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



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

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| **Code :** | **14EC2008** | **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. | Discuss the Inverting and Non-inverting amplifier using op-amp circuit and derive the expression for gain with a diagram. | CO1 | 10 |
| b. | Design an adder-subtractor circuit using op-amp to get the output V0= (V3+V4)-(V1+V2). Prove the expression by using super position principle. | CO1 | 10 |
| **(OR)** | | | | |
| 2. |  | With necessary circuit diagrams, prove that the operational amplifier can be used as a Differentiator. State the problems associated with the basic differentiator and design a practical differentiator to overcome the drawbacks. | CO1 | 20 |
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| 3. | a. | A Schmitt trigger circuit with R2=100Ω, R1=50KΩ, Vref= 0V, Vi=1 Vpp (peak to peak) sine wave and saturation voltages are +14V &-14V. Determine threshold voltages VUT and VLT. | CO1 | 5 |
| b. | Explain the working of precision diode as half wave rectifier and full wave rectifier with necessary circuits and input/output waveforms. | CO1 | 15 |
| **(OR)** | | | | |
| 4. | a. | State the Barkhausen criterion. With suitable circuits, predict the expression for the frequency of Phase shift oscillator. | CO1 | 10 |
| b. | Derive the expression for time constant for a monostable multivibrator using IC741 op-amp with necessary explanation. | CO1 | 10 |
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| 5. | a. | Draw the diagram of the functional block diagram of 555 IC timer and explain how it is used for generating accurate time delay or oscillation. | CO2 | 10 |
| b. | Design a wide band reject filter having fl = 400Hz, fh = 2 kHz and pass band gain of 4. | CO1 | 10 |
| **(OR)** | | | | |
| 6. | a. | Design a fourth order Butterworth low pass filter having upper cut-ff frequency 1 kHz. | CO1 | 10 |
| b. | Explain the working of Astable multivibrator using IC 555 timer and derive the expression for time period(T). | CO2 | 10 |
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| 7. | a. | Design an analog to digital converter circuit with R-2R type for the binary input 100. | CO3 | 10 |
| b. | Explain the functional modules of a Phase locked loops with the necessary diagrams. | CO3 | 10 |
| **(OR)** | | | | |
| 8. | a. | How will you encode a digital data from an analog signal using successive approximation technique? Explain with an example. | CO3 | 10 |
| b. | Summarize the working principle of IC723 general purpose voltage regulator. | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Describe in detail the planar process used in the fabrication of IC with neat diagrams. | CO3 | 20 |