17302

15116

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) 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 $R_f = 25\ k\Omega$, $R_i = 5\ k\Omega$.

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

a) Differentiate Bijunction 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.

Marks

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

a) Sketch pin out diagram of IC 741. Lable 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 ?
