

Code: 9A02405

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2016

ANALOG ELECTRONIC CIRCUITS

(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Derive the voltage gain, current gain, input resistance and output resistance of a single stage CB amplifier with source resistance R_S and load resistance R_L .
(b) In a single stage CB amplifier circuit, $R_E = 10K$, $R_C = 10K$, $V_{EE} = -15 V$, $V_{CC} = 20 V$, $R_L = 10K$ and $R_S = 0.5K$. Find A_i , R_i , R_o & A_v .
- 2 (a) What is diffusion capacitance of a transistor and derive its equation.
(b) In a given germanium PNP transistor whose base width is 10^{-4} cm. At room temperature and for a dc emitter current of 2mA, find emitter diffusion capacitance and gain-bandwidth product.
- 3 (a) Explain the stabilization gain in feedback amplifier.
(b) An amplifier has a voltage gain of 400, $f_1 = 50$ Hz, $f_2 = 200$ kHz and a distortion of 10% without feedback. Determine the amplifier voltage gain f_{1f} , f_{2f} and D_f when a negative feedback is applied with feedback ratio of 0.01.
- 4 (a) Draw and explain the basic FET resonant circuit oscillator.
(b) Determine frequency of oscillations when a RC phase shift oscillator has $R = 10k$, $C = 0.02\mu F$ and $R_c = 4.7k$.
- 5 (a) Write a short note on power output and efficiency of power amplifiers
(b) In case of class A power amplifiers circuit, $R_L = 5\Omega$. Transistor ratings are $P_{C(max)} = 10 W$, $V_{CE(sat)} = 1 V$, $V_{CE(max)} = 12 V$. Transformer coupling is used with $n = 2$. Determine the efficiency of the amplifier.
- 6 (a) For a shunt diode clipper circuit $V_i = 20 \sin \omega t$, $V_R = 10 V$ is obtained from a potential divider circuit using 100 V supply and 10K potentiometer.
(i) Draw the circuit diagram.
(ii) If $R_f = 50 \Omega$, $R_r = 1$ and $V_r = 0$, sketch the transfer characteristic, output waveform for the given V_i .
(b) Draw the basic circuit diagram of a DC restorer circuit and explain its operation. Sketch the output waveform for a sinusoidal input signal.
- 7 (a) Explain in detail the junction diode switching times.
(b) Give a brief note on piece-wise linear diode characteristics.
- 8 (a) Draw the circuit diagram of self-bias with symmetrical triggering using diodes. Explain the working of the same.
(b) Compare between triggering at base and collectors.
