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Roll No. ....

**328551(28)**

**B. E. (Fifth Semester) Examination, April-May 2021**

**(New Scheme)**

**(Et&T Engg. Branch)**

**LINEAR INTEGRATED CIRCUITS &  
APPLICATIONS**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two from (b), (c) and (d) of each question. Any missing data may be suitably assumed.***

**Unit-I**

1. (a) Define CMRR. What should be its Ideal Value? 2

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- (b) What is the concept of virtual ground in an operational amplifier? For voltage series feedback amplifier, derive expression for input and output resistance with feedback. 7
- (c) Define Slew Rate. What causes slew rate? How is slew rate measured? An operational amplifier has a slew rate of  $2 \text{ V}/\mu\text{sec}$ . If the peak output is  $15 \text{ V}$ , what is the power bandwidth? 7
- (d) For an op-amp the value of  $R_F$  and  $R_1$  are  $100 \text{ k}\Omega$  and  $1 \text{ k}\Omega$  respectively. It is an inverting amplifier with input offset voltage drift of  $14 \mu\text{V}/^\circ\text{C}$  and input offset current drift of  $0.5 \text{ nA}/^\circ\text{C}$ . The amplifier is nulled at  $25^\circ\text{C}$ . Calculate the error voltage  $E_V$  and the output voltage at  $45^\circ\text{C}$  if the input is  $7 \text{ mV dc}$ . 7

### Unit-II

2. (a) What is a Voltage Follower? Draw its circuit diagram. 2

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- (b) Explain the operation of practical integrator circuit using operational amplifier and also draw its frequency response. 7
- (c) Draw the circuit of a full wave precision rectifier and explain how it behaves as absolute value circuit. Draw waveforms. 7
- (d) Design a three op-amp instrumentation amplifier to vary a gain from 1 to 10,000. 7

### Unit-III

3. (a) Define Resolution and Monotonicity. 2
- (b) Define and explain the specification of Digital to Analog Converter (DAC). 7
- (c) Explain Dual Slope Analog to Digital Converter with its functional diagram and explain the function of each component used. 7
- (d) Explain the successive approximation A/D converter technique with the help of block diagram. 7

### Unit-IV

4. (a) Define Safe Operating Area (SOA). 2
- (b) List and explain the characteristics of Voltage Regulator. 7
- (c) Explain how adjustable voltage regulator IC works. Derive the expression for the output voltage for LM337 adjustable voltage regulator? 7
- (d) Explain internal structure of IC 723. Also explain the pins of IC 723. 7

**Unit-V**

5. (a) Define lock range and capture range. 2
- (b) Draw the block diagram of PLL and explain the working of each block. 7
- (c) Explain the working of PLL as an AM detector and as frequency synthesizer. 7
- (d) Explain the following application of multiplier along-with necessary circuit diagram : 7
- (i) Square rooting circuit
- (ii) RMS calculator