Reg. No. :

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Third Semester

Electronics and Instrumentation Engineering

14UEI302 - LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

(Regulation 2014)
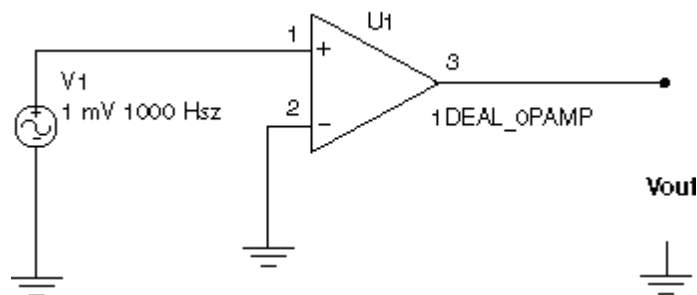
Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. An ideal operational amplifier has

    (a) infinite output impedance   (b) zero input impedance
    (c) infinite bandwidth   (d) all of the above

2. Input impedance of an inverting amplifier is approximately equal to

    (a) Ri   (b) Rf + Ri   (c) ∞   (d) Rf - Ri

3. Evaluate the output waveform of the circuit?

    (a) sine wave   (b) square wave
    (c) sawtooth wave   (d) triangle wave

4. If the gain of a closed-loop inverting amplifier is 3.9, with an input resistor value of 1.6 *kilo ohms*, discriminate the value of feedback resistor?

    (a) 6240 *ohm*s   (b) 2.4 *kilo ohms*   (c) 410 *ohms*   (d) 0.62 *kilo ohms*

5. The Schmitt trigger is a two-state device that is used for

    (a) pulse shaping   (b) peak detection
    (c) input noise rejection   (d) filtering

6. Evaluate the maximum conversion time of a clock rate of 1 *MHz* operating a 10-stage counter in an ADC.

    (a) 1.024 *s*   (b) 102.3 *ms*   (c) 1.024 *ms*   (d) 10.24 *ms*

7. In a PLL, to obtain lock, the signal frequency must

    (a) come within the lock range
    (b) come within the capture range
    (c) be less than the capture frequency
    (d) be greater than the capture frequency

8. An astable multivibrator is also known as a

    (a) one-shot multivibrator   (b) free-running multivibrator
    (c) bistable multivibrator   (d) monostable multivibrator

9. An amplifier that offers electrical isolation between its input and output terminals

    (a) Power amplifier   (b) Isolation amplifier
    (c) Video amplifier   (d) Optocoupler

10. How many Vcc connection does the 565 PLL use?

    (a) 0   (b) 1   (c) 2   (d) 3

<center>PART - B (5 x 2 = 10 Marks)</center>

11. Point out the reason why IC 741 is not used for high frequency applications?

12. Summarize the need for frequency compensation in practical op-amps.

13. List the features of instrumentation amplifier.

14. For perfect lock, illustrate the phase relation between the incoming signal and VCO output signal?

15. What is an opto-coupler IC? Give examples?

<center>2</center>

16. (a) Explain briefly about fabrication process of monolithic ICs.   (16)

Or

(b) (i) Sketch the internal circuit of an op-amp.   (6)
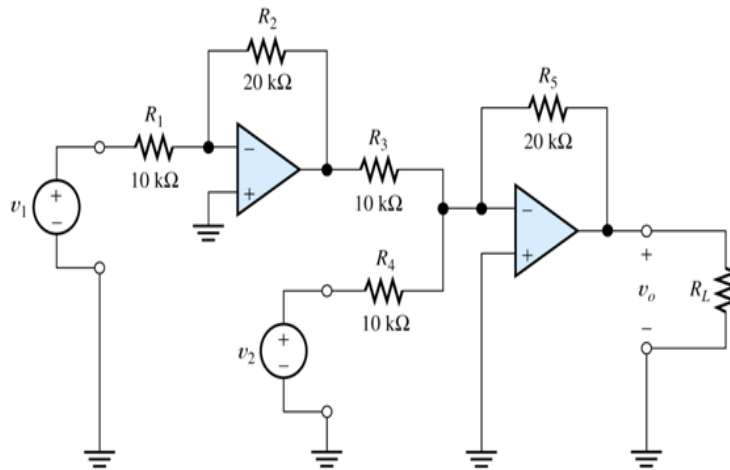
(ii) Discuss in detail about ideal op-amp characteristics.   (10)

17. (a) (i) Illustrate briefly about op-amp summer.   (8)

(ii) Prove that op-amp acts as a integrator.   (8)

Or

(b) (i) Deduce the expression for the output voltage in the amplifier circuit.   (10)

(ii) Experiment the methods of improving slew-rate in two-stage Op-amps.   (6)

18. (a) (i) With neat circuit diagram explain about instrumentation amplifier.   (10)

(ii) Discuss about R-2R ladder network for D/A converters briefly.   (6)

Or

(b) (i) Explain the principle of operation of successive approximation ADC.   (8)

(ii) Draw and explain about sample and hold circuits.   (8)

19. (a) (i) Derive the expression for voltage to frequency conversion factor.   (6)

(ii) Describe the application of PLL.   (10)

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(b) (i) What is 555 timer? What are the features of 555 timer? Explain the monostable mode in detail? (10)

(ii) Derive the expression for frequency of oscillation in monostable mode. (6)

20. (a) (i) Design a adjustable voltage regulator using IC 723 to obtain positive low voltage and high voltage. (10)

(ii) Write short notes on opto couplers? (6)

Or

(b) (i) Discuss in detail about isolation amplifier. (8)

(ii) Explain the functional diagram of LM 380 power amplifier. (8)

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