SE MECA SEM-IV 3) Sub - AIC Dt- 21-12-16.

Q. P. Code : 723803

(3 Hours) Max marks 80

N.B. : 1) Question **no. 1** is **compulsory**
2) Attempt **any three** questions out of the remaining **five**
3) Assume suitable data wherever necessary, with proper justification

1. Solve any four (**All subparts carry 5 marks each**)
   a) Explain resolution, accuracy and settling time with respect to DAC
   b) State the important ideal characteristics of an op-amp, compare it with the values of IC 741 op-amp.
   c) Explain Barkhausen criterion.
   d) Explain Schmitt trigger. Draw its VTC.
   e) What do you understand by Input Bias current of an op-amp, How it can be measured practically. What should be its ideal value.

2. a) Design a 15KHz generator with IC 555 using 47 μF capacitor for a 60% duty cycle. Draw the waveforms 10
   b) Draw and explain OPAMP based square wave and triangular wavegenerator. How is duty cycle modulation achieved? 10

3. a) Explain in detail R-2R ladder DAC. 10
   b) Explain narrow band, band pass RLC filter with circuit diagram and derive its transfer function. Also find expression for its Q factor and cutoff frequency.

4. a) Explain RC phase shift oscillator and derive the relation for its frequency of oscillation. 10
   b) What are different possible IC 723 based voltage regulator. Design voltage Regulator to give Vo = 9V at 600 mA using IC 723. . Draw the circuit diagram of the designed circuit. 10

5. a) Explain OPAMP based sample and hold circuit. 5
   b) Explain current to voltage converter. 5
   c) Design an infinite gain high pass filter having cutoff frequency of 2KHz. Draw the circuit diagram of the designed circuit. 10

6. a) Explain 3 OPAMP Instrumentation amplifier. List its features and applications. 10
   b) Write short notes on
      (i) PLL and its application 5
      (ii) VCO and its features 5
