Part C

Answer any **one** *full questions from each module.*
Each full question carries 12 *marks.*

Module I

11. (a) Draw and explain the voltage transfer characteristics of an op-amp.

    (b) For an op-amp PSRR = -70 dB (min), CMRR = 10^5 and differential mode gain $A_d = 10^5$. The output changes by 20 V in 4μsec. Calculate

        (i) numerical value of PSRR.

        (ii) common mode gain.

        (iii) slew rate.

Or

12. Three voltages V_1, V_2 and V_3 are available as output from three transducers. It is desired to get output voltage $V_0 = V_1 + 2V_2 - V_3$. Draw and design the circuit and derive the above gain formula used for your circuit.

Module II

13. Using an integrator and comparator, draw the op-amp circuit to generate a sweep of ±6volt peak-to-peak amplitude, 600 Hz, 60% duty cycle. Design the circuit values.

Or

14. Draw the circuit of an astable multivibrator using op-amp 741 and design it to generate square waves of ±6V peak-to-peak amplitude, 600 Hz, 60% duty cycle. Design your circuit values.

Module III

15. Draw the circuit of a second order active butterworth high pass filter and design it for a cut off at 1.6 kHz.

Or

16. With a block circuit diagram describe the working of a successive approximation ADC. Explain the help of a suitable example.

Module IV

17. Draw the FSK demodulator circuit using 565 and explain the working.

Or

18. With the help of internal functional diagram, explain the working of a 555 timer used as astable multivibrator. Complete the circuit diagram to generate 0 to 6 V, amplitude, 600 Hz, 60% duty cycle square waves. Design the circuit values.