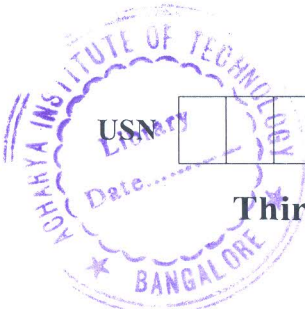


CBCS SCHEME

18EE34



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Third Semester B.E. Degree Examination, July/August 2021 Analog Electronic Circuits

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Analyse the given clipper circuit and sketch the nature of its output voltage. Given input voltage $V_i = 25 \sin \omega t$ and assume diode is silicon diode.

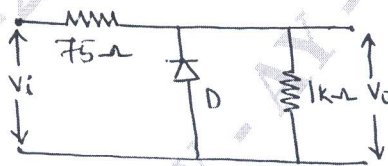


Fig.Q1(a)

(06 Marks)

- b. What is operating point of a transistor? Explain the significance of operating point. (06 Marks)
- c. For the emitter bias network shown in Fig.Q1(c), determine I_B , I_C , V_{CE} and saturation current for the network. Given $\beta = 50$ and $V_{BE} = 0.7V$.

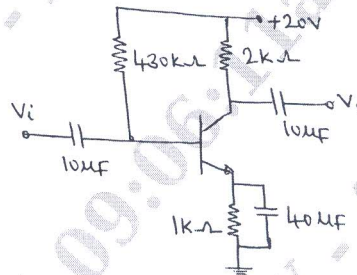


Fig.Q1(c)

(08 Marks)

- 2 a. Design suitable circuit represented by the box shown Fig.Q2(a) which has input and output waveforms as indicated.

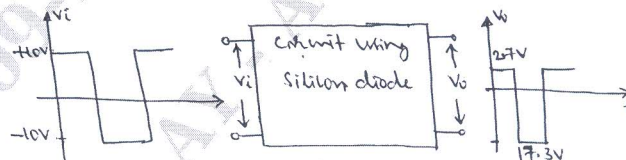


Fig.Q2(a)

(06 Marks)

- b. Derive an expression for V_{th} , I_B and V_{CE} for voltage divider bias circuit using exact analysis. (08 Marks)
- c. Define the following stability factors : i) S ii) S_V iii) S_β . (06 Marks)
- 3 a. Define h-parameters. Draw the h-parameter model of a transistor. (04 Marks)
- b. A CE transistor amplifier has $R_S = 1k\Omega$ and $R_L = 2k\Omega$. The h-parameters are $h_{ie} = 1250\Omega$, $h_{re} = 2.5 \times 10^{-4}$, $h_{fe} = 70$ and $h_{oe} = 25\mu A/V$. Find A_I , A_V , R_i and R_o . (08 Marks)
- c. For the emitter follower circuit, derive expressions for input impedance and output impedance. Use h-parameter model. (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.

- 4 a. Obtain the expressions for input impedance, output impedance, voltage gain and current gain of common-base configuration using AC equivalent circuit with h-parameter model. (10 Marks)
- b. For the circuit shown in Fig.Q4(b). Use Miller's theorem calculate Z_i , Z_i^1 , A_V and A_I . Given $h_{ie} = 1100\Omega$, $h_{fe} = 50$, $h_{oe} = \frac{1}{40K}$ and $h_{re} = 2.5 \times 10^{-4}$.

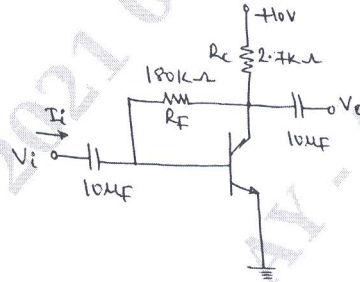


Fig.Q4(b)

- (10 Marks)
- 5 a. Draw the cascade configuration and list the advantages of this circuit. (05 Marks)
- b. Derive expression for Z_i , A_I and A_V for a Darlington emitter follower circuit. (10 Marks)
- c. With the help of block diagram explain the concept of feedback amplifier. (05 Marks)
- 6 a. Explain with the help of circuit what is cascade connection. Mention its advantages. (07 Marks)
- b. Prove that how band width of an amplifier increases with negative feedback. (06 Marks)
- c. Derive an expression for input resistance for voltage series feedback amplifier. (07 Marks)
- 7 a. Discuss the different types of power amplifiers. (04 Marks)
- b. Draw the circuit diagram of a class-B push pull amplifier and explain the operation with relevant waveforms. (08 Marks)
- c. With basic circuit, derive the expression for the frequency of oscillations of a Wien bridge oscillator. (08 Marks)
- 8 a. With circuit diagram explain the operation of transistor Hartley oscillator. Write the expression for the frequency of oscillation. (08 Marks)
- b. In a Colpitt's oscillator $C_1 = C_2 = C$ and $L = 100\mu H$. The frequency of oscillations is 500KHz. Determine the value of C . (06 Marks)
- c. Calculate the power dissipated in the individual transmitter of a class B push-pull power amplifier if $V_{CC} = 20V$ and $R_L = 4\Omega$. (06 Marks)
- 9 a. With sketches, describe the constructional details of JFET. (08 Marks)
- b. Explain drain and transfer characteristics of a n-channel JFET. (08 Marks)
- c. A JFET has $g_m = 5mV$ at $V_{GS} = -1V$. Find I_{DSS} if pinch-off voltage $V_P = -2.0V$. (04 Marks)
- 10 a. Explain the basic operation and characteristics of n-channel depletion type MOSFET. (08 Marks)
- b. Derive the expression for Z_i , Z_0 and A_V for common source JFET amplifier with fixed bias. (08 Marks)
- c. Give the difference between JFET and MOSFET. (04 Marks)
