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22/11/23

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Roll No.:

National Institute of Technology, Hamirpur (HP)

Name of Examination: B.Tech. End Semester Examination

Branch: ECE

Semester: 3rd

Subject: Analog Electronics

Subject Code: EC-212

Time: 3 Hours

Maximum Marks: 50

Note: Attempt all questions

- Q. 1 (a)** Draw neatly the configuration of Class-B power amplifier and explain its working. (5)
- (b)** Explain what is meant by harmonic distortion in reference to power amplifiers. Derive expressions for the second- and third-order harmonic distortion and total harmonic distortion. (5)
- Q. 2 (a)** Define alpha and beta cut-off frequency. Derive the relationship between them. (5)
- (b)** What is the effect of cascading on the bandwidth? Derive the mathematical expression for the same. (5)
- Q. 3 (a)** Discuss trans-impedance amplifier. Draw its equivalent circuit and derive expression for transfer characteristics. (5)
- (b)** Calculate the voltage gain, input and output resistances of a voltage-series feedback amplifier having $A_v = 300$, $R_i = 1.5 \text{ k}\Omega$, $R_o = 50 \text{ k}\Omega$ and $\beta = 1/15$. (5)
- Q. 4(a)** Give the importance of quality factor. Derive various forms of quality factor. (5)
- (b)** What is Barkhausen criterion for oscillation? What is the condition for sustained oscillation? Describe the principle of operation of a crystal oscillator. (5)
- Q. 5 (a)** Draw the high-frequency hybrid- π model of BJT in common emitter configuration and discuss about Miller capacitance. (5)
- (b)** Draw a Darlington emitter follower. Explain why the gain is higher than that of a single stage emitter follower. (5)