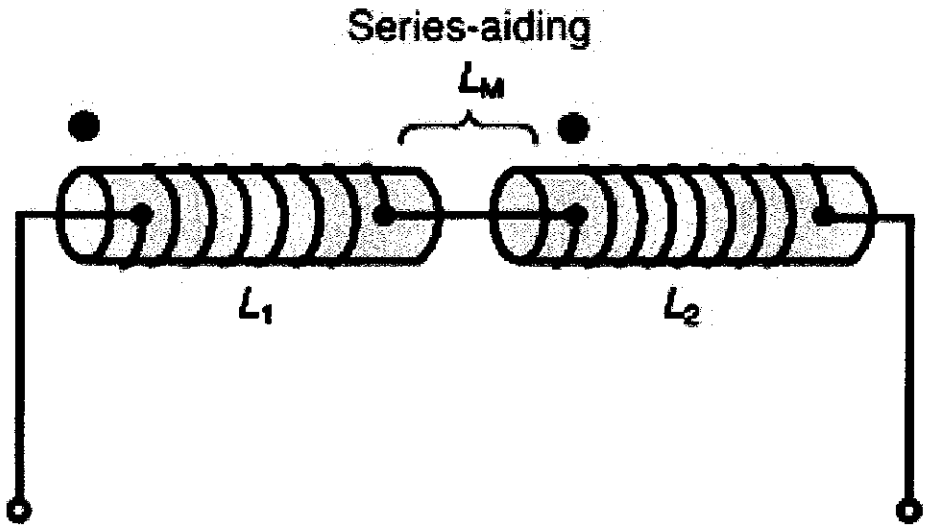

Figure Q4 (a)

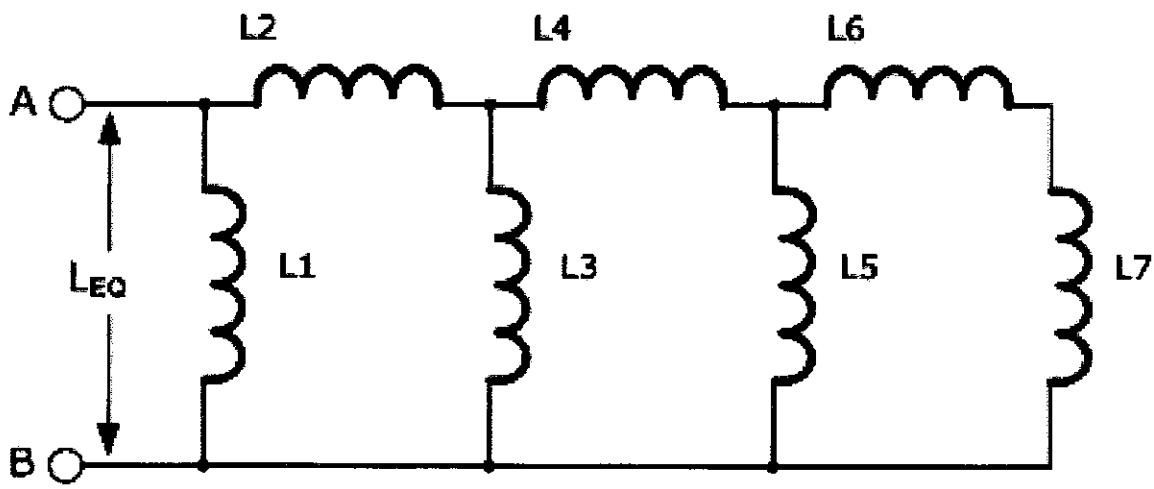

Figure Q4 (b)

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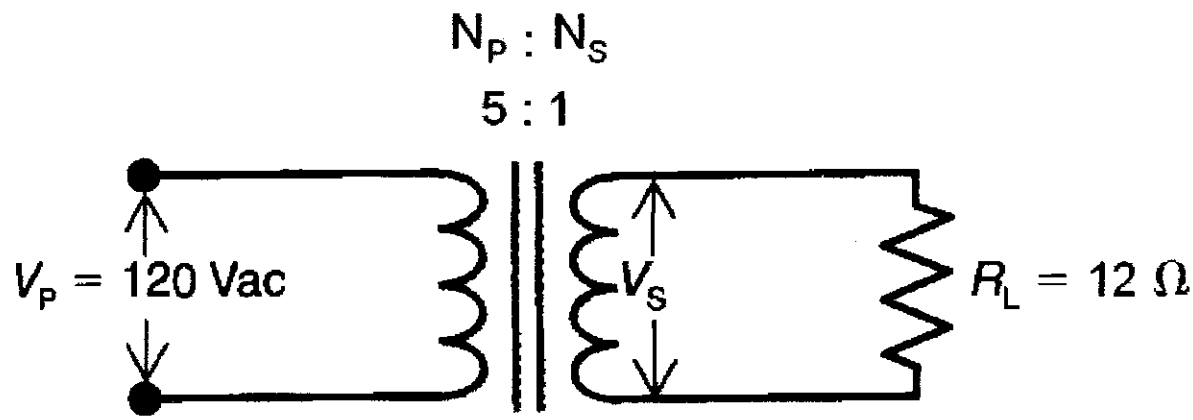

Figure Q5

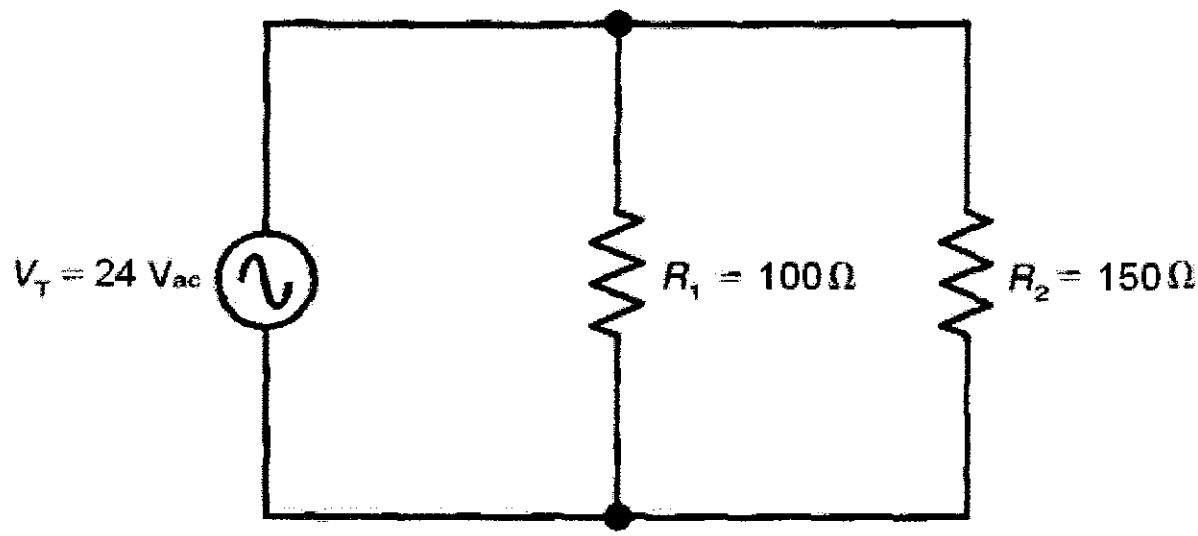

Figure Q6

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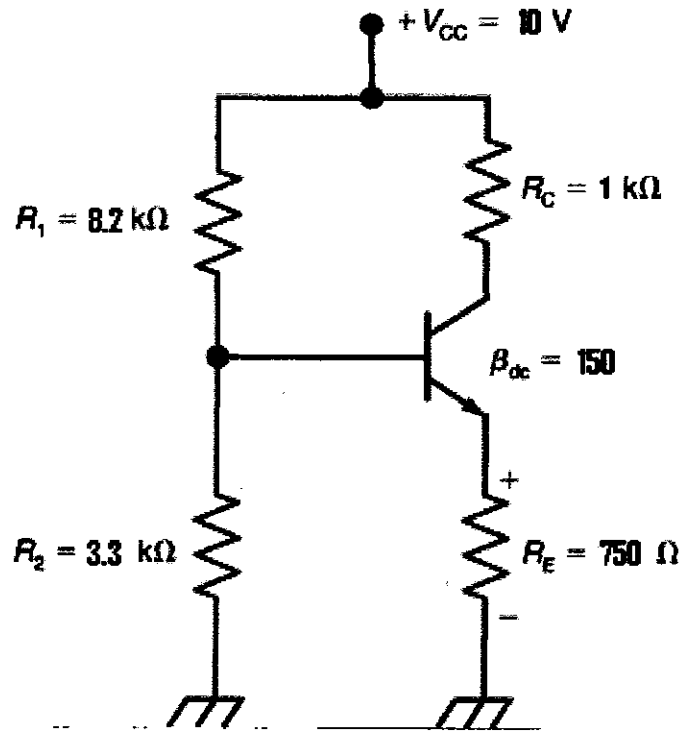

Figure Q7 (a)

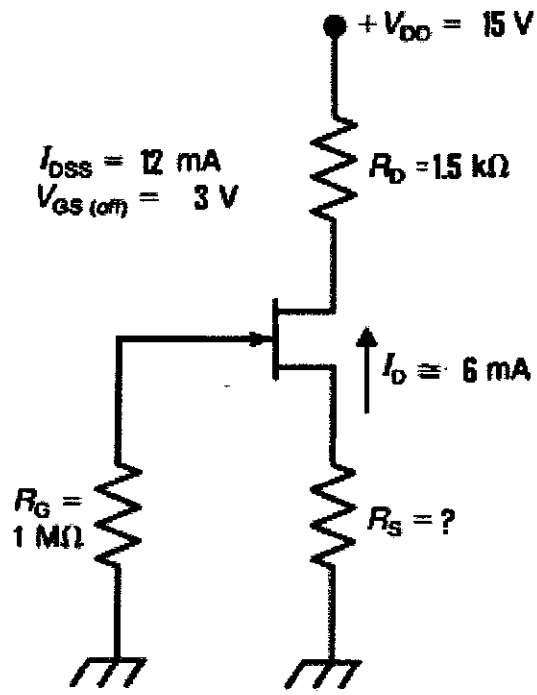

Figure Q7 (b)

References :

Band Color	Digit	Multiplier	Tolerance
Black	0	1	---
Brown	1	10	±1%
Red	2	100	±2%
Orange	3	1,000	±3%
Yellow	4	10,000	±4%
Green	5	100,000	---
Blue	6	1,000,000	---
Violet	7	10,000,000	---
Gray	8	100,000,000	---
White	9	---	---
Gold	---	0.1	±5%
Silver	---	0.01	±10%
None	---	---	±20%