17302

21718

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) Mobile Phone, Pager and any other Electronic Communication devices are ***not*** *permissible in Examination Hall.*

Marks

1. a) Attempt **any six** of the following : **12**

i) Draw symbols and label the terminal of :
1) Photodiode 2) UJT

ii) Define intrinsic and extrinsic semiconductor.

iii) List types of BJT and draw symbols of the same with neat labels.

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

v) Draw logical symbol of 2 : 1 mux. and write its truth table.

vi) What is transducer ? How they are classified ?

vii) What is mechatronics ? Write its applications.

viii) State types of real time mechatronics system.

b) Attempt **any two** of the following : **8**

i) Compare microprocessor and microcontroller (any four points).

ii) Sketch circuit diagram of non-inverting op-amp. Calculate gain if $R_f = 25\ K\Omega$, $R_i = 5\ K\Omega$.

iii) List any four advantages and applications of CNC system.

2. Attempt **any four** of the following : **16**

a) What is thermal runway ? How it is avoided ?

b) Draw instrumentation amplifier and write its output voltage equation.

c) What is Barkhausen criteria ? Which type of feedback is used in an oscillator ? State types of oscillator.

d) Define load regulation and line regulation.

P.T.O.

Marks

e) Sketch symbol and write truth table of :

I) AND gate

II) NAND gate

f) State function and application of robotic system.

3. Attempt **any four** of the following : **16**

a) Sketch pin out diagram of IC741, label all pins and state function of each pin.

b) Compare RC coupling and transformer coupling w.r.t. following points.

I) Coupling element

II) Distortion

III) Voltage gain

IV) Applications.

c) Draw circuit diagram input and output waveform of full wave bridge rectifier.

d) Draw circuit diagram and waveform of bistable multivibrator using IC 555.

e) Sketch block diagram for PLC and state functions of each block.

f) Compare Active and Passive transducers on the basis of any four points.

4. Attempt **any four** of the following : **16**

a) State the principle of R-2R type DAC and write two applications of DAC.

b) What is advance vehicle condition system ? Explain briefly.

c) Write features of 8085 microprocessor.

d) What is data logger ? State its applications.

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 block diagram of regulated power supply and write function of each block.

5. Attempt **any four** of the following : **16**

a) What is AC signal conditioning ? State types of circuit used for AC signal conditioning.

b) How transistor works as a switch ? Also draw a necessary circuit and waveform for it.

c) Sketch circuit diagram for integrator using op-amp, also draw output waveform for square wave and sine wave input.

d) Draw single channel data acquisition system and write function of each block.

e) What is opto coupler ? Draw its circuit, also write its advantages.

f) Draw decade counter using T Flip-flop and write its truth table.

Marks

6. Attempt **any four** of the following : **16**

a) What is decoder ? Draw logical diagram of 3 : 8 decoder and its truth table.

b) Write the selection factors for PLC.

c) Draw CB and CE configuration for BJT.

d) Draw JK Flip-flop using NAND gate and what is the race around condition ?

e) Compare HWR and FWR with

1) Diode use

2) Output voltage

3) Ripple factor

4) Efficiency

f) What is triggering mechanism ? Give types of triggering with waveform.