

Duration 3 hours

Marks 80

N.B.:

- (1) Question number 1 is compulsory.
- (2) Attempt any three questions from the remaining five questions.
- (3) Figures to the right indicate full marks.
- (4) Draw suitable graphs/diagrams wherever necessary.

Q.1 Solve any four questions out of five questions.

- a. Explain astable multivibrator for 50% duty cycle. [05]
- b. Explain working of VCO. [05]
- c. Explain different types of analog switches. [05]
- d. Explain working of opto-couplers in detail. [05]
- e. Explain working of Power MOSFET, its structure and characteristics. [05]

- Q.2 a. Explain the functional block diagram of IC 8038. [10]
 Q.2. b. Design instrumentation amplifier using AD620 for gain 800 and explain its applications. [10]

- Q3. a. Design a regulator using IC 723 to meet following specifications: [10]
 $V_0 = 6V$, $I_0 = 100mA$, $V_{in} = 15 \pm 20\% V$
 $I_{SC} = 150mA$ and $V_{sense} = 0.7 V$.
 Q3. b. Explain two transistor model of SCR. [10]

- Q.4. a. Design a band pass filter for $f_L = 800Hz$ and $f_H = 2KHz$. [08]
 Q4. b. Draw and explain the functional block diagram of PLL in detail. Explain lock range, capture range and pull in time. Explain applications of PLL. [12]

- Q.5 a. Explain low pass KRC filter and derive the equation for Q. [12]
 Q5. b. Draw and explain generalized impedance converter (GIC). [08]

Q.6. Write short notes on any four of the following: [20]

- a. Frequency to Voltage converter
- b. DIAC and TRIAC
- c. UJT as a relaxation oscillator
- d. Missing pulse detector
- e. Stepper motor
