

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Pages: 02]

[Total No. of Questions: 09]

Uni. Roll No.

Program: B.Tech. EE (Sem. 3rd)

ANALOG ELECTRONICS

Subject Code: PCEE-102

Paper ID:16065

Scientific Calculator is allowed

Max. Marks: 60

Time Allowed: 03 Hours

Note:

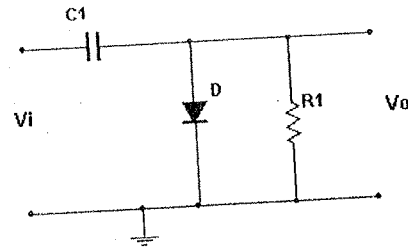
- 1) Parts A and B are compulsory
- 2) Part C has two questions Q8 and Q9. Both are compulsory, but with internal choice.
- 3) Any missing data may be assumed appropriately

[Marks: 02 each]

Part - A

Q1.

- a) What is space charge region? What is its another name and how it is formed?
- b) Mention any **four** characteristics of an Ideal Amplifier.
- c) Define Slew rate. Also write its formula.
- d) Derive the relation between α and β for a BJT.
- e) Identify the circuit. Draw the output waveform (V_o)? Here V_i is a square wave having magnitude V_m .



- f) What is meant by precision rectifier? Draw its circuit diagram.

Part - B

[Marks: 04 each]

- Q2. Draw the fully labeled $v-i$ characteristics of an ideal and practical pn junction diode.
- Q3. Which type of diode is also known as backbone of voltage regulators? Draw the fully labeled $v-i$ characteristics of that device and explain its working under forward bias and reverse bias conditions.
- Q4. Explain the construction and operation of n-channel depletion type MOSFET. Also draw its V_i characteristics.
- Q5. Under what conditions does a BJT act an amplifier and as a switch. Explain.
- Q6. Draw the input and output characteristics of common emitter configuration? Why there

is more tilt in output characteristics as compared to common base characteristics?

Q7. What is meant by Zero cross detector? Draw its circuit using 741-OpAmp. Give its one practical application.

[Marks: 12 each]

Part - C

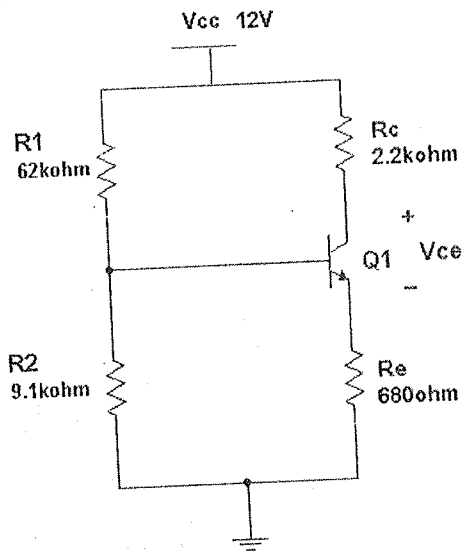
Q8. Draw and explain the working of any three operations using Op-Amp. Write the expressions of output voltage in each case.

- a) Non-Inverting amplifier b) Summing amplifier c) Integrating amplifier d) Low pass active filter.

OR

- a. Explain with circuit diagram the working of a centre tap full wave rectifier. What is meant by centre tap and why it is required?
 b. A full wave rectifier is directly being fed from a.c. mains. Power transformer has a centre tapped secondary. RMS secondary voltage across each half of secondary is 12V. If the load resistance is 100Ω. Calculate i) Average load voltage ii) RMS voltage iii) A.C. output power iv) PIV of each diode.

Q9. A voltage divider bias network is as shown below. Derive and calculate the values for the variables as mentioned below. Take $\beta=100$ and $V_{BE} = 0.7V$. Why this biasing network is considered the best as compared to other biasing networks?



- a) I_{BQ}
 b) I_{CQ}
 c) I_E
 d) V_{CEQ}
 e) V_E
 f) V_C

OR

What is criterion to get sustained oscillation in oscillators? Draw and explain transistorized RC phase shift oscillator. How many RC networks are used? Justify supporting the answer.
