Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 51208

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Third Semester

Electronics and Communication Engineering

EC 1203 — ELECTRONIC CIRCUITS — I

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Write the factors that contribute to thermal instability.

2.   Define stability factor and determine stability factor for CB amplifier.

3.   Draw the biasing circuit of Darlington emitter follower.

4.   Give the features and applications of cascode amplifiers.

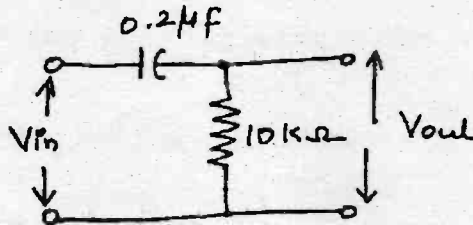5.   For the given network determine the cut off frequency.

Fig. Q.5

6.   Define Rise Time and Sag of an amplifier.

7.   Why non-linear distortion is called harmonic distortion?

8.   What is thermal resistance? And give its unit.

9.   Define sensitivity of feed back amplifier.

10.   State Nyquist criterion for stability.

PART B — (5 × 16 = 80 marks)

11.   (a)   A CE transistor amplifier with voltage divider bias circuit is designed to establish the quiescent point at $V_{CE} = 12V$, $I_c = 2mA$ and stability factor ≤ 5.1. If $V_{cc} = 24V$, $V_{BE} = 0.7V$, $\beta = 50$ and $R_c = 4.7k\Omega$ determine the values of resistors R_E, R_1 and R_2.   (16)

Or

   (b)   Calculate the operating point of the self biased JFET having the supply voltage $V_{DD} = 20V$ maximum value of drain current is 10 mA and gate source voltage is $-3v$ at $I_D = 4mA$. Also determine the values of R_D and R_s to obtain this bias condition.   (16)

12.   (a)   Draw the AC equivalent circuit of a CE amplifier with unby passed emitter resistor using h-parameter. And derive the expressions for input imdepance, output impedance, voltage and current gain.   (16)

Or

   (b)   Draw and explain the circuit diagram of an emitter coupled BJT differential amplifier and derive expressions for CMRR and output impedance.   (16)

13.   (a)   Discuss the effect of emitter by pass capacitor on low frequency response of BJT amplifiers.   (16)

Or

   (b)   Explain common source amplifier at High frequencies and obtain the voltage gain, input admittance and output admittance.   (16)

14.   (a)   (i)   With neat circuit diagram explain transformer coupled class A Audio power amplifier.   (8)

      (ii)   Determine the efficiency of class A amplifier.   (8)

Or

   (b)   (i)   With neat circuit diagram explain class B push pull amplifier.   (8)

      (ii)   What are the different types of distortion in amplifiers? Explain.   (8)

15. (a) (i) Determine the voltage gain, input and output impedance with feed back for voltage series feed back having $A = -100$ $Ri = 10k\Omega$ and $R_0 = 20k\Omega$ for feed back of $\beta = -0.1$. (8)

   (ii) Enumerate the effects of negative feedback on the various characteristics of the amplifier. (8)

Or

(b) (i) Explain the effect of current series feedback in the following performance measures of a BJT amplifier (10)

   (1) Input resistance

   (2) Output resistance

   (3) Bandwidth

   (4) Gain stability.

   (ii) For BJT amplifiers with current series feedback. Obtain input and output resistance with feedback. Consider $R_B = 600k\Omega, R_E = 1.2k\Omega, Rc = 4.7k\Omega$ and $\beta = 75$. Use $V_{CC} = 16V$ $h_{f_e} = 120$ and hie $= 900\,\Omega$. (6)

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