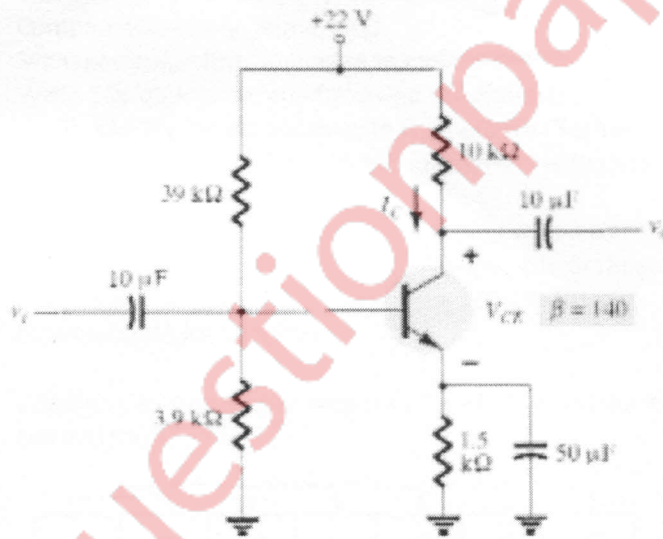


Duration:3 hours

Total marks:80

- N.S.: (1) Question No.1 is compulsory.  
 (2) Solve any three from remaining five questions.  
 (3) Figures to the right indicate full marks

- Q1. A. Draw input & output characteristics of BJT. State significance of DC load line. 5  
 B. For an AM DSBFC modulator with carrier frequency  $f_c = 100\text{kHz}$  and a maximum modulating signal frequency  $f_m = 5\text{kHz}$ , determine 5  
 i) Frequency limits for the upper and lower side bands  
 ii) Bandwidth  
 iii) Draw the frequency spectrum  
 C. Write a note on zero crossing detector using op-amp with waveforms 5  
 D. Compare Class A and Class C Amplifiers 5
- Q2. A. Explain Superheterodyne receiver with suitable diagram 5  
 B. Implement summing Operational Amplifier using inverting configuration of Op-amp 5  
 C. For the emitter bias network of figure below, determine: 10  
 (a)  $I_b$ . (b)  $I_c$ . (c)  $V_{ce}$ . (d)  $V_c$ . (e)  $E_{th}$  (f)  $R_{th}$



- Q3. A. Explain generation of DSBSC using balanced Modulator along with its frequency and power spectrum 10  
 B. With suitable waveforms explain how Op-amp can be used as Differentiator 10
- Q4. 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. Differentiate between TDM and FDM 5  
C. State Shannon's Theorem and explain its significance 5
- Q5. A. Draw PAM, PWM and PPM waveforms in time domain using a sinusoidal signal and explain in brief. 10  
B. Define and explain in brief Amount of information, average information, information rate and Channel capacity of a communication system 10
- Q6. A. State significance of modulation in Communication 5  
B. Write a note on Pulse Code Modulation with waveforms 5  
C. Explain and give ideal values of following parameters of an Op-Amp: 10  
i. CMRR  
ii. Slew rate  
iii. Offset voltage  
iv. Input Resistance  
v. Output Impedance

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