

Seat No. : 2535

AG-113

April-2017

B.Sc., Sem.-VI

CC – 307 : Electronics

Time : 3 Hours]

[Max. Marks : 70

- Instructions :** (1) All questions carry equal marks.
(2) Figures on the right side indicate marks.
(3) Symbols have their usual meanings.

1. (a) Draw the circuit diagram of log amplifier Op-Amp and derive the equation for its output voltage. Which types of problem involved with the circuit and how are they overcome? 8

OR

Using multiplier IC, explain how to get

- (1) Multiplication of two sine waves of the same frequency, and
(2) Square of the given analog signal
- (b) Explain, with the circuit diagram an inverting Op-Amp comparator in which time varying signal is applied to inverting input and V_{ref} ($V_{ref} > 0$) is applied to the non-inverting input. Sketch input and output waveforms with reference voltage. 6

OR

Describe Op-Amp as an integrator and explain its frequency response.

2. (a) Draw the block diagram of the phase-locked loop (PLL) and describe the function of each block. Also explain some important characteristics of the PLL. 8

OR

Draw Edge triggered phase detector connection and logic circuit diagram. Explain its operation with input-output waveforms. What are the advantages of edge triggered phase detector over the exclusive-OR detector?

- (b) Explain the use of IC 565 PLL as AM demodulator. 6

OR

Describe the frequency multiplier using IC 565 PLL.

3. (a) Draw the circuit diagram of an SCR full wave rectifier. Explain its working and obtain expression for average output voltage and output current. 8
- OR**
- Draw the equivalent circuit of an SCR and explain its working from the equivalent circuit.
- (b) Discuss V-I characteristics of an SCR. 6
- OR**
- Describe an application of an SCR as static contactor.
4. (a) Draw circuit diagram of UJT relaxation oscillator. Explain its working and obtain the expression for frequency of oscillation. 7
- OR**
- Explain the construction and operation of Diac. Mention the application of a Diac.
- (b) Explain the construction and working of Triac. 7
- OR**
- Describe any one important application of a Triac.
5. Answer the following questions in one or two sentences : 14
- (1) Give the full form of VCO and LPF.
 - (2) What is the major difference between digital and analog PLLs ?
 - (3) What will be the output voltage for antilog amplifier ? Given data : $K = 1$, $V_m = 1 \text{ V}$, $V_{ref} = .1 \text{ V}$.
 - (4) For Op-Amp comparator, $V_{NINV} = 10 \text{ mV}$, $V_{INV} = 20 \text{ mV}$, supply voltage = 15 V , then $V_{load} = \underline{\hspace{2cm}}$.
 - (5) Why an SCR is made of silicon and not germanium ?
 - (6) How does SCR differ from ordinary rectifier ?
 - (7) Define Holding current of SCR.
 - (8) Why SCR cannot be used as a bidirectional switch ?
 - (9) Give the circuit diagram of UJT as an over voltage detector.
 - (10) What are the advantages of SCR switch over a mechanical switch ?
 - (11) What are the advantages of a triac over on SCR ?
 - (12) Why is diac used to trigger a triac ?
 - (13) Draw the circuit diagram and symbol of a summing integrator using Op-Amp.
 - (14) Why integrators are preferred over differentiator for analog computers ?