

22391

24225

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answer with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) 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 following terms w.r.t. amplifier –
 - i) Gain
 - ii) Bandwidth.
 - b) State need of transducer.
 - c) Draw the pin diagram of I.C. 741.
 - d) Name the fixed voltage regulator IC's used for given output voltage
 - i) +9v
 - ii) –15v
 - e) State Barkhausen criteria of oscillation.

P.T.O.

- f) Define following terms related to phase lock loop –
 - i) Lock range
 - ii) Capture range.
- g) List the applications of Thermister.

2. Attempt any FOUR of the following: 12

- a) Draw pin diagram of IC-555 and state functions of each pin.
- b) State and explain selection criteria of transducer.
- c) State classification of amplifier and write applications of each amplifier.
- d) Explain working of double tuned amplifier.
- e) Describe basic integrator circuit using Op-amp.

3. Attempt any FOUR of the following: 12

- a) Draw and explain RC phase shift Oscillator.
- b) Draw voltage to current converter with grounded load.
- c) Explain the block diagram of phase locked-loop.
- d) Draw block diagram of instrumentation system. State function of each block.
- e) Sketch the circuit diagram of closed loop non-inverting amplifier and state its gain.

4. Attempt any THREE of the following: 12

- a) Explain working of IC-555 as a Voltage Controlled Oscillator (VCO).
- b) Explain the construction and working principle of LVDT.
- c) Calculate output voltage (V_o) for inverting amplifier if:
 $R_1 = 2k\Omega$, $R_f = 100k\Omega$, $V_{cc} = \pm 15V$ and $V_{in} = 20\text{ mv}$.
- d) Compare RC coupled, transformer coupled and direct coupled amplifier on the basis of –
 - i) Types of coupling
 - ii) Gain
 - iii) Frequency response
 - iv) Application.
- e) Draw and explain wein bridge oscillator by using op-amp IC-741.

5. Attempt any THREE of the following: 12

- a) Define following parameter of Op-amp. –
 - i) Input bias current
 - ii) Input offset current
 - iii) Slew rate
 - iv) CMRR.
- b) Explain Miller's sweep generator with circuit diagram.
- c) Explain the working of Schmitt trigger circuit using IC-555 timer.
- d) Compare positive feedback and negative feedback on the basis of –
 - i) Gain
 - ii) Bandwidth
 - iii) Stability
 - iv) Application.
- e) Explain with help of neat diagram working of single stage CE amplifier.

6. Attempt any TWO of the following: 12

- a) Explain construction and working of sample and hold circuit using Op-amp. State any two applications of it.
 - b) Draw Bootstrap sweep circuit and explain its working with waveform.
 - c) Astable multi-vibrator using IC-555 has $T_{ON} = 5 \text{ ms}$ and $T_{OFF} = 3 \text{ MS}$. Calculate its frequency of oscillations and duty cycle.
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