Total No. of printed pages = 6

END SEMESTER/RETEST EXAMINATION – 2019

Semester : 3rd

Subject Code : ET-305

ANALOG ELECTRONICS – I

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instruction :

1. *All* questions of PART – A are compulsory.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) Atomic number of silicon is _____.

   (b) A diode has forward resistance of the order of _____.

   (c) The forward current in a diode is of the order of _____.

[Turn over

(d) The Barrier potential of a silicon PN junction is _____.

(e) The maximum efficiency of a full-wave rectifier is _____.

(f) A half-wave rectifier uses _____ diode(s).

(g) A transistor has _____ terminal(s).

(h) The ratio of I_C/I_B is called _____.

(i) A zener diode is always _____ connected.

(j) A _____ circuit removes the AC component of rectifier output and allows only DC component to reach the load.

2. Write true or false : 1×10=10

(a) Zener diodes have a highly doped p-n junction.

(b) The value of α of a transistor is less than 1.

(c) The phase difference between the input and output voltages in a common emitter arrangement is 0°.

(d) Common Emitter Configuration has both Current and Voltage Gain.

(e) Transistors that are fully "ON" are said to be in their cut-off region.

(f) Field Effect Transistor is a voltage operated device.

(g) A JFET is also called unipolar transistor.

(h) A MOSFET has two terminals.

(i) A radio receiver has one stage of amplification.

(j) When a multistage amplifier is to amplify DC signal, then one must use transformer coupling.

3. Choose the correct answer : 1×5=5

(a) When a trivalent impurity is added to a pure semiconductor, it becomes _____.

(i) an insulator

(ii) an intrinsic semiconductor

(iii) p-type semiconductor

(iv) n-type semiconductor

(b) Ripple factor of half-wave rectifier is

(i) 1.414 (ii) 1.21

(iii) 1.3 (iv) 0.48

(c) Which of the following configuration is used for impedance matching ?

(i) Common base configuration.

(ii) Common emitter configuration.

(iii) Common collector configuration.

(iv) All configurations are equally suited.

(d) In a transistor _____.

(i) $I_C = I_E + I_B$ (ii) $I_B = I_C + I_E$

(iii) $I_E = I_C - I_B$ (iv) $I_E = I_C + I_B$

(e) _____ coupling is generally employed in power amplifiers.

(i) Transformer (ii) RC

(iii) Direct (iv) Impedance

PART – B

Marks – 45

4. Answer in short : 2×5=10

(a) Draw VI characteristic curve of forward biased PN junction diode.

(b) Draw the symbol of zener diode and varactor diode.

(c) What is zener breakdown ?

(d) What is a filter circuit ?

(e) Draw a CE configuration circuit diagram for NPN transistor.

5. Answer any *five* of the following : 3×5=15

(a) What is doping ? Differentiate between intrinsic and extrinsic semiconductor.

(b) Draw a full wave rectifier circuit showing its input and output waveform.

(c) What is biasing ? Name different types of biasing used in transistor.

(d) Draw output characteristic of CE configuration and label it.

(e) For a single stage transistor circuit, if $\alpha = 0.95$ and $I_E = 1$ mA, find I_C and I_B.

(f) Draw the symbol for n-channel JFET, N-channel MOSFET and UJT.

6. Answer any *four* of the following : 5×4=20

(a) What is zener diode ? What are the essential conditions required for zener biasing ? Write two applications of zener.

(b) What is α and β factor ? Derive a relation between α and β.

(c) Compare CB, CE and CC configurations in terms of their current gain, voltage gain, input resistance and output resistance.

(d) Draw a two stages transformer coupled amplifier and draw its frequency response curve.

(e) Classify MOSFET. Explain the working of N-Channel MOSFET ?

(f) Compare Class A, Class B, Class C and Class AB amplifier.