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)**

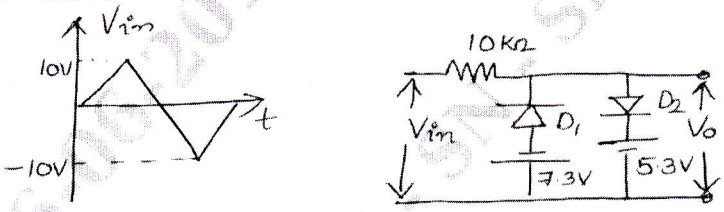

Fig.Q1(a)

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_0, A_V and A_I. **(06 Marks)**

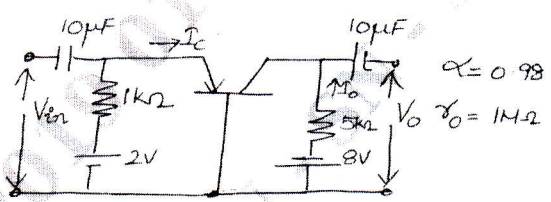

Fig.Q3(c)

OR

4 a. Determine the high frequency response of the amplifier circuit shown in Fig.Q4(a). Draw the frequency response curve.

$\beta = 100$, $C_{be} = 20pF$, $C_{bc} = 4pF$, $h_{ie} = 1100$, $C_{wi} = 6pF$, $C_{WO} = 8pF$, $C_{CC} = 1pF$. **(08 Marks)**

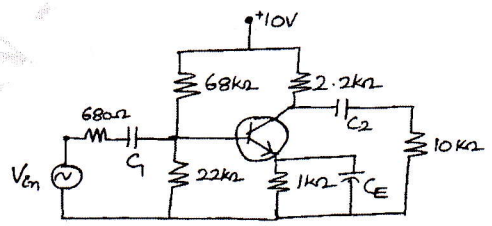

Fig.Q4(a)

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

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)**

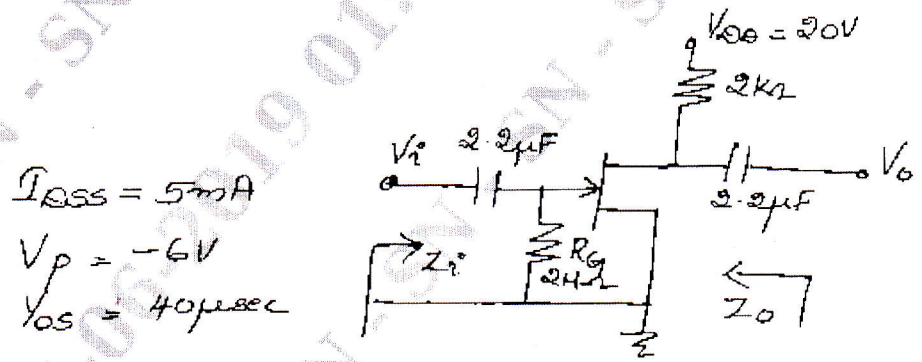

Fig.Q9(b)

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)**

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