

Day: **Saturday**
Date: **02/06/2018**

S-2018-2291

Time: **10.00 AM TO 01.00 PM**
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labelled diagrams **WHEREVER** necessary.
- 4) Use of non-programmable **CALCULATOR** is allowed.

Q.1 Discuss the characteristics of an ideal OP- amp. Compare ideal and practical op- amps. **(10)**

OR

- Q.1** a) Sketch the schematic symbol for an op-amp and identify all terminals. **(04)**
b) Define the following terms: **(06)**
i) CMRR ii) input offset voltage iii) Slew rate

Q.2 Draw a circuit diagram for an inverting amplifier using an op-amp graphic symbol. Discuss the circuit operation, and derive the equation for the closed loop voltage gain. **(10)**

OR

Q.2 Sketch the circuit of a two-input inverting summing amplifier. Discuss the operation of the circuit and derive an equation for the output voltage. **(10)**

Q.3 Draw the circuit diagram of sample and hold circuit and define its any four characteristics. **(10)**

OR

Q.3 Design an inverting Schmitt trigger with $V_{UT} = V_{LT} = 3V$ and $\pm V_{CC} = \pm 12V$. **(10)**
Draw its circuit diagram, input- output waveforms and Hysteresis.

Q.4 Show how a band pass filter can be constructed by using a low-pass and high-pass filter. Sketch the expected A_v/f response graph and discuss the filter operation. **(10)**

OR

Q.4 Design a first order high pass filter using an op-amp with cut off frequency of 1kHz with pass band gain of 2. **(10)**

Q.5 Design a basic 555 astable multivibrator to generate 1KHz output with a 75% duty cycle. Use 15V power supply. **(10)**

OR

- Q.5** a) Draw the block diagram of IC 565. Discuss the operation of each block in detail. **(07)**
b) Calculate the ON duration of a 1KHz pulse generator with 20% duty cycle. **(03)**

Q.6 Sketch the circuit of a 3- input R-2R DAC, and derive its output equation. Discuss how the R-2R DAC performance improves to that of the weighted-resistor DAC. **(10)**

OR

Q.6 Draw the circuit diagram of I-V converter using an op-amp and derive its output equation. Also discuss any one application of I-V converter with its circuit diagram. **(10)**