

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

00852 Term-End Examination

December, 2017

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. (a) Draw the equivalent circuit of a BJT using h-parameter for CB configuration. Compare it with CE configuration. 5
- (b) Calculate the A_i , A_v , R_i , and R_o for common base (CB) configuration using h-parameters. 5
2. (a) Draw and explain the Darlington Connection. What is the main advantage of it? 5
- (b) Calculate the current gain provided by a Darlington connection of two identical transistors each having a current gain of $\beta = 200$. 5

3. (a) Define class A, B, and C amplifiers, giving their relative merits and demerits. 5
- (b) Draw the circuit diagram of a push-pull amplifier and explain its working principle. 5
4. (a) Draw the circuit of an astable multivibrator. Justify that it is a two-stage RC coupled amplifier using feedback. 5
- (b) Discuss briefly the merits and demerits of an RC coupled amplifier. 5
5. (a) In a negative feedback amplifier, $A = 100$, $\beta = 0.02$ and input signal voltage is 40 mV. Determine : 6
- (i) Voltage gain with feedback
- (ii) Feedback factor
- (iii) Output voltage
- (b) Determine the oscillation frequency of a transistor based Hartley oscillator with the circuit values $L_1 = 150 \mu\text{H}$, $L_2 = 1.5 \text{ mH}$, $M = 75 \mu\text{H}$ and $C = 150 \text{ pF}$. 4
6. Explain the effect of coupling and bypass capacitors in a circuit. Define f_α , f_β and f_γ and derive the relation between f_β and f_γ . 10

7. Draw the series resonant circuit. Plot a curve showing the variations of circuit current with frequency and explain it briefly. 10
8. What is the Barkhausen criterion of oscillation? Explain the Wien bridge oscillator. Also calculate the frequency of oscillations of a Hartley oscillator having $L_1 = 0.5 \text{ mH}$, $L_2 = 1 \text{ mH}$ and $C_3 = 0.2 \mu\text{F}$. 10
9. (a) Explain the construction and working of a crystal oscillator. What are the advantages of a crystal oscillator? 6
- (b) State the classification of oscillators. Explain the frequency stability of an oscillatory circuit. 4
10. Write short notes on any *two* of the following : $2 \times 5 = 10$
- (a) 555 Timer
 - (b) Q-Factor of a Circuit and Coil
 - (c) UJT
 - (d) Single Tuned Amplifier
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