TERTIARY AND VOCATIONAL EDUCATION COMMISSION

Fluid Power Technology
NVQ Level 5 Semester l Examination

Applied Electrical and Electronics – E40C00M04

Instructions to Candidates:

1. **Answer five (05) questions**

Total Time: 03 hours **Total Marks: 100**

Q1.

a. State the ohm's law. (01 Mark)

b. From the Figure 1 find, (06 Marks)

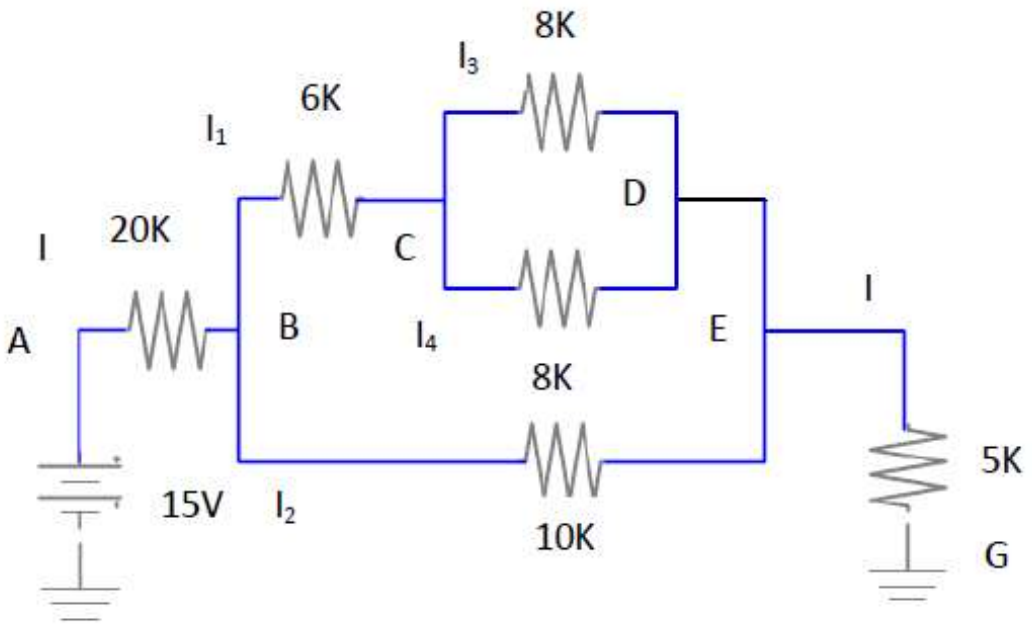


Figure 1

i. Resistance of the entire circuit.

ii. Current in each resistor.

iii. Voltage drops across 10K resister.

c. Find the voltage V_{AB} in the circuit shown Figure2. (03 Marks)

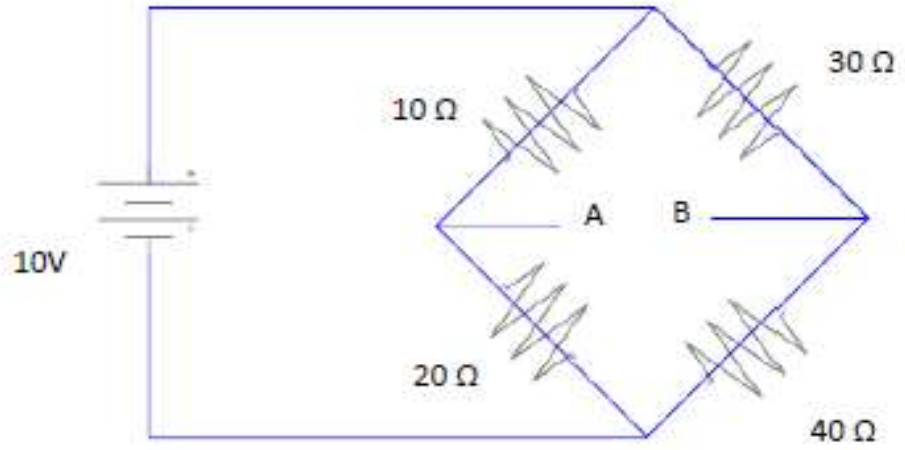


Figure 2

d.

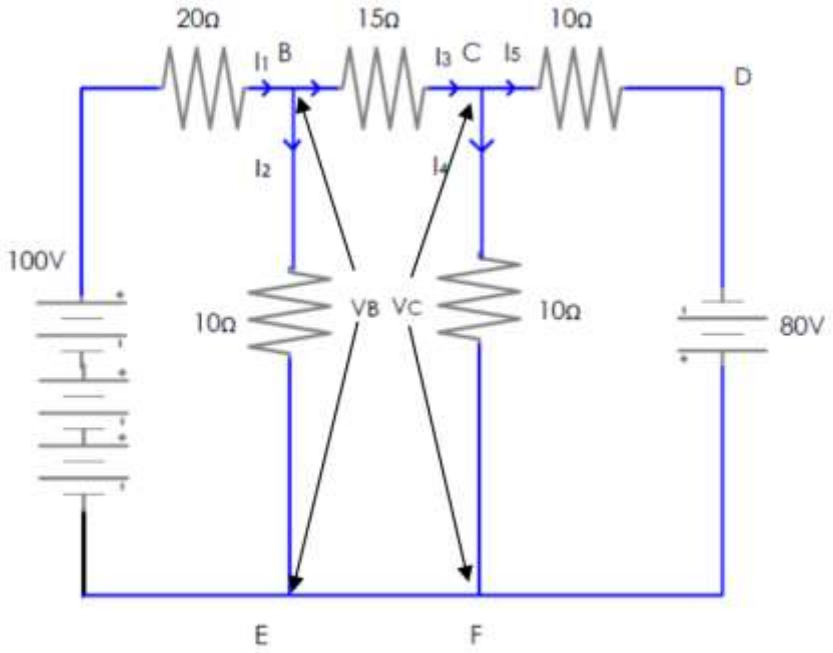


Figure 3

Find the currents in the various branches of the circuit in Figure 3 by nodal analysis. (10 Marks)

Q2

a) Draw the VI characteristics of Zener diode and show the main regions (05 Marks)

b) Zener diode finds numerous applications in transistor circuitry. what are common uses (03 Marks)

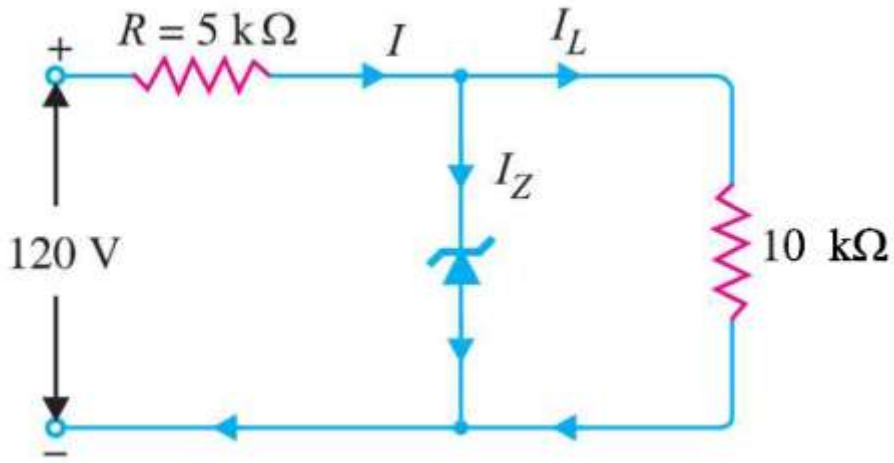
c) Using the Zener Diode circuit shown in figure 2, compute the following. Consider Zener Voltage (VZ)= 50V

I. State weather the Zener diode is in “On Stage” or “Off Stage”

II. Voltage across the 10 KΩ

III. Voltage drop through the series resister (R)

IV. Current through the diode (Iz) (12 Marks)



Q3

a) Draw the input characteristic curve for common emitter transistor. (4 Marks)

b) In the collection- feedback bias circuit V_{cc}= 12V of figure 2 compute (16 Marks)

i. The three transistor currents.

ii. Drop across R_c and R_B

iii. Value of V_{CE}

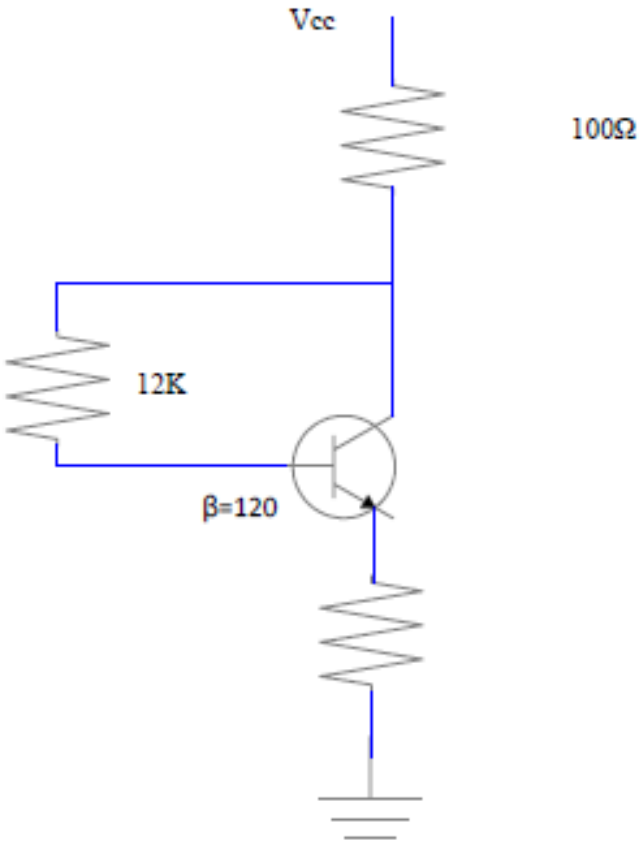


Figure 2

Q4

a. Draw logic circuit solutions for the below Boolean expression. (08 Marks)

i. $(A + B) \cdot \overline{C} \cdot (D + E) = Y.$

ii. $\overline{A} \cdot (B + C) \cdot D = Y.$

iii. $A + (B \cdot C) + \overline{D} = Y.$

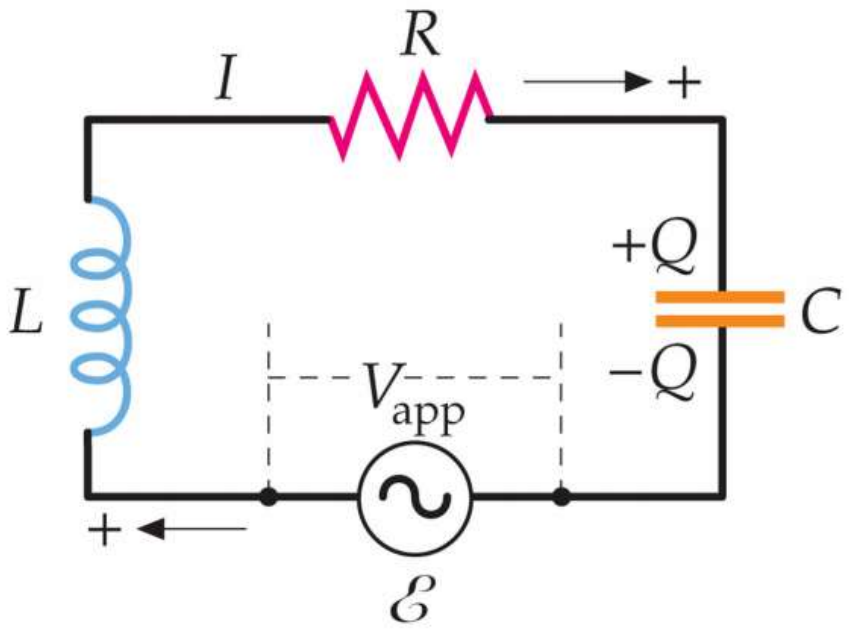
iv. $A \cdot B + \overline{C} + D \cdot E = Y.$

b. Simplify the Boolean expression from Karnaugh maps (K Maps) (12 Marks)

a) $A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + AB\bar{C} = Y$

b) $A\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}BCD + A\bar{B}\bar{C}D = Y$

Q5



R= 250 Ω, L = 1.20mH, C = 1.80 µF, V p = 120v, f = 60Hz Determine the following:

(a.) X L - Inductive reactance

(b.) X C - Capacitive reactance

(c.) Z - Impedance

(d.) θ - Phase angle

(e.) I p - Peak current

(20 Marks)