

(3 Hours)

[Total Marks : 80

N.B. : (1) Question No. one is compulsory.

(2) Solve any three questions from remaining.

(3) Assume suitable data if necessary.

(4) Figures to the right indicate marks.

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| 1. | (a) | Design Inverting op-amp circuit for voltage gain 10. what care should be taken to operate it linearly. | 4 |
| | (b) | Design a differentiator to differentiate the input signal that varies in frequency from 10 Hz to 1 kHz. | 4 |
| | (c) | Compare zero crossing detector with schmitt trigger circuit. | 4 |
| | (d) | What are the specifications of DAC ? | 4 |
| | (e) | Design a circuit to keep LED 'ON' for 20 seconds once circuit is triggered. | 4 |
| 2. | (a) | Define the following . | 10 |
| | (i) | Slew rate | |
| | (ii) | CMRR | |
| | (iii) | Input offset voltage | |
| | (iv) | Output offset voltage | |
| | (v) | PSRR | |
| 2. | (b) | Draw neat diagram of Instrumentation Amplifier using op-amp and hence derive the equation of output voltage. | 10 |
| 3. | (a) | Give complete procedure to design schmitt trigger circuit and hence design it for $UTP = 0.5\text{ V}$ and $LTP = -0.5\text{ V}$. | 10 |
| | (b) | Explain 4-bit successive approximation type ADC. | 10 |
| 4. | (a) | (i) Give design procedure of first order HPF. | 3 |
| | | (ii) Draw functional block diagram of IC 8038. | 3 |
| | | (iii) What is the basic and performance parameter of sample and hold amplifier circuit ? | 4 |
| 4. | (b) | Design RC phase shift oscillator to produce a sinusoidal frequency output of 5 kHz. | 10 |
| 5. | (a) | Design triangular waveform generator for frequency of 5 kHz and $V_{opp} = 6\text{ V}$ using op-amp. | 10 |
| 5. | (b) | Compare normal regulator with SMPS, explain any one circuit of SMPS. | 10 |
| 6. | (a) | Design voltage regulator using IC 723 to give $V_0 = 5\text{ V}$ and output current = 2A | 10 |
| | (b) | Explain in detail about frequency multiplier and application of PLL. | 10 |