

(Following Paper ID and Roll No. to be filled in your  
Answer Books)

**Paper ID : 131651**

Roll No.

## B.TECH.

Theory Examination (Semester-VI) 2015-16

### ANALOG SIGNAL PROCESSING

*Time : 3 Hours*

*Max. Marks : 100*

#### Section-A

1. **Attempt all parts. All parts carry equal marks. Write answer of each part in short.** (2×10=20)

- (a) List two linear and two non-linear applications of op-amp.
- (b) What is voltage limiting and why is it needed?
- (c) Give differences between a normal rectifier and precision rectifier.
- (d) Draw the circuit diagram and write the transfer function of a first order passive low pass filter.
- (e) Give principal difference between Operational amplifier and Operational Transconductance Amplifier.

- (f) Draw frequency and phase response of a non inverting differentiator.
- (g) What is Negative Impedance Inverter?
- (h) Define the basic principle of an rms to dc converter.
- (i) Enlist the applications of the Voltage Limiter circuit.
- (j) Define the characteristics of a Grounded Inductor.

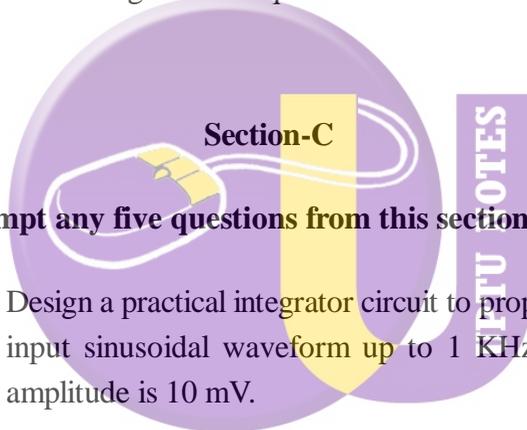
### Section-B

2. Attempt any five questions from this section.

(10×5=50)

- (a) Design an active high pass filter with a cut-off frequency of 1Khz and a pass band gain of 2. Plot the frequency response curve of the same.
- (b) List the basic characteristics of comparator. What is the difference between basic comparator and the Schmitt trigger?
- (c) Design a circuit using analog multiplier which produces the equation  $V_o \propto (V_{s1} \cdot V_{s2})^{1/2}$ .
- (d) Draw the circuit of a passive second order High Pass filter using Resistance, Inductance and capacitance. Convert the same to an active filter using OTA.

- (e) Explain the difference between integrator and differentiator and give one application of each.
- (f) Design a differentiator that will differentiate an input signal with  $f_{\max} = 100$  Hz.
- (g) Explain the operation of a precision AC/DC converter with the help of a neatly labeled circuit diagram.
- (h) Explain the working of op-amp based NIC with proper circuit diagram and equations.



**Note: Attempt any five questions from this section. (15×2=30)**

- 3.
  - (i) Design a practical integrator circuit to properly process input sinusoidal waveform up to 1 KHz. The input amplitude is 10 mV.
  - (ii) Explain the working of op-amp as an amplitude demodulator.
- 4.
  - (i) Draw the circuit of capacitance multiplier and find the equivalent circuit of the impedance you obtain.
  - (ii) Draw and find the transfer function of an integrator circuit using OTA.

5. (i) Design a summing amplifier to add three dc input voltages. The output of this circuit must be equal to two times the negative sum of input.
- (ii) Detail the working of log and antilog amplifier.

