

S.E. (IS) CBCGS (Choice Base) II Semester

[Time: Three Hours]

[Marks:80]

N.B:

1. Question.No.1 is compulsory.
2. Attempt any three questions from remaining five questions.
3. Assume suitable data wherever necessary.

Q.1o Attempt any four questions.

- a) Draw the circuit diagram and waveforms for positive and negative clamper circuit.
- b) Explain, How BJT can be used as a switch?
- c) Describe total harmonic distortion.
- d) What input must be applied to the input of Fig.1 to result in an output of 2.4 V?

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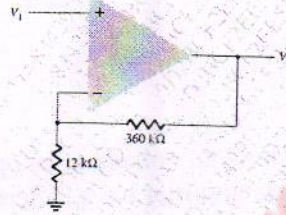


Fig. 1

- e) Explain the condition for oscillation using opamp.

Q.2 a) Determine the current  $I_1$ ,  $I_2$  and  $I_{D2}$  for the fig.2

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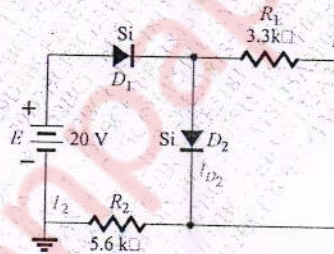


Fig.2

- b) Describe how the Centre tapped full wave rectifier works, calculate its output voltage and peak inverse voltage.

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Q.3 a) Sketch the majority and minority carrier flow for the npn transistor, Describe the resulting carrier motion. What is the source of leakage current.

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- b) For the emitter Bias network, find the parameters (Fig.3):

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$I_B, I_C, V_{CE}, V_C, V_B$

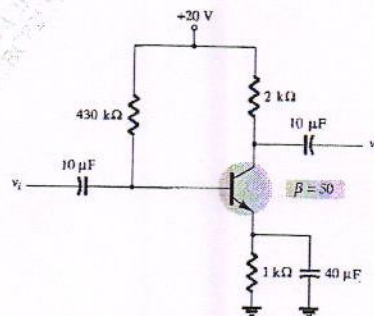


Fig. 3

- Q.4 a) Is the relationship between change in  $V_{GS}$  and resulting change in  $I_D$  is linear or nonlinear, Explain? Describe in your own words why is the input impedance of JFET so high. 10
- b) For the network of Fig. 4, the levels of  $V_{DQ}$  and  $I_{DQ}$  are specified. Determine the required values of  $R_D$  and  $R_S$ ? 10

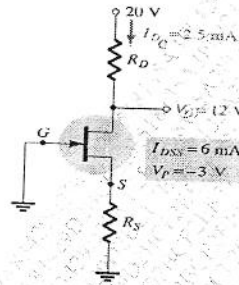


Fig.4

- Q.5 a) Determine the output voltage of an op-amp for input voltages of  $V_{i1} = 200 \text{ mV}$  and  $V_{i2} = 140 \text{ mV}$ . The amplifier has a differential gain of  $A_d = 6000$  and the value of CMRR is: i.) 200. ii.)  $10^5$  10
- Q.6 a) Draw and explain the circuit for summation and differentiator using opamp. 10
- b) Explain class A amplifier with the help of circuit diagrams. 10
- c) Derive the expression for 3 opamp Instrumentation amplifier with neat diagram. 10