



# CBCS SCHEME

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18EE46

## Fourth Semester B.E. Degree Examination, Jan./Feb. 2021 Operational Amplifiers and Linear ICs

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Draw and explain the block diagram representation of Typical Op-amp with schematic symbol, equivalent circuit and ideal voltage transfer curve. (10 Marks)
- b. What are the ideal characteristics of the op amp? Also explain about Common Mode Rejection Ratio (CMRR) and slew Rate. (10 Marks)

OR

- 2 a. With a neat diagram explain about Instrumentation amplifier using transducer bridge. (10 Marks)
- b. Explain with neat diagrams about summing scaling and averaging amplifier in investing configuration. (10 Marks)

### Module-2

- 3 a. Draw and explain second order low pass butterworth filter with cut off frequency and voltage gain expressions. Also explain the design steps of above said filter. (10 Marks)
- b. Design a wide band pass filter with  $f_L = 200\text{HZ}$ ,  $f_H = 1\text{KHZ}$  and pass band gain = 4. Draw its circuit diagram and frequency response. (10 Marks)

OR

- 4 a. Draw the circuit of LM317 positive voltage regulator and LM337 negative voltage regulator. Also draw the pin configuration of LM317 and LM337 and briefly explain about it. (10 Marks)
- b. An unregulated dc power supply output changes from 22V to 21.6V when the load is increased from zero to maximum. The voltage also increases to 22.3V when the supply increases by 10%. Calculate the load and source effects and the load and line regulations. (10 Marks)

### Module-3

- 5 a. With a neat diagram explain about RC phase sift oscillator with expressions of frequency of oscillations and relationship of  $R_1$  and  $R_F$ . What are the two requirements of oscillations? (10 Marks)
- b. Explain about triangular wave generator with neat diagram and waveform. (10 Marks)

OR

- 6 a. With a neat diagram explain about inverting Schmitt trigger. Draw the input and output waveforms and hysteresis voltage curve. If a Schmitt trigger with UTP and LTP of different magnitude, what modifications should done on above Schmitt trigger circuit. (10 Marks)
- b. With a neat diagram and waveform, explain about frequency to voltage converter. (10 Marks)

### Module-4

- 7 a. With a neat diagram, explain the working of R-2R D/A converter (3bit). Calculate the output voltage for the 100,010,001, and 111 input combinations. (10 Marks)
- b. Draw the circuit of successive approximation ADC and explain its working. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 a. What is the main difference between precision full wave rectifier and normal full wave rectifier? With a neat diagram, explain the working of full wave precision rectifier. (10 Marks)
- b. With a neat diagram, explain the working of Integrated Circuit 8bit D/A converter. (10 Marks)

**Module-5**

- 9 a. What are the important components of discrete Phase-Locked Loops? Briefly explain each one with neat diagram. (10 Marks)
- b. What are the application of Phase Locked Loops. Explain the operating principle of PLL. (10 Marks)

OR

- 10 a. With the help of neat diagram and waveforms, explain the working of monostable multivibrator using 555 timer. (10 Marks)
- b. Briefly explain the application of monostable multivibrator with neat diagrams/waveforms. (10 Marks)

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