



# 17302

15116

3 Hours / 100 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) *Use of Non-programmable Electronic Pocket Calculator is **permissible**.*
  - (5) *Mobile Phone, Pager and any other Electronic Communication devices are **not** permissible in Examination Hall.*

**Marks**

1. a) Attempt **any six** :

**12**

- i) State types of filters.
- ii) Draw symbols of LDR and Diode.
- iii) State types of oscillators.
- iv) Define thermal runaway.
- v) Draw logical symbol of NOT and AND gate.
- vi) Draw symbol and label terminals of NPN and PNP transistors.
- vii) Define intrinsic and extrinsic semiconductors.
- viii) Draw VI characteristics of PN junction diode.

b) Attempt **any two** :

**8**

- i) What is PLC ? Sketch architecture of PLC and label all blocks.
- ii) Differentiate microprocessor and microcontroller.
- iii) Sketch circuit diagram of non-inverting op-amp. Calculate gain if  $R_f = 25 \text{ k}\Omega$ ,  $R_i = 5 \text{ k}\Omega$ .

2. Attempt **any four** :

**16**

- a) Differentiate Bipolar junction transistor and field effect transistor.
- b) Draw instrumentation amplifier and write its output voltage equation.
- c) Explain load and line regulation.
- d) Illustrate working of BJT as a switch with diagram.
- e) Draw ladder diagram for start-stop logic with one input push button for start and one push button for one output for motor to activate solenoid valve.
- f) Write truth table and sketch symbol of AND and NAND Gate.

**P.T.O.**

**3. Attempt any four :****16**

- a) Sketch pin out diagram of IC 741. Label all pins and state function of each pin.
- b) Differentiate RC, LC and crystal oscillator on the basis of
  - i) Component used
  - ii) Frequency range
  - iii) Frequency stability
  - iv) Applications.
- c) Sketch circuit diagram, input and output waveform of half wave rectifier.
- d) What is mechatronics ? State its any four applications.
- e) Draw circuit diagram and waveform of astable multivibrator using IC 555.
- f) Illustrate function of D flip-flop with truth table and logical diagram.

**4. Attempt any four :****16**

- a) State the principle of R-2R type DAC and write two applications of DAC.
- b) Draw two stage RC coupled amplifier and its frequency response.
- c) What is data logger ? State its applications.
- d) Write features of 8085 microprocessor.
- e) Draw and explain the circuit of op-amp as adder.
- f) Draw block diagram of regulated power supply and write function of each block.

**5. Attempt any four :****16**

- a) What is transducer ? Write selection criteria for transducer.
- b) State need of signal conditioning. Draw AC signal conditioning system.
- c) Draw single channel data acquisition system and write function of each block.
- d) Draw CB and CE configuration for BJT.
- e) Draw transformer coupled amplifier and its frequency response.
- f) Draw logical diagram of 4 : 1 multiplexer and write its truth table.

**6. Attempt any four :****16**

- a) What is decoder ? Draw logical diagram of 3 : 8 decoder and its truth table.
  - b) State the factors on which selection of PLC is based.
  - c) Explain the concept of CIM briefly.
  - d) What is advance vehicle condition system ? Explain briefly.
  - e) State function and applications of robotics.
  - f) Draw J-K flip-flop using NAND gate and what is the race around condition ?
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