

Third Semester B.E. Degree Examination, June/July 2019
Analog Electronic Circuits

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Explain the different diode equivalent circuits with necessary approximations, if any. (06 Marks)
- b. Determine the output waveform transfer characteristics for the sinusoidal input of Fig. Q1 (b). Assume diode is ideal. (06 Marks)

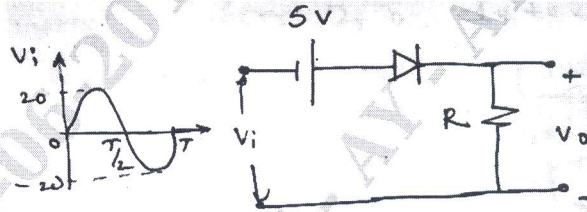


Fig. Q1 (b)

- c. Define clamper circuit. Draw and explain the working of the clamper circuit which clamps the positive peak of a signal to zero volts. (08 Marks)

- 2 a. Explain with a neat diagram, emitter bias configuration to fix the operating point. (06 Marks)
- b. For the network shown in Fig. Q2 (b), determine I_{CQ} , V_{CQ} , V_B , V_C , V_E and V_{BC} . (08 Marks)

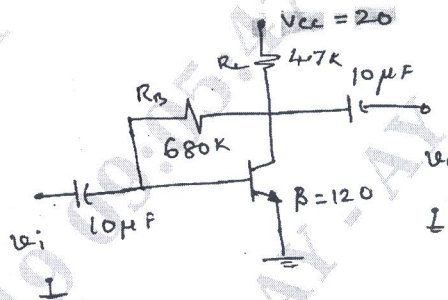


Fig. Q2 (b)

- c. Derive an expression for $S_{I_{CQ}}$, $S_{(V_{BE})}$ and $S_{(\beta)}$ for a fixed bias circuit. (06 Marks)

- 3 a. Derive an expression for voltage gain Z_i and Z_o for common emitter voltage divider bias configuration using r_e model. (08 Marks)
- b. For the emitter follower network shown in Fig. Q3 (b), determine r_e , Z_i , Z_o , A_v if $r_o = \infty$. (06 Marks)

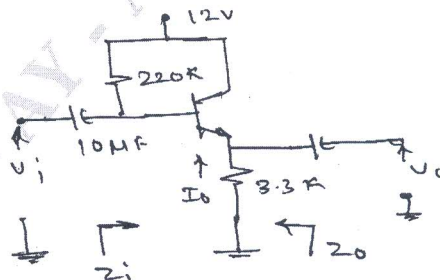


Fig. Q3 (b)

- c. Define h-parameters. Draw the complete hybrid equivalent circuit of a transistor. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 4 a. Explain the low frequency response of BJT amplifier and obtain expression for lower cut off frequency due to C_C , C_E and C_S . (10 Marks)
 b. Obtain expression for Miller effect input and Miller effect output capacitance. (10 Marks)

PART - B

- 5 a. For the Darlington emitter follower circuit shown in Fig. Q5 (a), calculate the Z_i , Z_o , A_V and A_i . (10 Marks)

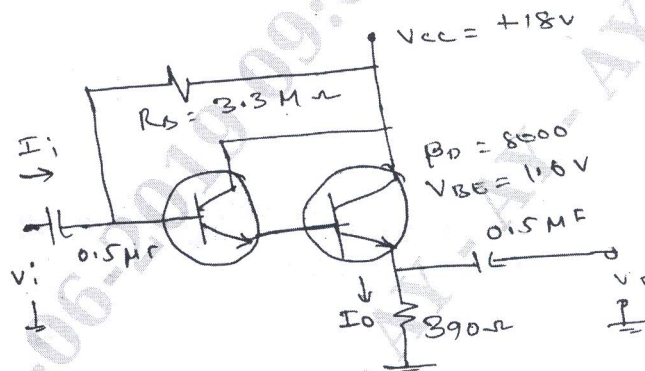


Fig. Q5 (a)

- b. List the advantages of negative feedback on amplifier. (04 Marks)
 c. Derive an expression for Z_{in} , Z_o for a voltage series feedback. (06 Marks)
- 6 a. Draw the circuit diagram and explain the operation with relevant waveform of class-B push full amplifier. Also, show that the maximum conversion efficiency of class-B push pull amplifier is 78.5%. (12 Marks)
 b. Explain the operation of transformer coupled class-A power amplifier and prove that the maximum power efficiency is 50%. (08 Marks)
- 7 a. Obtain the Barkhausen criterion for operation of the oscillator using basic feedback circuit and hence, explain the operation of the oscillator. (06 Marks)
 b. With the help of a neat circuit diagram, explain transistor Colpitt's oscillator. Write the expression for the frequency of oscillation. (08 Marks)
 c. A Quartz crystal has $L = 0.2$ H, $C = 0.085$ pF, $C_M = 1$ pF and $R = 5$ kΩ. Find
 (i) Series resonant frequency. (06 Marks)
 (ii) Parallel resonant frequency.
- 8 a. With necessary equivalent circuit, obtain the expression for A_V , Z_{in} , Z_o for a fixed biased JFET amplifier. (10 Marks)
 b. Define g_m of field effect transistor. Explain the procedure to determine g_m value graphically. (06 Marks)
 c. List the difference between FET and BJT. (04 Marks)
