

B. Tech 3rd Semester Examination
Analog Electronics Engineering (NS)
EC-212

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

- Note :** (i) Attempt five questions in all, select one question from each section A, B, C, D. Section E is compulsory.
(ii) Assume suitable data if necessary.

SECTION - A

1. (a) Draw hybrid model of transistor for CE configuration. Find current gain, input impedance, voltage gain and output impedance. (10)
(b) Compare the performance of CB, CC and CE amplifiers. Which amplifiers mode is suitable for cascading and why? (10)
2. (a) Draw circuit diagram of RC coupled amplifier. Explain its frequency response. Discuss the effect of coupling capacitor on its performance. (10)
(b) What are cascade amplifiers? What are the advantages offered by the cascade amplifiers? (10)

SECTION - B

3. (a) Draw the hybrid π model of transistor; explain each of the components used in the model. (5)

- (b) Derive the expression for the short circuit current gain of a common emitter transistor amplifiers as a function of frequency. (10)
- (c) Prove the following:
$$g_{ce} = h_{oe} - g_m h_{re}$$
 (5)
4. (a) Draw the circuit diagram of class A push pull amplifier and explain its principle of operation with proper waveforms. (8)
(b) Write short notes on the following.
 - (i) Cross over distortion.
 - (ii) Harmonic distortion. (12)

SECTION - C

5. (a) Explain in brief the function of tank circuit in tuned voltage amplifier. Also discuss the effect of changing Q of the coil used in tank circuit on its bandwidth. (10)
(b) Draw the circuit diagrams of single and double tuned amplifier and their frequency response. Also explain in brief the advantages of using double tuned circuit over a single tuned circuit. (10)
6. (a) Differentiate between positive feedback and negative feedback. (4)
(b) Discuss the effect of negative feedback on bandwidth. (6)
(c) How will the input impedance of an amplifier be affected by introduction of (i) voltage series feedback and (ii) current shunt feedback? (10)

[P.T.O.]

SECTION - D

7. (a) Draw the circuit diagram of phase shift oscillator and explain its operation by deriving expression for frequency of oscillation. (10)
- (b) Draw the circuit diagram of a transistor Hartley oscillator and explain its operation. Determine the frequency of oscillation and oscillation condition for it. (10)
8. (a) Explain the action of a zener diode as a voltage regulator. (6)
- (b) With the help of circuit diagrams, briefly explain how
- (i) Fixed output voltage three terminal regulator can be used to get a variable regulated output.
- (ii) A three terminal regulator can be used as a constant current source. (8)
- (c) Distinguish between a linear regulated power supply and a switched mode power supply. (6)

SECTION - E

9. (i) What are the main purposes for which a common collector amplifier may be used?
- (ii) How do you improve the gain of an RC coupled amplifier at low frequency?
- (iii) Define base spreading resistance.
- (iv) Why a power amplifier is always preceded by a voltage amplifier?
- (v) What is the difference between parallel resonance and series resonance?

- (vi) Voltage gain of an amplifier without feedback is 60dB. It decreases to 40dB with feedback. Calculate the feedback factor.
- (vii) Discuss effect of negative feedback on noise.
- (viii) The parameters of a crystal oscillator equivalent circuit are $L_s=0.8H$, $C_s=0.08PF$, $R_s=5K\Omega$ and $C_p=1.0PF$. Determine the resonance frequencies f_s and f_p .
- (ix) What are the Barkhausen conditions of oscillations?
- (x) What do you mean by voltage regulation? (2×10=20)