

# CBBCS Scheme

USN

1CR15EE078

15EE46

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018

## Operational Amplifiers and Linear IC's

Time: 3 hrs.

Max. Marks: 80

- Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. Standard resistance and capacitance data table may be used.  
3. 741 Datasheet allowed.

### Module-1

- 1 a. Draw the block diagram of Op-Amp and explain. (08 Marks)  
b. In the circuit of AC inverting amplifier  $R_{in} = 50\Omega$ ,  $C_i = 0.1\mu F$ ,  $R_1 = 100\Omega$ ,  $R_F = 1k$ ,  $R_L = 10k$  and supply voltages =  $\pm 15V$ . Determine the bandwidth of the amplifier. ( $\omega_{GB} = 10^6$ ,  $K = 0.909$  for 741 IC). (08 Marks)

OR

- 2 a. Derive the closed loop voltage gain equation for the voltage series feedback amplifier. (08 Marks)  
b. The circuit of peaking amplifier is to provide a gain of 10 at a peak frequency of 16KHz. Determine the values of all components. (08 Marks)

### Module-2

- 3 a. Derive the gain equation for first order low pass Butterworth filter. (08 Marks)  
b. With diagram, explain the adjustable output regulator. (08 Marks)

OR

- 4 a. Explain in detail the all pass filter. (08 Marks)  
b. Design an adjustable positive voltage regulator using LM317 for output voltage varying from 4 to 12V and output current of 1A. (08 Marks)

### Module-3

- 5 a. Design a RC phase shift oscillator for an output frequency of 5 KHz. Use LM741 with  $\pm 15V$  power supply. (08 Marks)  
b. With circuit diagram and necessary derivation for load current, explain voltage – to – current converter with grounded load. (08 Marks)

OR

- 6 a. Explain the oscillator amplitude stabilization with necessary figures. (08 Marks)  
b. Design a non inverting Schmitt trigger circuit to have  $u_{TP} = +3V$  and  $LTP = -5V$ . Use 741 Op-Amp with  $V_{CC} = \pm 15V$ . (08 Marks)

**Module-4**

- 7 a. Explain the precision full wave rectifier circuit as a combination of half wave rectifier and summing circuit. (08 Marks)  
b. With neat circuit explain three bit R – 2R DAC. (08 Marks)

**OR**

- 8 a. With diagram explain the working of Op-Amp sample and hold circuit. (08 Marks)  
b. Explain the dual slope ADC with the necessary figure. (08 Marks)

**Module-5**

- 9 a. With block diagram, explain phase locked loop in detail. (08 Marks)  
b. Sketch the circuit diagram of an Op-Amp monostable multivibrator, draw the circuit waveforms and explain its operation. (08 Marks)

**OR**

- 10 a. Write a note on applications of PLL IC 565. (08 Marks)  
b. Explain the Astable multivibrator circuit operation using Op-Amp. (08 Marks)

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