17302

16117

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** : **12**

i) What is semiconductor ? Give two examples.
ii) What is rectifier ? How are they classified ?
iii) Draw the symbol of NPN and PNP transistor.
iv) List any four applications of op-amp.
v) Draw the logical symbol of 4 : 1 multiplexer.
vi) Define :
a) Active and
b) Passive transducer
vii) Define mechatronics.
viii) State any four advantages of mechatronics.

b) Attempt **any two** : **8**

i) With the help of neat diagram explain the working of half wave rectifier.
ii) List and explain any four features of ideal op-amp.
iii) Draw the block diagram of FMS and explain the function of each block.

2. Attempt **any four** : **(4×4=16)**

a) What is the need of biasing circuit ? List the various types of biasing circuit for transistors.
b) With the help of neat sketch explain how BJT is used as switch.
c) Draw the circuit diagram of inverting amplifier. Calculate R_F is gain is 10 and $R_1 = 1k\,\Omega$.
d) Draw the diagram of astable multivibrator and explain its working.
e) Define oscillator. State Barkhausen criteria for oscillation.
f) Draw the half adder circuit. Also write its truth table.

P.T.O.

Marks

3. Attempt **any four**: **(4×4=16)**

a) Draw the circuit diagram of RC coupled amplifier. Explain its working.

b) Draw the logical symbol and write truth table for
   a) AND gate b) NOR gate.

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

d) What is decoder and encoder ? State their applications (any two).

e) With the help of suitable example explain the concept of primary and secondary transducer.

f) Draw the functional block diagram of CMC and explain the function of each block.

4. Attempt **any four**: **(4×4=16)**

a) Draw the ladder diagram to verify the truth table of NOT gate and OR gate.

b) Draw the circuit diagram of direct coupled amplifier. State its any two applications.

c) Explain the criteria for the selection of PLC for an application.

d) What is ADC and DAC state their application (any two) ?

e) Draw the block diagram of single channel data acquisition system. Explain the function of each block.

f) Explain the working principle of
   a) Photo diode
   b) LDR.

5. Attempt **any four**: **(4×4=16)**

a) What is signal condition ? Explain with the help of diagram AC signal conditioning.

b) Explain any four criteria for selection of a transducer for an application.

c) Draw the symbol and write any two applications of
   a) UJT and b) Zener Diode.

d) What is opto coupler ? How it is used as an isolator ?

e) Draw the construction of decade counter using T-flip flop.

f) Compare intrinsic and extrinsic semi conductor.

6. Attempt **any four**: **(4×4=16)**

a) What do you mean by load regulation and line regulation ?

b) Draw the block diagram of regulated power supply. State its two applications.

c) What is crystal oscillator ? State its any four applications.

d) Draw the block diagram of SR flip flop. Write its truth table.

e) What is PLC ? Explain the function of input module of PLC.

f) Draw 4-bit asynchronous counter circuit.
