B.Tech. (Sem. - 4th)
ANALOG ELECTRONICS
SUBJECT CODE : EC - 202
Paper ID : [A0306]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours   **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.

2) Attempt any **Four** questions from Section - B.

3) Attempt any **Two** questions from Section - C.

Section - A

Q1)   (10 × 2 = 20)

a)   What is PIV of a diode in a rectifier circuits?

b)   What is a Zener diode? Draw its V-I characteristics?

c)   Why are two transistors used in a Wein Bridge Oscillator?

d)   What is meant by 'Cross-over Distortion'?

e)   State Barkhausen's Criteria for Oscillation.

f)   Explain the effect of coupling capacitor on low frequency response of BJT amplifiers.

g)   What are multi-stage amplifiers?

h)   Discuss the effect of Emitter bypass capacitor on low frequency response of BJT amplifiers.

i)   Define : Gain Margin.

j)   Why do we need three RC networks for a phase - shift oscillator?

Section - B

(4 × 5 = 20)

Q2) An amplifier has voltage gain with feedback of 100. If the gain without feedback changes by 20% and the gain with feedback should not vary more than 2% , determine the values of open loop gain A and feedback ratio β.

Q3) In a Hartley oscillator, the value of the capacitor in the tuned circuit is 500 pF and the two sections of coil have inductances $38\mu H$ and $12\mu H$. Find the frequency of oscillations and the feedback factor β.

Q4) Show that a full - wave rectifier is twice as efficient as a half-wave rectifier.

Q5) Describe with necessary derivations, the effect of negative feedback on the bandwidth and distortion in an amplifier.

Q6) Sketch the circuit of a push-pull class B transistor amplifier in the common-collector configuration with an output transformer, and explain its working.

Section - C

$(2 \times 10 = 20)$

Q7) (a) In an RC phase shift oscillator, if $R_1 = R_2 = R_3 = 200\ k\Omega$ and $C_1 = C_2 = C_3 = 100$ pF. Find the frequency of oscillations.
  (b) State Nyquist criterion for stability.
  (c) Draw a circuit using complementary symmetry and discuss its advantages.

Q8) (a) Given the following transistor measurements made at $I_c = 5$ mA, $V_{CE} = 10V$ and at room temperature:

  $h_{fe} = 100$ $h_{ie} = 600\ \Omega$

  $A_{ie} = 10$ at 10MHz $C_c = 3pF$

  Find $f_{\beta,}\ C_e,\ r_{b'e}$ and $r_{bb'}$.

  (b) With the help of a circuit diagram explain the working of a transistor series regulator.

Q9) (a) Draw the circuit diagram of a tuned amplifier. Discuss its operation. How are Current gain and voltage gain given in this case? Name various types of tuned amplifiers.
  (b) Determine the value of ripple factor in the full-wave rectifier operating at 50 Hz with a $100\mu F$ capacitor filter and 100Ω load.

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