

# 22423

**11920**

**3 Hours / 70 Marks**

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.
  - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following: **10****
- a) Define the operational amplifier parameters
    - (i) Slew rate
    - (ii) Input bias current
  - b) Draw Wien bridge oscillator circuit using IC 741
  - c) List four specifications of IC LM324
  - d) State the four applications of an instrumentation amplifier.
  - e) State the four advantages of active filter over passive filter.
  - f) Define roll-off rate and order of filter.
  - g) State the function of the following pins of IC 555
    - (i) Threshold
    - (ii) Discharge

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Describe the block diagram of op-amp
  - b) Explain with neat circuit diagram, the significance of virtual ground in an op-amp.
  - c) Draw the circuit diagram of grounded load type V to I converter and derive expression for its output.
  - d) Sketch the astable multivibrator using IC 555 and explain it.
- 3. Attempt any THREE of the following:** **12**
- a) Describe the basic integrater circuit using op-amp.
  - b) Compare comparator and schmitt trigger circuit (any four points)
  - c) Design a first order low pass filter at a cut off frequency 12KHz with pass band gain '2' (Assume  $C = 0.01\mu\text{f}$ )
  - d) Explain the working of IC 555 as a voltage controlled oscillator (VCO)
- 4. Attempt any THREE of the following:** **12**
- a) Compare open loop and closed loop of configuration of operational amplifier (any four points)
  - b) Sketch the circuit diagram of closed loop non-inverting amplifier and derive expression for it's gain.
  - c) Explain the working of PLL as multiplier using block diagram.
  - d) Draw the neat circuit diagram of first order highpass filter and explain it's operation.
  - e) Explain the block diagram of phase locked loop.

- 5. Attempt any TWO of the following:** **12**
- a) Explain the function of sample and hold circuit by using op-amp.
  - b) Explain the circuit diagram of logarithmic amplifier using op-amp.
  - c) Sketch the circuit diagram of active wide band reject filter and explain it.
- 6. Attempt any TWO of the following:** **12**
- a) Sketch the circuit diagram of closed loop inverting amplifier and obtain output expression.
  - b) Explain schmitt trigger circuit using Op-amp and how UTP and LTP are calculated.
  - c) Explain the circuit diagram of phase shift oscillator using op-amp.
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