

(3 Hours)

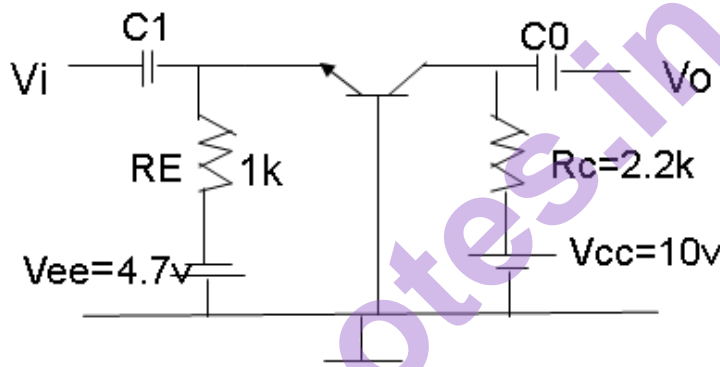
[Total Marks : 80]

- N.B. : 1. Question **ONE** is **Compulsory**.  
 2. Solve any **THREE** out of remaining.  
 3. **Draw** neat and **clean** Diagrams.  
 4. Assume suitable **data** if required

Q.1. Attempt the following

- |   |   |
|---|---|
| A. Explain with diagram Input and output characteristic of Common base configuration                                | 5 |
| B. List the ideal Characteristic of op-amp  | 5 |
| C. Calculate the percent power saving an SSB signal if the AM wave is modulated to a depth of (a) 100 % and (b) 50% | 5 |
| D. Define the term Information theory. Give definitions for Information Rate and Entropy                            | 5 |

- |   |    |
|---|----|
| Q.2. A. For the circuit shown in Figure below calculate $V_{CB}$ , $I_E$ , and $I_B$ if $\beta=100$ | 10 |
|---|----|



- |   |    |
|---|----|
| B. Explain how op-amp can be used as a differentiator.  | 10 |
| Q.3. A. What do you mean by Zero Crossing detector? Explain with diagram  | 5  |
| B. Write Short note on generation of FM by Armstrong method.  | 5  |
| C. Use op-amp IC741 to realize the expression $V_0 = 5V_1 + 2V_2 - 3V_3$  | 5  |
| D. What is a Nyquist criteria? What is its significance   | 5  |
| Q.4. A. Explain Delta Modulation with neat diagram and waveforms after each block.  | 10 |
| B. An AM signal appears across a $50\ \Omega$ load and has the following equation $v(t) = 12(1 + \sin 12.566 \times 10^3 t) \sin 18.85 \times 10^8 t$ volts | 10 |
| 1. Sketch the envelope of this signal in time domain  |    |
| 2. Calculate modulation index, sideband frequencies, total power and bandwidth  |    |
| Q.5. A. Compare PAM, PWM and PPM pulse modulation techniques  | 10 |
| B. Explain the generation of DSBSC using Balance modulator  | 10 |
| Q.6. A. What do you mean by multiplexing? Explain TDM   | 10 |
| B. List down various parameters of op-amp with their practical values for IC741.  | 10 |
| Explain common mode gain and differential mode gain.  |    |

\*\*\*\*\*