Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5057]-2072

S.E. (Instrumentation & Control) (First Semester)

EXAMINATION, 2016

LINEAR INTEGRATED CIRCUITS

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Solve Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6** Q. No. **7** *or* Q. No. **8**.

(*ii*) Figures to the right indicate full marks.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Use of calculator is allowed.

(*v*) Assume suitable data, if necessary.

1. (*a*) Define common mode rejection ratio, supply voltage rejection ratio, offset voltage of an op-amp cop-amp = operational amplifier) [6]

(*b*) Design an inverting closed loop amplifier using IC 741. Choose closed loop voltage gain of 10 (gain magnitude-ten). Draw circuit diagram. [6]

P.T.O.

Or

2. (*a*) Draw pin diagram of IC741 and give pin names. [6]

(*b*) Design a non-inverting closed loop amplifier using op-amp for a voltage gain of 200. Draw circuit diagram. [6]

3. (*a*) Design an inverting summing amplifier when the input voltage to be added/summed are :

$$V_a = +1V,\ V_b = +2V,\ V_c = +3V$$

Assume input side resistors as $R_a = R_b = R_c = 3\ k\Omega$. Feedback resistor is of 1 kΩ. Vsupply = ± 15 V. Determine the output voltage. [3]

(*b*) Draw circuit diagram for above-question Q 3a. [3]

(*c*) Design an inverting Schmitt trigger with :

LTP = –7.5 volts, UTP = +7.5 volts. Let magnitude of saturation voltage of op-amp 741C be 14 volts. Let maximum output voltage swing be ± 14 volts. Draw circuit diagram. [6]

Or

4. (*a*) Draw circuit diagram for practical integrator and practical differentiator op-amp. [6]

(*b*) How precision rectifier with op-amp works ? Explain precision full wave rectifier with op-amp. [6]

5. (*a*) Write a short note on astable multi-vibrator using IC-555 timer. [6]

(*b*) Draw capacitor waveforms and output voltage for Q5(a). [6]

(*c*) How monostable multivibrator circuit is different from astable multivibrator. Explain in one statement. [1]

Or

6. (*a*) Write a short note on IC 7805. [8]

(*b*) Write a short note on switching regulator. [5]

Note : Circuit diagrams in above questions carry *three* marks each.

7. (*a*) Define filter. [2]

(*b*) Give filter classification. [4]

(*c*) List commonly used filters. [4]

(*d*) How is order of filter decided ? [3]

Or

8. (*a*) Design a low pass filter (first order) for a cut-off frequency of 2 kHz with a pass band gain of 2. (Active filter). [5]

(*b*) Design an active high pass filter at a cut-off frequency of 1 kHz with a passband gain of 2. [5]

(*c*) What is center frequency f_c ? [2]

(*d*) What is Q (figure of merrit) ? How is it related with bandwidth ? [1]