Reg. No.

Question Paper Code : **57287**

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

Third Semester

Electronics and Communication Engineering

EC 6404 – LINEAR INTEGRATED CIRCUITS

(Common to Medical Electronics and Robotics and Automation Engineering)

(Regulations 2013)
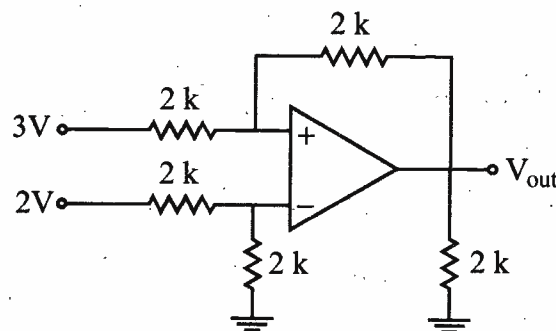
Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Find the maximum frequency for sine wave output voltage 10 V peak to peak with an op-amp whose slew rate is 1 V/μs.

2. Differentiate the ideal and practical characteristics of an op-amp.

3. Calculate the output voltage for the circuit shown below :

4. Draw the circuit diagram of a comprarator. Mention its applications.

5. What is a four quadrant multiplier ?

6. Draw the circuit diagram of a PLL circuit using as a FM detector.

7. A 12 bit D/A converter has resolution of 20 mV/LSB. Find the full scale output voltage.

8. Draw the binary ladder network of DAC. If the value of the smaller resistance is 10 k, what is the value of the other resistance ?

9. A Hartley oscillator has L_1 = 10 mH, L_2 = 5 mH and C = 200 pF. Calculate the frequency of oscillation.

10. What is an isolation amplifier ? Mention its applications.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) With a schematic diagram, explain the effect of R_E on CMRR in differential amplifier. **(4)**

    (ii) Discuss about the methods to improve CMRR. **(12)**

OR

(b) (i) Write a note on stability criteria and frequency compensation technique applied in op-amp. **(12)**

    (ii) A non-inverting amplifier with a gain of 300 having an impact offset voltage of ± 3 mV. Find the output voltage when the input is 0.01 sin ωt volt. **(4)**

12. (a) (i) Draw the circuit diagram of an instrumentation amplifier and explain its operation. List few applications. **(12)**

    (ii) How an op-amp can be used as an log amplifier ? **(4)**

OR

(b) (i) Design a second order high pull Butter worth filter having cut off frequency of 5 kHz. **(6)**

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(ii) What is a precision rectifier. With circuit schematic explain the working principle of full wave rectifier. **(6)**

(iii) Determine the output voltage for the following circuit shown in figure. **(4)**
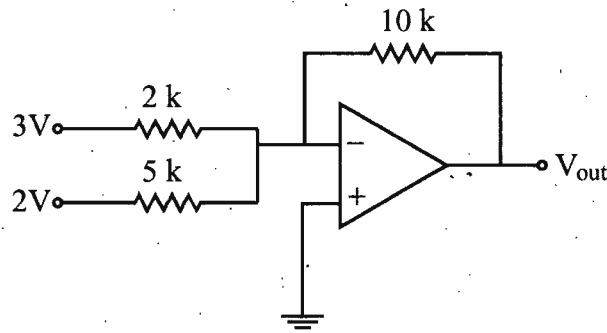
13. (a) Explain the working principle of four quadrant variable form transconductance multiplier. **(16)**

OR

(b) (i) Discuss the principle of operation of NE 565 PLL circuit. **(10)**

(ii) How can PLL be modelled as a frequency multiplier ? **(6)**

14. (a) (i) Explain the successive approximation type A/D converter. **(12)**

(ii) Narrate the functions of analog switches. **(4)**

OR

(b) (i) State the significance of using high speed sample and hold circuits. Explain its working principle. **(12)**

(ii) Compare the performance of various DACS. **(4)**

15. (a) (i) Briefly write the working principle and functionalities of LM 380 audio amplifier. **(8)**

(ii) Draw the schematic of a linear IC saw tooth waveform generator and explain the circuit operation. **(8)**

OR

(b) (i) Summarise the working principle of IC 723 general purpose voltage regulator. **(12)**

(ii) A 555 timer is configured in actable mode with $R_A = 2$ k ohm $R_B = 6$ k ohm and C = 0.1 μF. Determine the frequency of oscillation. **(4)**

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