Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17EC2015** | **Duration :** | **3hrs** |
| **Sub. Name :** | **LINEAR INTEGRATED CIRCUITS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Explain the working of basic BJT current mirror circuit with neat circuit diagram and necessary equations. | CO1 | 10 |
| b. | Write short notes on the following.  i) Input Bias current.  ii) Input Offset current. | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Illustrate the construction and working of op-amp based instrumentation amplifier. | CO1 | 10 |
| b. | Show with the help of circuit diagram an op-amp that can be used as,  i) Inverting Amplifier.  ii) Non-Inverting Amplifier. | CO1 | 10 |
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| 3. | a. | Given R1= 2 kΩ ,R2= 1 kΩ, R3= 4 kΩ , Rf=4 kΩ, V1 = 2 V, V2 =3 V and V3 = 1 V respectively. Calculate the output voltage Vo for the circuit shown. | CO1 | 6 |
| b. | Analyze the working of a circuit which gives the output waveform as the derivative of its input and also whose input impedance will decrease with increase in frequency which makes the circuit as noise sensitive. | CO1 | 14 |
| **(OR)** | | | | |
| 4. | a. | Trace the output waveform of half wave rectifier and explain its operation. | CO1 | 4 |
| b. | Discuss how positive feedback will increase the gain of a comparator with suitable equations for upper (VUT) and lower threshold voltage (VLT) | CO1 | 12 |
| c. | Calculate VREF for the circuit. Given R1=2 kΩ, R2=4kΩ, Vcc=12 V. | CO1 | 4 |
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| 5. | a. | Design a second order Butterworth high pass filter having lower cut off frequency 1kHz. | CO2 | 10 |
| b. | List the applications of PLL . With relevant block diagram, explain the functionality of a PLL circuit and its operation | CO6 | 10 |
| **(OR)** | | | | |
| 6. | a. | Design a wide band reject filter having fl=400Hz, fh=2kHz and pass band gain of 4. Find the value of Q of the filter. | CO2 | 10 |
| b. | Give the circuit diagram of weighted resistor digital to analog converter and explain its operation with an example. | CO3 | 10 |
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| 7. | a. | Discuss the working of the flash type Analog to Digital Converter with neat diagram. | CO3 | 6 |
| b. | Show the circuit diagram of the RC phase shift oscillator and derive an equation to find the frequency of oscillations of the oscillator. | CO5 | 14 |
| **(OR)** | | | | |
| 8. | a. | Design a Wien’s bridge oscillator to oscillate at a frequency of 1000Hz and explain its operation. | CO5 | 8 |
| b. | Explain the working of the Astable multivibrator and derive a suitable equation to find its frequency of oscillations. | CO5 | 12 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Outline the mechanism of 555 IC timer for generating accurate time delay with neat functional block diagram. | CO4 | 10 |
| b. | Interpret the principle of IC723 regulator with neat diagram. Also discuss the limitations of linear voltage regulators. | CO5 | 10 |