

OR

- 6 a. Define Barhausen's criteria. Explain with design, phase shift oscillator and with relevant waveforms. (08 Marks)
- b. Show the realization of logarithmic amplifier using an op-amp. Obtain the expression for the output voltage. (08 Marks)

Module-4

- 7 a. Write a brief note on the following op-amp applications:
i) First order low pass filter (08 Marks)
ii) Second order high pass filter. (08 Marks)
- b. Design a single stage bandpass filter with frequency of $f_1 = 300\text{Hz}$ and $f_2 = 30\text{kHz}$. Also state whether the design is narrow band or wide band. Use 741 op-amp for designing. [Assume $c_2 = 1000\text{pF}$]. (08 Marks)

OR

- 8 a. Explain the working of a series regulator using op-amp. (06 Marks)
- b. With a neat internal diagram of IC723. Explain the functions of each block. Mention the advantages. (10 Marks)

Module-5

- 9 a. Explain D to A converter using R-2R network. (08 Marks)
- b. With a neat block diagram, explain the blocks of PLL. (08 Marks)

OR

- 10 a. Explain 555 timer as Monostable multivibrator with waveforms. (08 Marks)
- b. Explain the working of A to D converter using successive approximation method. (08 Marks)

