

1108
B.E. (Electronics and Communication Engineering)
Second Semester
EC-201: Analog Electronics Circuits – I

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.
x-x-x

1. (a) What will happen if the three regions of the transistor are equally doped? (2)
- (b) What is meant by early effect in BJT and what is its significance? (2)
- (c) Why are non-sinusoidal oscillators referred to as relaxation oscillators? (2)
- (d) Why large signal amplifiers are also known as power amplifiers? (2)
- (e) Why do you need a tank circuit in the Class C power amplifier? (2)

Part-A

2. (a) What is the need for bias compensation? Explain the compensation techniques used for V_{BE} and I_{CBO} . (5)
- (b) The dc current gain of a transistor in CE mode is 100. Determine its dc current gain in CB mode. (2)
- (c) Find out the (i) base current, (ii) emitter current and (iii) V_{CE} for the CE circuit shown in fig.1. For $V_{CC}=10\text{ V}$, $R_B=200\text{ k}\Omega$, $R_C=2\text{ k}\Omega$, $V_{BE(on)}=0.7\text{ V}$, $\beta=200$. (3)

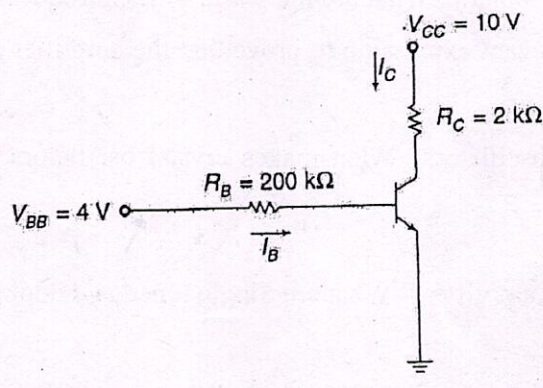


Fig. 1

3. (a) Explain working of transistor as an amplifier. (3)
- (b) For the circuit shown in fig. 2, find the (i) input impedance, (ii) voltage gain, (iii) current gain, and (iv) output impedance. The values of the h-parameters of the transistor are $h_{ie}=1.5\text{ k}\Omega$, $h_{fe}=100$, $h_{re}=1 \times 10^{-4}$, and $h_{oe}=25\text{ }\mu\text{A/V}$. (7)

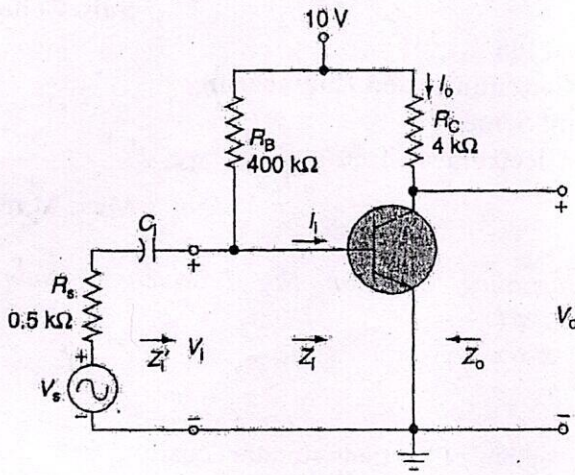


Fig. 2

4. (a) Explain the construction difference between enhancement and depletion type MOSFET. (3)
- (b) What is meant by a field effect transistor? How is it different from BJT? (3)
- (c) Explain FET small signal model and list FET applications. (4)

Part-B

5. (a) What is an R-C coupled amplifier? Explain its working with the help of suitable diagram. (5)
- (b) What is meant by bandwidth of an amplifier? What is its significance and how do you determine it in case of amplifier? (5)
6. (a) With the help of relevant circuit diagram, describe the operation of Wien Bridge oscillator configured around an opamp. What are the phase shifts introduced by the feedback and amplifier parts? Derive the relevant expression to prove that the amplifier should have a gain of atleast 3 for sustained oscillations. (5)
- (b) What are Crystal oscillators? What makes crystal oscillators exhibit exceptionally high frequency stability? (5)
7. (a) How do we classify amplifiers? What are Single tuned and double tuned amplifiers? (5)
- (b) Explain the functioning of a Class B push-pull power amplifier with necessary circuit diagram. What is crossover distortion present in the output of the amplifier? (5)