Basic Electronics (ECE113)
Assignment 2 **(40 marks)**

Q1. Calculate the power dissipated in the 40Ω resistor and the voltage labeled v_C in each of the circuits depicted in Fig. 1.

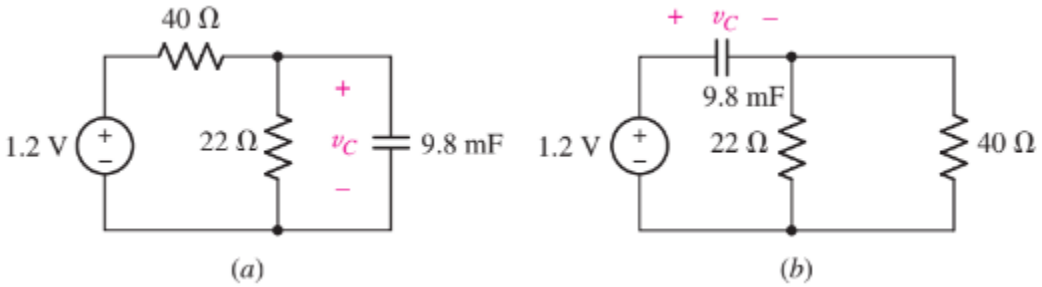

Fig.1 **(5 marks: 2.5+2.5)**

Q2. Determine the equivalent capacitance C_{eq} of the network shown in Fig. 2.

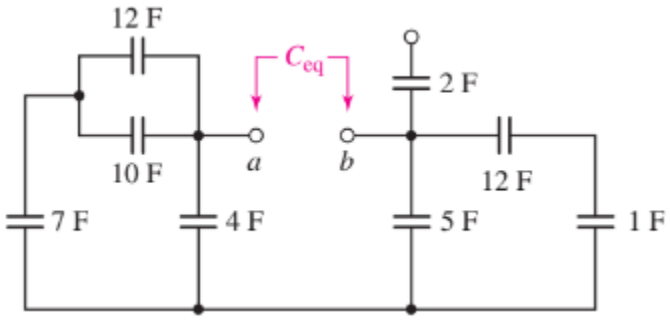

Fig.2 **(5 marks)**

Q3. Determine the equivalent inductance seen looking into the terminals marked a and b of the network represented in Fig. 3.

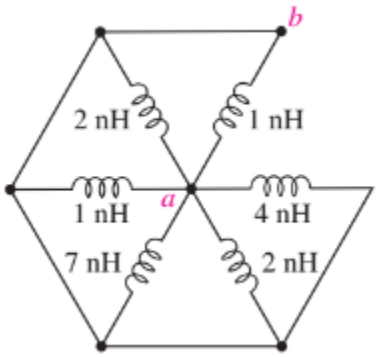

Fig.3

(5 marks)

Q4. (a) Write nodal equations for the circuit of Fig. 4. (b) Write mesh equations for the same circuit.

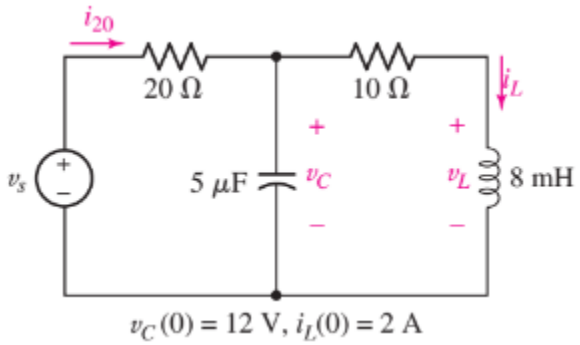

Fig.4

(5 marks:2.5+2.5)

Q5. For the circuit represented schematically in Fig. 5, (a) calculate $v(t)$ at t = 0, t = 984 s, and t = 1236 s; (b) determine the energy still stored in the capacitor at t = 100 s.

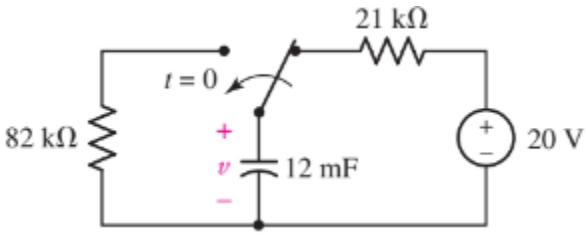

Fig.5

(5 marks:2.5+2.5)

Q6. For the circuit shown in Fig. 6, (a) obtain an expression for $i(t)$ valid for all time; (b) obtain an expression for $v_R(t)$ valid for all time; and (c) graph both $i(t)$ and $v_R(t)$ over the range of −1 s ≤ t ≤ 6 s.

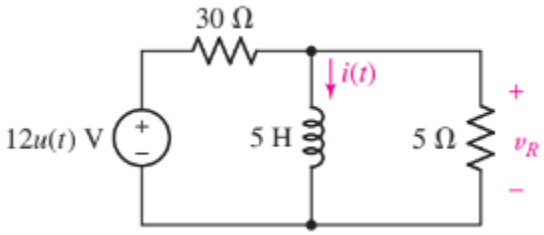

Fig.6

(5 marks:2+2+1)

Q7. (a) Obtain an expression for v_C in the circuit of Fig. 7 valid for all values of t. (b) Sketch $v_C(t)$ over the range 0 ≤ t ≤ 4 μs.

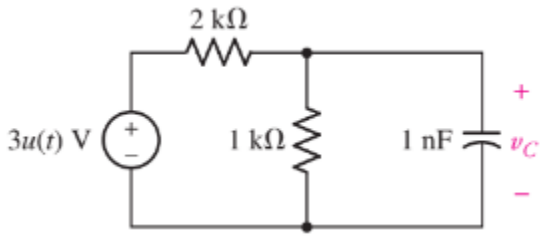

Fig.7

(5 marks:3+2)

Q8. Obtain an equation which describes the behavior of i_A as labeled in Fig. 8 over the range of −1 ms ≤ t ≤ 5 ms.

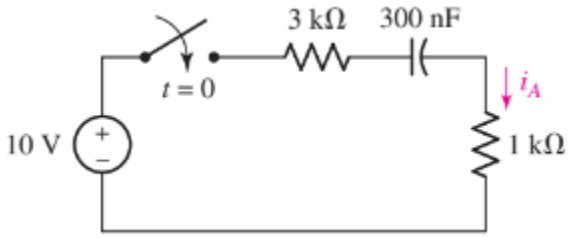

Fig.8

(5 marks)