

CBCS SCHEME

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15EE34

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

Analog Electronic Circuits

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. For the circuit shown in Fig.Q1(a), sketch the output waveforms and transfer characteristics for cut in voltage = 0.7V. (08 Marks)

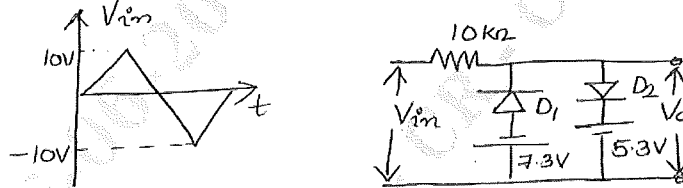


Fig.Q1(a)

- b. Derive an expression for I_B , I_C , V_{CE} for voltage divider bias using exact analysis. (08 Marks)

OR

- 2 a. In a voltage divider bias circuit of BJT. $R_C = 4K\Omega$, $R_E = 1.5K\Omega$, $R_1 = 39K\Omega$, $R_2 = 3.9K\Omega$, $V_{CC} = 18V$ and $\beta = 70$. Find I_{CQ} and V_{CEQ} . (08 Marks)
- b. Explain the operation of transistor as switch along with suitable circuit and necessary waveforms. Highlight the design procedure. (08 Marks)

Module-2

- 3 a. Define h-parameters and hence derive h-parameter model of a CE – BJT. (06 Marks)
- b. State and prove Miller's theorem. (04 Marks)
- c. For the network shown in Fig.Q3(c), determine r_e , Z_i , Z_o , A_v and A_i . (06 Marks)

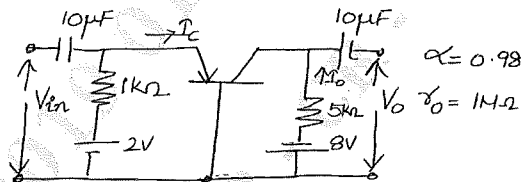


Fig.Q3(c)

OR

- 4 a. Determine the high frequency response of the amplifier circuit shown in Fig.Q4(a). Draw the frequency response curve. (08 Marks)
- $\beta = 100$, $C_{be} = 20pF$, $C_{bc} = 4pF$, $h_{ie} = 1100$, $C_{wi} = 6pF$, $C_{wo} = 8pF$, $C_{cc} = 1pF$.

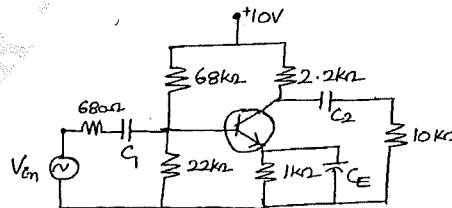


Fig.Q4(a)

- b. Describe Miller effect and derive an equation for miller input and output capacitances. (08 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.

Module-3

- 5 a. Derive an expression for Z_i , A_V and A_I for Darlington emitter follower circuit. (08 Marks)
 b. Explain the block diagram of a feedback amplifier. (08 Marks)

OR

- 6 a. List the general characteristics of negative feedback amplifier and derive the expression for gain with negative feedback. (08 Marks)
 b. Derive the expression of R_{if} and R_{of} for voltage series feedback amplifier. (08 Marks)

Module-4

- 7 a. Explain the operation of a Class B push pull amplifier and show that its conversion efficiency is 78.5%. (08 Marks)
 b. What is Brakhansen criteria for sustained oscillation? Explain basic principle of operation of oscillators. (08 Marks)

OR

- 8 a. Prove that the maximum conversion efficiency of class A transformer coupled amplifier is 50%. (08 Marks)
 b. The harmonic distortion component in a power amplifier is $D_2 = 0.1$, $D_3 = 0.02$, $D_4 = 0.01$. The fundamental current amplitude is 4A and it supplies a load of 8Ω . Find total harmonic distortion, fundamental power and total power. (08 Marks)

Module-5

- 9 a. Draw the circuit of common source amplifier using JFET with the help of small signal model and derive an expression for input impedance, voltage gain and output impedance. (08 Marks)
 b. For the JFET amplifier shown in Fig.Q9(b). Calculate i) g_m ii) r_d iii) Z_i iv) Z_0 v) A_V . (08 Marks)

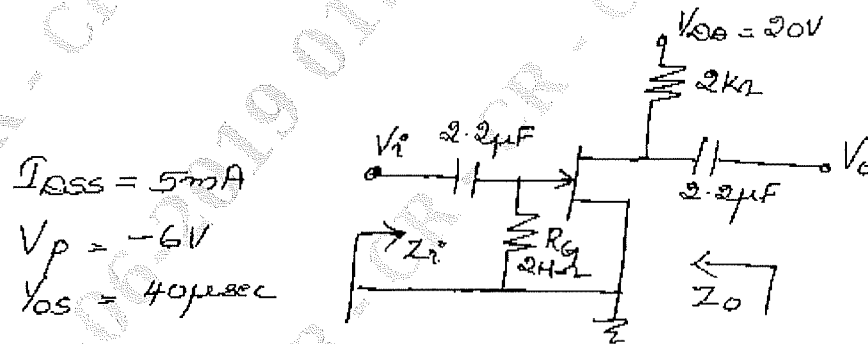


Fig.Q9(b)

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OR

- 10 a. With the help of neat diagram, explain the construction, working and characteristics of n-channel JFET. (08 Marks)
 b. Define transconductance and r_d of FET. Explain the procedure to determine the above values graphically. (08 Marks)
