

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

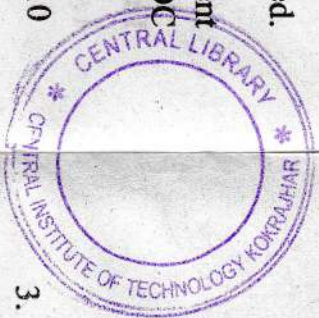
Marks - 25

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 : $1 \times 10 = 10$
- (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 : $1 \times 5 = 5$
- (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

291/ET-305/AE-1 (4) 1000(W)

PART - B
Marks - 45

4. Answer in short : $2 \times 5 = 10$

(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 : $3 \times 5 = 15$

(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 $I_E = 1 \text{ mA}$, find I_C and I_B .

291/ET-305/AE-1 (5) [Turn over

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

6. Answer any *four* of the following : $5 \times 4 = 20$

(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.

