Shahjalal University of Science & Technology
Department of Electrical & Electronic Engineering
2nd year 2nd Semester Final Examination – December 2012
Course No: EEE 103
Course Title: Introduction to Electrical and Electronic Circuits
Credits : 2.0   Full Marks : 50   Time : 2 Hours

[Answer any four questions taking two from each group]

Group A

Q1 (a) Give the statement of ohm's law. Find the value of conductance from I-V curve.   7.5

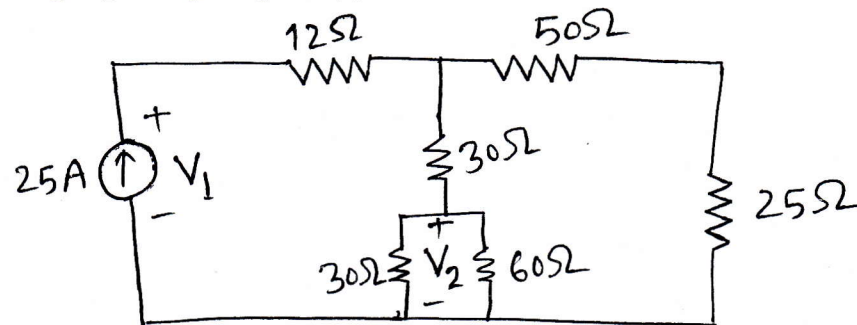(b) Find the voltage V_1 and V_2 in figure 1(b).   5

Fig 1(b)

Q2 (a) What is semiconductor diode? Draw the I-V characteristic curve and mention the forward and reverse region of semiconductor diode.   6

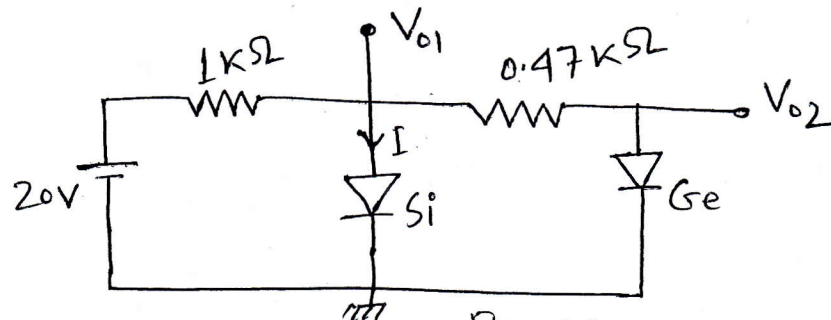(b) Determine V_{01}, V_{02} and I of the circuit shown in fig 2(b)   4

Fig 2(b)

(c) Calculate the phase angle between $i_1 = -4\sin(10t + 35^0)$ and $i_2 = 5\cos(10t - 45^0)$ 2.5
Does i_1 lead or lag i_2 ?

Q3 (a) Find the thevenin equivalent circuit in a-b terminal of fig 3(a). 6.5

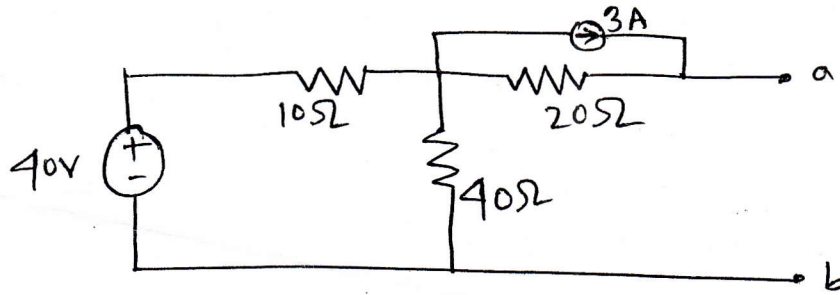Fig 3 (a)

(b) Propose and explain an equation for the charging and discharging phenomenon of a capacitor along with necessary figures. 6

Group B

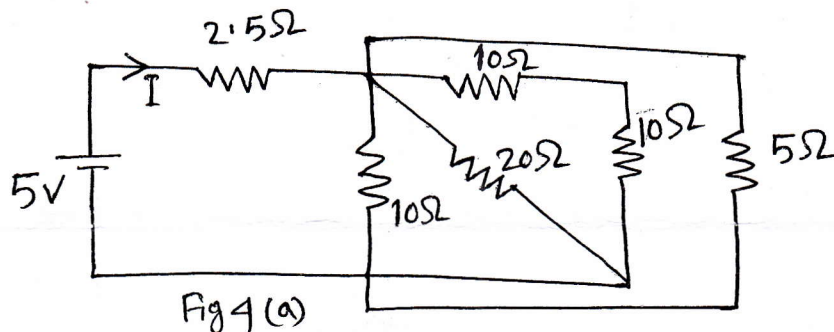Q4 (a) Find the value of current I of the circuit as shown in fig 4(a) 6

Fig 4 (a)

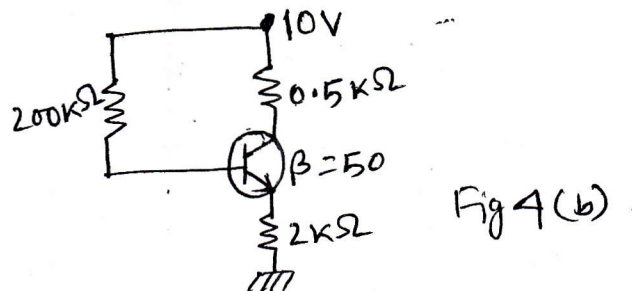(b) Determine I_B, I_E, V_{CE} and V_B for the transistor circuit in fig 4(b). 6.5

Fig 4 (b).

Q5 (a) Using Boolean algebra prove that 6
   i) (X+Y)(X+Z)=X+YZ
   ii) $\overline{AB} + AC + \overline{A}\overline{B}C = \overline{A} + \overline{B}\overline{C}$

(b) Write down few characteristics of an ideal and practical Op-Amp respectively. 2+2
(c) Design an inverting amplifier having gain 100 by using op-amp. 2.5

Q6 (a) Give the symbols, logic expressions and truth table of AND gate, OR gate and NOT gate respectively. 9
(b) What is counter? Distinguish between asynchronous and synchronous counter. 3.5