

(3 Hours)

[Total Marks: 80]

- N.B.:** (1) Question No. 1 is compulsory.
 (2) Solve any three questions from the remaining five.
 (3) Figures to the right indicate full marks.
 (4) Assume suitable data if necessary and mention the same in answer sheet.

- Q.1** Attempt any 4 questions:
- (A) Draw a neat circuit of Voltage to Current converter with floating load. Give its output expression. [05]
 - (B) Draw a neat diagram of non-inverting Schmitt trigger and its voltage transfer characteristics. [05]
 - (C) Discuss the various parameters of op-amp. [05]
 - (D) Draw the functional block diagram of IC 723. [05]
 - (E) Draw a neat circuit of half wave precision rectifier. Draw its input and output waveforms. [05]
- Q.2** (A) What is an instrumentation amplifier? Design an instrumentation amplifier using 3 op-amps for gain variation of 0.5 to 100. [10]
 (B) With the help of a functional block diagram explain the working of voltage regulator LM317 to give an output voltage variable from 5 V to 10 V to handle maximum load current of 500 mA. [10]
- Q.3** (A) Draw a neat circuit with all the component values of astable multivibrator using IC 555 to obtain 40% duty-cycle. [10]
 (B) Design a second order Butterworth high pass filter for cut off frequency of 1 kHz and pass-band gain of $AF=2$. [10]
- Q.4** (A) Draw the circuit diagram of a square and triangular waveform generator using op-amps and explain its working with the help of waveforms. For variation in duty cycle what is the modification needed in the circuit. [10]
 (B) Design a voltage regulator using IC 723 to give $V_o = 10$ V to 32 V and output current of 2 A. [10]
- Q.5** (A) Draw a neat circuit diagram of RC phase shift oscillator using op-amp. Derive its frequency of oscillation. What are the values of R and C if its frequency of oscillation is 2 kHz? [10]
 (B) Draw a mod-7 counter using IC 7490. Draw its timing diagram. [10]
- Q.6** Write short notes on: (Attempt any two)
- (A) Power amplifier LM380. [10]
 - (B) IC 74181 Arithmetic Logic Unit. [10]
 - (C) Internal structure of IC 7493. [10]
