

Roll No.

Total Pages : 3

020302

January 2023

B.Tech. (RAI) III SEMESTER

Basics of Electronics Engineering (PCC-RAI-302-21)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Explain the term PIV of a diode in a rectifier circuit.
What is its importance? (1.5)
- (b) What is pinch off voltage? (1.5)
- (c) Explain the concept of virtual ground. (1.5)
- (d) How FETs differ from BJTs? (1.5)
- (e) Why transistors are called bipolar junctioned devices? (1.5)

- (f) Which feature of Zener diode enables it to be used as voltage regulator? (1.5)
- (g) How are power amplifiers different from voltage amplifiers? (1.5)
- (h) What is Barkhausen's criteria? (1.5)
- (i) What are the advantages of negative feedback in amplifiers? (1.5)
- (j) What is load line? (1.5)

PART-B

2. (a) Draw and explain the working of bridge rectifier. Why is it preferred over a full wave rectifier? (10)
- (b) Differentiate between clipper and clamper circuit. (5)
3. (a) Compare the three transistor configurations (CB, CE and CC) w.r.t their VI characteristics. Which configuration is preferred as an amplifier and why? (8)
- (b) Prove $I_C = \beta I_B + (\beta + 1)I_{CO}$. In a grounded base configuration, voltage drop across base resistance of 4 K ohms is 3 V. Determine base current if α is 0.96. (7)

4. (a) Explain the working of RC coupled amplifier and explain the decline in gain at low and high frequencies in the frequency response curve. (8)
- (b) Differentiate between Class A, B and C power amplifiers. (7)
5. (a) Why is a common drain JFET called the source follower? Draw and explain. (7)
- (b) Draw and explain the drain characteristics of JFETs. (8)
6. (a) Draw and explain the Wein bridge oscillator. Derive the expression for its frequency of oscillation. (8)
- (b) Draw the basic circuit for Colpitt's oscillator and determine the operating frequency of Colpitt's oscillator if $L = 100 \mu\text{H}$, $C_1 = 0.001 \mu\text{F}$ and $C_2 = 0.01 \mu\text{F}$. (7)
7. Discuss :
- (a) Op amp as non inverting adder.
- (b) Op amp as integrator and differentiator.
- (c) Ideal and practical characteristics of Opamps. (15)