

T.E. (EXTC) Csem-V) CCBSGS) (R-2012)

(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) What is the need of negative feedback in op-amp based circuit? [05]
 - (b) What is input offset voltage and output offset voltage of an op-amp? [05]
How to measure it practically?
 - (c) With the help of a neat circuit diagram explain the working of Multiplier 534. [05]
 - (d) Give the working principle of switching regulator. [05]
 - (e) Draw mod-10 ripple counter using IC 7490. [05]
- Q.2**
- (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) Explain IC 555 as astable multivibrator and hence design an astable multivibrator using IC 555 to obtain 50% duty cycle. [10]
- Q.3**
- (a) Design a second order Butterworth high pass filter for cut off frequency of 1 kHz and pass-band gain of $AF=2$. [10]
 - (b) With the help of a neat circuit diagram explain the working of IC 74163 synchronous 4 bit binary counter. [10]
- Q.4**
- (a) Design a voltage regulator using IC 723 to give output voltage $V_o = 5\text{ V}$ to 15 V and output current of 2 A . [10]
 - (b) With a neat circuit explain the working of window detector using op-amp. Give its application. [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-10 counter using IC 7493. Draw its timing diagram. [10]
- Q.6** Write a note on: (Attempt any two)
- a) Instrumentation amplifier. [10]
 - b) Full wave precision rectifier. [10]
 - c) 74181 ALU. [10]
