Register Number: ……..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Third Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE105:Electronic Circuits I

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The use of emitter resistance in the context of biasing is
   a) Load resistance b) Stabilization resistance
   c) Biasing resistance d) Compensation resistance
2. The major role of source resistance in Voltage divider bias circuit of JFET is
   a) Fixing the quiescent values b) Providing input to amplifier
   c) Increasing the output voltage d) Decreasing the output voltage.
3. In the simplified CE approximate hybrid model
   a) Load resistance must be small b) h_{oe}, h_{re} are neglected
   c) Error in calculating the performance parameters is < 10% d) All the above
4. The voltage gain of a CS amplifier with R_D = 5 KΩ, R_G = 10 MΩ, μ = 50 and r_d = 35 KΩ is
   a) -6.25 b) 6.25
   c) -62.5 d) 62.5
5. Use of Darlington pair results in
   a) High input impedance b) high voltage gain
   c) High current gain d) High overall leakage current
6. Bisection theorem is used for
   a) Asymmetric circuits b) Series circuits
   c) Parallel circuits d) Symmetric circuits
7. The coupling used for amplifying extremely low frequency signals is
   a) RC coupling b) Transformer coupling
   c) Direct coupling d) All the above
8. A BJT has a maximum power dissipation of 2W at ambient temperature of 25°C and maximum junction temperature of 150°C. The thermal resistance is
   a) 87.5 b) 62.5

   c) 12 d) 3
9. Fold back limiting is used for
   a) Protecting the load b) Protecting the load and regulator
   c) Protecting the regulator d) Protecting the transistor
10. The advantages of π – section filter are
   a) Less Ripple factor, high dc output voltage b) High Ripple factor, less dc output voltage
   c) High Ripple factor, high dc output voltage d) Less Ripple factor, less dc output voltage

PART B (10 x 2 = 20 Marks)

11. Estimate the values of the resistors in a fixed bias circuit using the following specifications. I_{CQ}=9mA, V_{CEQ}=4.6V, β = 100, V_{CC} = 10V.
12. What are the techniques used for stabilizing of Q point?
13. Write the h-parameters conversion formulae for CB and CC amplifier in terms of CE parameters.
14. Calculate the cut-off frequency due to C_1 and C_2 in the circuit shown in figure 1.

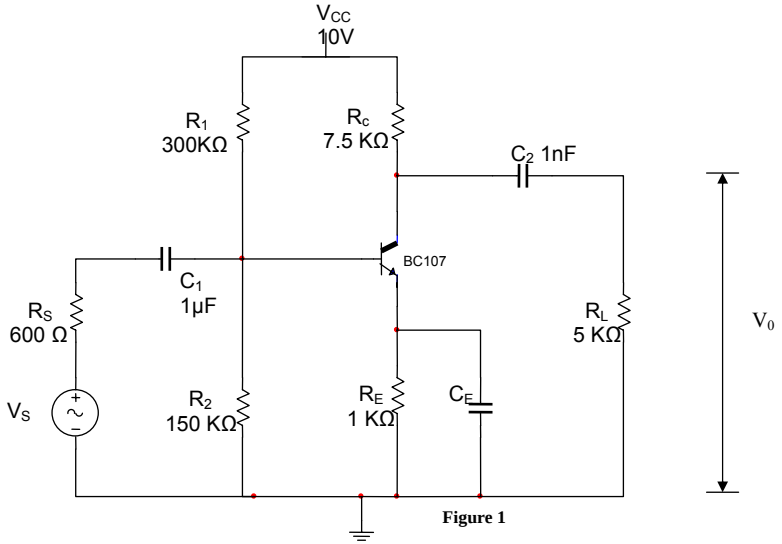

Figure 1

15. Draw the Darlington amplifier with Bootstrapping arrangement.
16. Define CMRR of a differential amplifier.
17. What is Class AB operation?

18. Define conversion efficiency of a power amplifier. What is its value for Class C?

19. Find the ripple factor of capacitance filter connected to FWR.

20. What are the disadvantages of Zener diode voltage regulator.

PART C (5 x 14 = 70 Marks)

21. a) (i) Draw the circuit diagram of self bias using CE configuration and Derive its stability factors. What are the design considerations to make the stability factor independent of h_{fe} variation? (10)

(ii) Explain bias compensation using Sensistors. (4)

(OR)

b) (i) A JFET amplifier with Voltage divider biasing circuit has the following parameters, R_1= 12MΩ, R_2= 8.57MΩ, R_D= 91KΩ, R_S= 3KΩ, V_{DD} = 24V, I_{DSS} = 4mA, and V_P = -2V. Calculate V_{GSQ}, I_{DQ}, V_{DSQ} and V_{DSQ}. (10)

(ii) Explain how FET acts as a VVR. (4)

22. a) Analyze and determine the input impedance, output impedance, current gain and voltage gain with and without source resistance of a CE transistor amplifier R_1 = 120 KΩ, R_2 = 24 KΩ, R_c = 6 KΩ R_E = 1.5 KΩ R_L = 4.7 KΩ and R_s = 600Ω. h_{ie} = 1.1 KΩ, h_{fe} = 100, h_{re} = 2.5 X 10^{-4}, KΩ and h_{oe} = 25μA/V.

(OR)

b) (i) Draw the high frequency hybrid-π model for a transistor in a CE configuration and explain the significance of each component. (10)

(ii) At I_c = 1mA and V_{CE} = 10V, a certain transistor has h_{fe} = 200. Calculate g_m and $r_{b'e}$. (4)

23. a) (i) Describe the working of cascade amplifier with neat schematics (8)

(ii) Analyze the Darlington pair emitter follower with neat diagram and derive the expression for its performance measures. List the advantages and disadvantages. (6)

(OR)

b) Draw the circuit diagram of a differential amplifier and derive expression for CMRR, input and output impedance. Also explain the methods of improving the CMRR.

24. a) (i) With necessary diagrams, explain a Transformer coupled Class A amplifier. Derive its efficiency, ac and dc power and power dissipation. (10)

(ii) Compare with direct coupled Class A amplifier. (4)

(OR)

b) (i) Explain the working of Class B push-pull power amplifier with necessary diagram and waveforms. Derive the efficiency and power dissipation. (10)

(ii) Explain how cross-over distortion can be minimized. (4)

25. a) Describe the working of a Full Wave Bridge Rectifier and derive the expression for RMS value of voltage and current, Ripple factor, Efficiency, TUF and PIV.

(OR)

b) (i) Explain the operation of transistorized series voltage regulator (8)

(ii) Explain the operation of Switched Mode Power Supply with block diagram. (6)

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