Scottish Church College

Internal Assessment Examination, 2021
Basic Electronic Devices and Circuits
Semester II (Hons.)
CMSA
Paper: CC-4

**Time: 1 Hour**   **Full Marks: 30**

Answer Question 1 and any four (4) from the rest.

1.   **Answer any four questions**   **(1.5 x 4)**

    i.   List out the ideal characteristics of OPAMP.

    ii.   List the basic blocks of IC 555 timers.

    iii.   Why must the base be narrow for the transistor (BJT) action?

    iv.   What is multiplying DAC?

    v.   List the PN diode parameters.

    vi.   State the maximum power transfer theorem.

    vii.   What is the superposition theorem?

2.   **i.** What do you understand about transistor self biasing?

    ii. What are the factors that affect the bias of a transistor?   **[3 + 3]**

3.   **i.** Define diffusion capacitance of a diode

    ii. In your own words, define an intrinsic material, a negative temperature coefficient, and covalent bonding.   **[3 + 3]**

4. Define α and for a transistor. Derive relation between them. In a CE transistor circuit if β=100 and I_B=50μA. Compute the values of α,I_E and I_C. [6]

5. Calculate the output voltage using the circuit of the figure below for resistor components of value R_f = 470 k, R_1 = 4.3 k, R_2 = 33 k, and R_3 = 33 k for an input of 80 mV.
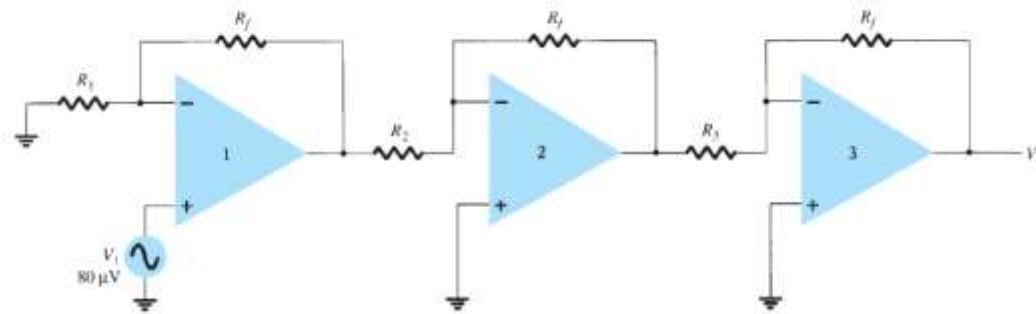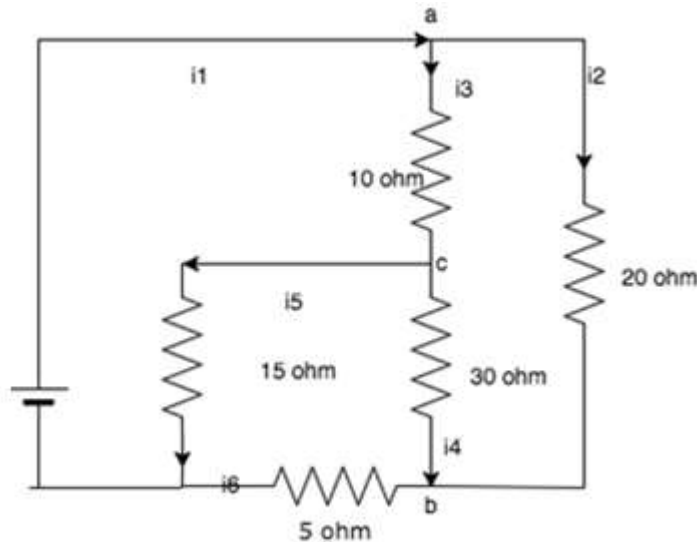

[6]

6. i. Define CMRR of an op-amp.

   ii. What do you mean by monostable multivibrator?

   iii. What is multiplying DAC? [2 + 2 + 2]
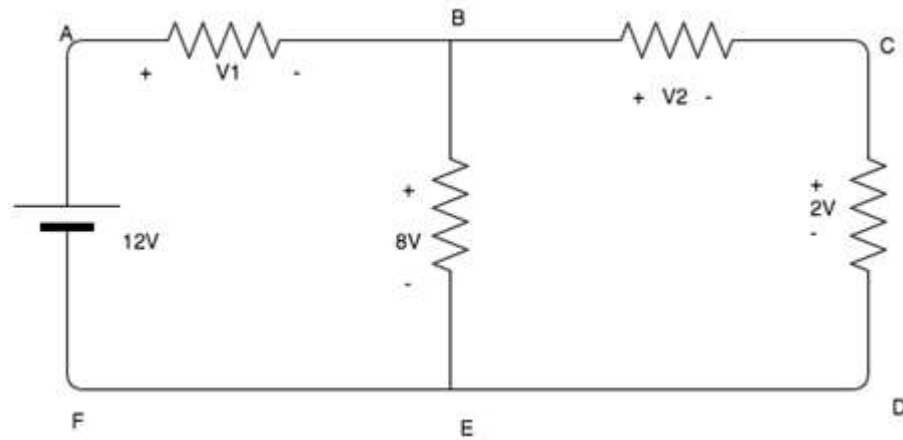
7. i. What is KCL?

   ii. Find the value of i2, i4 and i5 given that i1=3A, i3=1A and i6=1A.
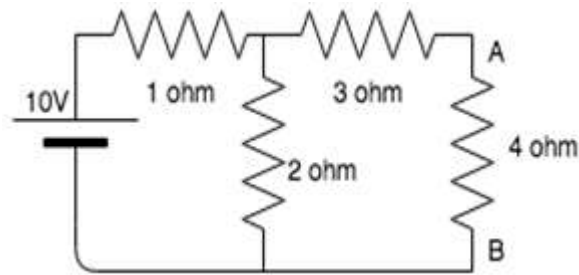

[4 + 2]

8. **i.** State Kirchhoff's Voltage Law. What physical quantity is conserved by this law?

ii. Calculate the value of V1 and V2.

[3 + 3]

9. **i.** Give Norton's theorem.

ii. Calculate the Thevenin resistance across the terminal AB for the following circuit:

[2 + 4]