Duration: 03 Hrs.   **Max. Marks   80**

Instructions:
- **(1) Question 1 is compulsory, solve any three from remaining questions**
- **(2) Assume suitable data if necessary.**
- **(3) Diagrams to be drawn neatly.**

Question No.		Max. Marks
Q 1	Solve any **FOUR** from the following	
Q1(A)	Draw block diagram of OPAMP and explain function of each block..	**05**
Q1(B)	Draw the circuit diagram of opamp to provide output voltage V0 =(V1+V2) / 2 ,where V1,V2 are the input voltages and derive the expression of output voltage.	**05**
Q1(C)	Explain operation of Zero crossing detector.	**05**
Q1(D)	Calculate the values of LSB,MSB and full scale output for an 8 bit DAC for the 0-10V range.	**05**
Q1 (E)	Explain in detail LM 380 Power amplifier	**05**
Q2(A)	Draw the circuit diagram and explain the operation of Sample and hold circuit, state its application areas.	**10**
Q2(B)	Design first order Low pass fitter using opamp at a cut off frequency of 1Khz , having pass band gain of 2.	**10**
Q3(A)	Draw the circuit diagram and explain the operation of precision half wave rectifier. Derive the expression of output voltage. Sketch its transfer characteristics.	**10**
Q3(B)	Design square wave generator using opamp to have output voltage = ±5 volts, frequency 1khz,with 70%duty cycle. Assume VCC = ± 14volts.	**10**

Q4(A) Draw neat circuit diagram and explain the operation of Dual slope type analog to digital converter. What are its advantages and disadvantages. **10**

Q4(B) Draw neat circuit diagram and explain the operation of Astable multivibrator using IC 555.List specifications of IC555. **10**

Q5(A) Design a IC 555 based symmetrical square wave generator for 1.4 KHz frequency of Vcc= 5 V. Draw all waveforms. **10**

Q5(B) Design Noninverting amplifier using Op-Amp for voltage gain of 6.6, with complete analysis. Which type of feedback is used in this amplifier? . **10**

Q 6 Solve any **TWO** of the following.

Q6(A) Explain different types of protections provided in IC 723 voltage regulator. **10**

Q6(B) Draw block diagram and explain the operation of PLL, Explain any one application of PLL. **10**

Q6(C) Draw circuit diagram and explain the operation of RC Phase shift oscillator using OPAMP. State formula for frequency of oscillations. **10**

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