

Roll No.

Total Pages : 3

020304

December 2023

B.Tech. (RAI)-III Semester

BASICS OF ELECTRONICS ENGINEERING

(PCC-RAI-302-321)

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) Differentiate between clipper and clamper circuits. (1.5)
(b) Draw the Hartley oscillator circuit. (1.5)
(c) What is the necessary condition of gain while designing RC phase shift oscillator to ensure the sustained oscillations? (1.5)
(d) What is the collector current for a CE configuration with a beta of 100 and a base current of 30 micro amperes? (1.5)
(e) What is dimension of hie parameter? (1.5)
(f) With a differential gain of 50,000 and a common mode gain of 2, what is CMRR? (1.5)

020304/70/111/129

27 [P.T.O.]

- (g) What is an angle of phase shift for each designed RC network in phase shift oscillator circuit? (1.5)
- (h) What is pinch off voltage in a FET? (1.5)
- (i) A certain non inverting amplifier has R_i of 1Kohm and R_f of 100 Kohm. The closed-loop voltage gain is? (1.5)
- (j) What is the difference between class A and class B amplifiers? (1.5)

PART-B

2. (a) Sketch a family of output characteristics for a Common Emitter amplifier for a $p-n-p$ transistor. Clearly indicate active, saturation and cut off region and explain it. Also define α and β , find the relation between them. (10)
- (b) Explain the characteristics of an ideal op-amp. (5)
3. (a) Explain MOSFET structure and its V-I characteristics. (8)
- (b) Discuss the application of FET as VVR. (7)
4. Draw the circuit diagram of centre tap full wave rectifier and explain its working. Also determine (i) average dc output current (ii) rms output current (iii) ripple factor (iv) rectification efficiency (v) PIV. (15)
5. (a) Explain diagram of comparator and zero crossing detector with their waveforms. (5)
- (b) Draw and explain the Clapp and Colpitt oscillators. (10)

6. (a) Draw and explain the RC coupled amplifier. Draw and discuss its frequency response diagram. (10)
- (b) Explain how Zener diode works as a voltage regulator. (5)
7. Draw and explain the working of op-amp as :
- (a) Integrator.
- (b) Adder.
- (c) Non inverting amplifier. (15)
-