R 3284

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Third Semester

(Regulation 2004)

Electronics and Communication Engineering

EC 1203 — ELECTRONIC CIRCUITS — I EC 2205

(Common to B.E. (Part-Time) Second Semester, Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why capacitive coupling used to connect a signal source to an amplifier?

2. What is the condition for thermal stability?

3. Define CMRR.

4. State Miller's theorem.

5. Draw general frequency response curve of an amplifier.

6. Define rise time.

7. What is called as crossover distortion and how to minimize this distortion?

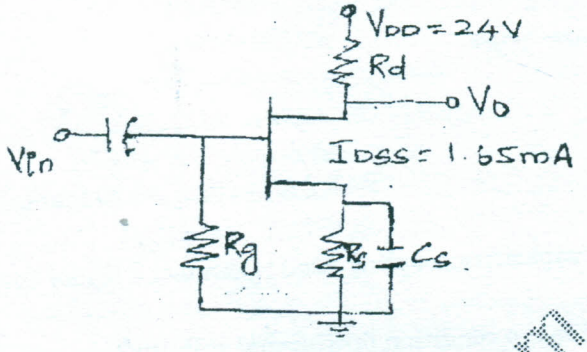
8. Compare the efficiency of class A, B, C, AB.

9. Define Transformer Utilization Factor.

10. Compare the performance of half wave rectifier and full wave rectifier.

PART B — (5 × 16 = 80 marks)

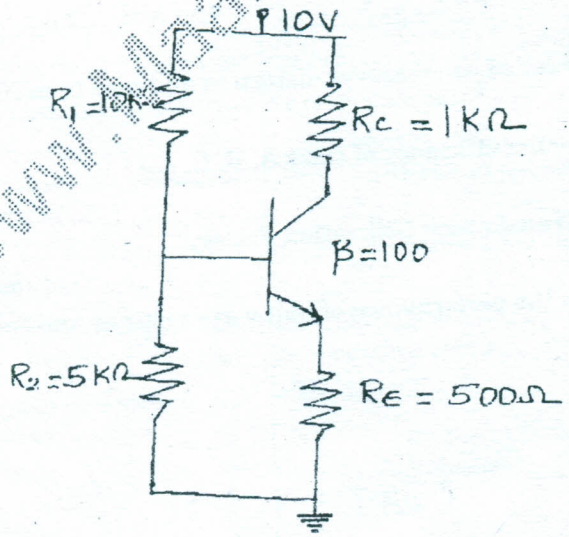
11. (a) (i) The amplifier shown in figure utilizes an n – channel FET for which, $I_D = 0.8$ mA, $V_p = -2.0$ V and $I_{DSS} = 1.65$ mA. Assume that $r_d > R_d$. Find (1) V_{GS} (2) g_m (3) R_S. (8)



(ii) How is a JFET used as a voltage variable resistance? Explain. (8)

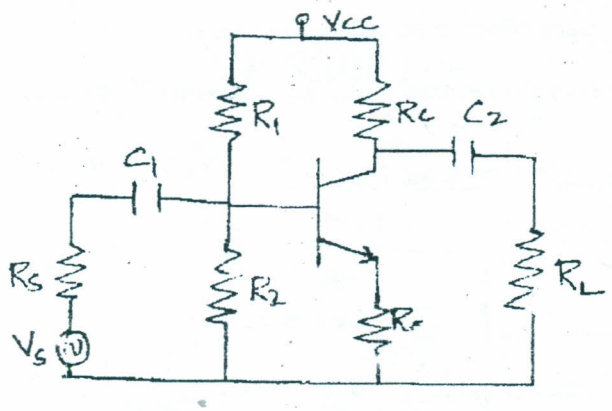
Or

(b) (i) For the given circuit calculate V_{CE} and Ic, where β = 100 for the silicon transistor. (8)



(ii) Why biasing is necessary in BJT amplifier and Explain the concept of DC load line with neat diagram. (8)

12. (a) Consider a single stage common emitter amplifier with Rs = 1 KΩ, R_1 = 50 KΩ, R_2 = 2 KΩ, Rc = 1 KΩ, R_L = 1.2 KΩ, h_{fe} = 50, h_{ie} = 1.1 KΩ, hoe = 25 μA/V and $h_{re} = 2.5 \times 10^{-4}$. Find A_I, Av, Zi, A_{IS}, A_{VS} and Y_O. (16)



Or

(b) (i) Explain the emitter coupled difference amplifier with neat diagram. (10)

(ii) Write the improving methods of CMRR. (6)

13. (a) (i) Sketch the small signal high frequency circuit of a common source amplifier and derive the expression for a voltage gain. (12)

(ii) What specific capacitance has the greatest effect on the high frequency response of a cascade of FET amplifier? Explain. (4)

Or

(b) (i) With the neat sketch explain hybrid – pi (π) Common Emitter transistor model. (8)

(ii) Derive the expression for transistor conductance (g_m) for hybrid π common emitter transistor model. (8)

14. (a) (i) Explain class A RC coupled power amplifier. (10)

(ii) Explain how the characteristics are modified with transformer coupling. (6)

Or

(b) A class B complementary A.F power amplifier shown in figure, Calculate

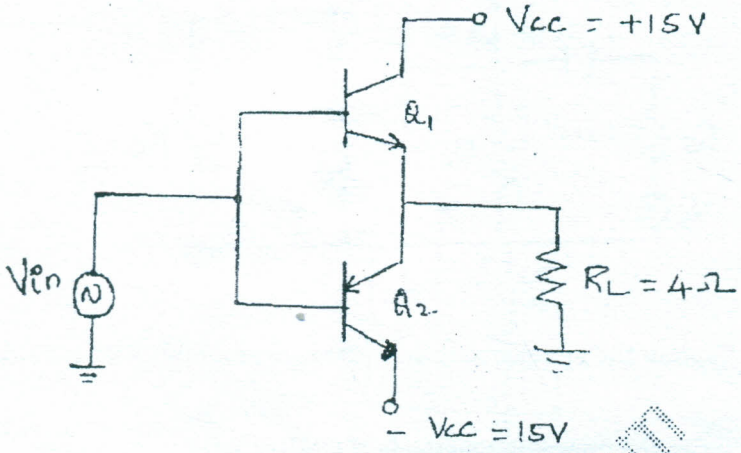
(i) Maximum AC power which can be developed

(ii) Collector dissipation while developing Maximum AC power

(iii) Efficiency

(iv) Maximum power dissipation per transistor

(v) Efficiency under maximum power dissipation condition.



15. (a) (i) With neat sketch explain the Switched Mode Power Supplies. (8)

(ii) A HWR circuit is supplies from a 230 V, 50 Hz supply with a transformer having step down ratio of 3 : 1 to a resistive load of 10 KΩ. The diode forward resistance is 75 Ω, while transistor series resistance is 10 Ω. Calculate maximum, average and RMS value of current. (8)

Or

(b) (i) Draw the circuit diagram of a FWR with capacitor input filter. With suitable waveform explain its working. Derive the expression for ripple factor. (10)

(ii) Design and draw a zener regulator circuit to meet the following specification. (6)

Load voltage = 8 V

Input voltage = 30 V

Load current = 0 – 50 mA

Izmin = 5 mA

Pz = 1 Watt.

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