17302

15162

3 Hours / 100 Marks   Seat No. ☐☐☐☐☐☐☐☐

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. A) Attempt **any six** :   **12**

a) What is rectifier ? List types of rectifier.

b) Sketch symbol and label the terminals of zener diode and LED.

c) Sketch and label input and output terminals of CB configuration.

d) Sketch pin diagram of IC 555 and label all pins.

e) Draw logical symbol of 2 : 1 multiplexer and write its truthtable.

f) State types of real time mechatronics system.

g) Draw V-I characteristics of P-N junction diode.

h) List types of Bijunction transistor and draw symbols of the same with neat labels.

B) Attempt **any two** :   **8**

i) What is filter ? List types of filter. Draw circuit diagram of any one type.

ii) Sketch circuit diagram of non-inverting op-amp. Calculate gain if $R_f = 15\,k\Omega$ $R_i = 5\,k\Omega$.

iii) What is PLC ? Sketch architecture of PLC and label all blocks.

2. Attempt **any four** :   **16**

a) Compare Bijunction transistor and Field effect transistor.

b) Sketch pin out diagram of IC 741. label all pins and state function of each pin.

c) What is thermal runway ? What is the use of heat sink ?

d) What is oscillator ? State Barkhausen criteria for oscillations. List types of oscillator.

e) Sketch logical circuit of differentiator and write its output voltage equation.

f) Write truthtable and sketch symbol of AND and NAND gate.

Marks

3. Attempt **any four** :   **16**
   a) Draw instrumentation amplifier and write its output voltage equation.
   b) Compare microprocessor and microcontroller (any 4 points).
   c) Draw two stage RC coupled amplifier and its frequency response.
   d) Sketch circuit diagram, input and output waveform of full wave bridge rectifier.
   e) What is mechatronics ? State its any four applications.
   f) Draw block diagram of ADC and write function of each block.

4. Attempt **any four** :   **16**
   a) Sketch block diagram of CNC system from mechatronics view and state function of each block.
   b) What is data logger ? State its applications.
   c) What is transducer ? What are the selection criteria of transducers ? Give classification of transducer.
   d) Write features of 8085 microprocessor.
   e) Draw ladder diagram for start-stop logic with one input push button for start and one push button for stop and one output for motor to activate solenoid valve.
   f) Draw logical diagram of D Flip-Flop and write its truthtable.

5. Attempt **any four** :   **16**
   a) Define load and line regulation.
   b) Compare HWR and FWR with respect to ripple factor and efficiency.
   c) How BJT works as a switch ? (Explain with diagram).
   d) Draw circuit diagram and waveform of Astable multivibrator using IC 555.
   e) Draw Decade counter using T. Flip-Flop and write its truthtable.
   f) State two reason that mechatronics system is getting popular. Give basic elements of mechatronics.

6. Attempt **any four** :   **16**
   a) Draw block diagram of regulated power supply and give function of each block.
   b) List four criteria to select PLC for any particular application.
   c) How optocoupler act as an isolator ?
   d) Draw single channel DAS (Data Acquisition System). Give function of each block.
   e) What is the need of signal conditioning ? Draw AC signal conditioning system.
   f) What is triggering mechanism ? Give types of triggering with waveform.

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