

# Prelim Paper

# Electronic Circuits and Communication Fundamentals

Time: 3 Hrs.]

[Marks : 80

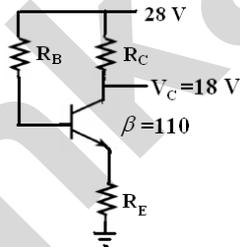
- N.B.:**
- (1) Question No. 1 is compulsory.
  - (2) Solve any THREE out of remaining questions.
  - (3) Draw neat and clean diagrams.
  - (4) Assume suitable data if required.

- 1. (a) Draw input & output characteristics of BJT. State significance of DC load line. [5]
- (b) Explain the concept of virtual ground in operational amplifiers. [5]
- (c) Compare class A and class C amplifier. [5]
- (d) Explain adaptive delta modulation. [5]

- 2. (a) Explain Superheterodyne receiver with suitable diagram. [10]
- (b) The emitter bias configuration as shown in following figure has the specifications: [10]

$$I_{CQ} = \frac{1}{2} I_{Csat}, I_{Csat} = 8 \text{ mA}, V_C = 18 \text{ V} \text{ and } \beta = 110$$

Determine  $R_C$ ,  $R_E$  and  $R_B$ .



- 3. (a) Explain generation of DSBSC using Ring Modulator. [10]
- (b) With suitable waveforms explain how Op-amp can be used as integrator. [10]
- 4. (a) For an AM DSBFC envelope with  $V_{max} = 20\text{V}$  and  $V_{min} = 4\text{V}$ ; determine : [10]
  - (i) Peak amplitude of USF AND LSF
  - (ii) Peak amplitude of carrier
  - (iii) Peak change in the amplitude of envelope
  - (iv) Modulation coefficient
  - (v) Draw the AM Envelope
- (b) Draw the PAM, PPM and PWM waveforms and compare them. [5]
- (c) Explain principle of FDM. [5]
- 5. (a) Explain and give ideal values of following parameters of an Op-Amp : (i) CMRR, [10]
  - (ii) Slew rate, (iii) Offset voltage, (iv) Input Resistance, (v) Output Impedance
- (b) Define and explain in brief Amount of information, average information, [10]
  - information rate and Channel capacity of a communication system.
- 6. (a) Implement using IC 741,  $V_o = 3V_1 - 4V_2 + 5V_3 - 6V_4 - V_5$ . [5]
- (b) Write a note on Pulse Code Modulation with waveforms. [5]
- (c) Obtain Expression for an FM Wave. [10]

