

**B.Tech. - VIEP - ELECTRONICS AND
COMMUNICATION ENGINEERING
(BTECVI)**

00353

Term-End Examination

December, 2016

BIEL-005 : ANALOG ELECTRONIC CIRCUITS

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **seven** questions. All questions carry equal marks. Any missing data may be suitably assumed and mentioned. Use of scientific calculators is permitted.*

1. Give the graphical symbol and the hybrid equivalent circuit of a BJT in CE configuration. Given $I_E = 3.2 \text{ mA}$, $h_{fe} = 150$, $h_{oe} = 25 \mu\text{mho}$, and $h_{ob} = 0.5 \mu\text{s}$. Determine the common emitter hybrid equivalent circuit ($\beta = 150$). 5+5=10

2. Explain the operation of an RC-coupled amplifier with the help of a neatly labelled circuit diagram. Also give its frequency response curve. Give the merits and demerits of an RC-coupled Amplifier. 4+2+4=10

3. Give the desirable features and circuit diagram of a Cascode Configuration [CE-CB]. Calculate the no-load voltage gain for the cascode configuration shown in Figure 1. 5+5=10

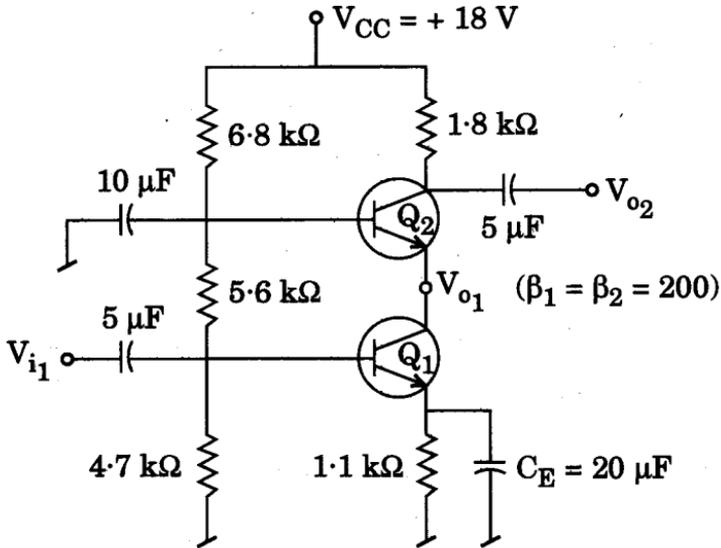


Figure 1

4. Explain the effect of coupling and by-pass capacitors in a circuit. Define the following :

$$f_{\alpha}, f_{\beta} \text{ and } f_T.$$

Also establish the relationship between the three terms f_{α} , f_{β} and f_T . 10

5. (a) Calculate the gain, input and output impedance of a voltage-series feedback amplifier having $A = -500$, $R_i = 1.5 \text{ k}\Omega$, $R_o = 50 \text{ k}\Omega$ and $\beta = \left(-\frac{1}{10}\right)$. 5

(b) An FET phase-shift oscillator having $g_m = 6000 \mu\text{s}$, $r_d = 36 \text{ k}\Omega$ and $R_F = 12 \text{ k}\Omega$ is to operate at 2.5 kHz. Calculate the value of C for specified oscillator operation. Also give the circuit diagram of such an oscillator circuit.

5

6. Explain the operation of an astable multivibrator using IC-555 with the help of a neatly labelled circuit diagram, waveforms across capacitor and output waveform. Also derive the expression for the frequency of the output waveform and its duty cycle.

10

7. Explain the operation of a Class-A Transformer-coupled Load Amplifier showing the circuit diagram and its output characteristics. Prove that the maximum efficiency of such an amplifier is 50%.

10

8. Draw the circuit diagram of a Colpitts Oscillator using op-amp and derive the expression for the condition and frequency of oscillation.

10

9. Define the term Harmonic Distortion in an Amplifier. Calculate the total harmonic distortion (THD) for an output signal having fundamental amplitude of 2.5 V, second harmonic amplitude of 0.25 V, third harmonic amplitude of 0.1 V and fourth harmonic amplitude of 0.05 V.

10

10. Write short notes on any *two* of the following : $2 \times 5 = 10$

- (a) **Series and Parallel Resonant Circuits**
 - (b) **HF Current Gain with Resistive Load**
 - (c) **Bistable Multivibrators**
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