

(Time: 3 Hours)

Total Marks: 80

- N. B. 1) Question No. 1 is compulsory.
2) Answer any 3 questions from the remaining 5 questions.
3) Assume suitable data wherever necessary.
- Q1 Solve any four 20
(a) Explain the significance of all pass filter
(b) With suitable diagram discuss the concept of loading and how to avoid it.
(c) Explain the characteristics of digital data
(d) Explain V to F converter
(e) What are the four characteristics of 3 terminal IC regulator
- Q2 (a) Draw and explain circuit diagram of differentiator using op-amp. Discuss its advantages over practical differentiator. 20
(b) Explain the optical encoder signal conditioning for linear displacement and linear velocity application with suitable diagram.
- Q3 (a) Draw and explain the principle and construction of metal strain gauges. What is the signal conditioning associated with it. 20
(b) Temperature is to be measured in the range of 0 to 100°C with an accuracy of $\pm 2^\circ\text{C}$. The sensor is a resistance that varies linearly from 100 Ω to 139.2 Ω for this temperature. Develop analog signal conditioning that provides a voltage varying linearly 0V to 5V for this temperature range.
- Q4 (a) Mention the types of analog to digital converters and explain any one of them 20
(b) Discuss the applications of Instrumentation amplifier. Explain one in detail.
- Q5 (a) What is a multivibrator? Explain astable multivibrator using IC 555 and also design astable multivibrator for 35% and 65% duty cycle. 20
(b) A CdS cell has a dark resistance of 100k Ω and a resistance in a light beam of 30k Ω . The cell time constant is 72ms. Devise a system to trigger a 3V comparator within 10ms of the beam interruption.
- Q6 Write a short note on . (Any Four) 20
(a) Impedance matching and concept of loading
(b) Sample and hold circuit
(c) Data Acquisition System
(d) Phase lock loop
(e) Peak detector