

Code :R7311004

R7**III B.Tech I Semester(R07) Supplementary Examinations, May 2011****ELECTRONIC CIRCUIT ANALYSIS**
(Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

1. (a) Perform the Small Signal Analysis of CE Amplifier and explain the characteristics with the help of relevant graphs.
(b) For the emitter follower with $R_s=0.5\text{ K}$ and $R_L=5\text{ K}\Omega$ calculate A_i, R_i, A_v, A_{vs} and R_0 . Assume $h_{fe}=50$, $h_{ie}=1\text{ K}$, $h_{oe}=25\mu\text{ A/V}$
2. (a) Perform the Analysis of Two Stage RC Coupled JFET-CS Amplifier Circuit.
(b) Draw the circuit for Darlington pair Amplifier and derive the expressions for A_i, A_v, R_i and R_0 .
3. (a) Derive the expressions for resistive parameters of hybrid- π model in terms of low frequency h-parameters.
(b) Following measurements of a certain transistor are available at room temperature and with $I_c=5\text{ mA}$, $h_{fe}=100$, $h_{ie}=0.62\text{ K}\Omega$. Short circuit current gain $= A_{is} = 10$ at 10 MHz . $C_{bc} = 3\text{ pF}$. Calculate f_T and f_β .
4. (a) Draw the circuit diagram of class -B push pull amplifier and explain the operation.
(b) Ideal class - B transformer-coupled audio amplifier is fed from 20 V DC . Transformer ratio is $\frac{N_p}{N_s} = 4$. A 4 ohm speaker is connected to load. Calculate:
 - i. Maximum signal power delivered to load.
 - ii. Power dissipation rating to each transistor.
 - iii. Maximum excitation current at input if transfer characteristics is linear ($h_{fe} = 20$)
5. (a) Derive the expression for the gain of a single-tuned Capacitance coupled amplifier. Discuss about its Selectivity.
(b) A single-tuned class A transformer-coupled RF amplifier has the following parameters:
 Transconductance, g_m of the transistor $= 5\text{ mA/V}$
 Primary inductance $= 100\mu\text{ H}$
 Secondary inductance $= 50\mu\text{ H}$
 Coefficient of coupling $= 0.01$
 Primary resistance $= 10\Omega$
 Secondary resistance $= 8\Omega$
 The primary is tuned with a 100 pF capacitor and the secondary is loaded by a $10\text{ K}\Omega$ resistance. Find:
 - i. The resonant frequency
 - ii. The effective Q of the tuned circuit
 - iii. The 3 dB bandwidth
 Assume r_0 of the transistor to be very large.
6. (a) What is stagger tuning? How it is different from synchronous tuning? Derive an expression for the selectivity of a stagger tuned amplifier.
(b) Write notes on wide band tuned amplifiers.
7. (a) Draw the circuit and explain how short circuit over load protection is provided in Voltage regulators circuits.
(b) Design a Zener-shunt regulator with the specifications using a zener diode with $V_z=10\text{ V}$. Input supply voltage varies from 15 V to 25 V and the load current varies between 0 and 15 mA . Also determine the line and load regulation.
8. (a) Explain the principle of operation of switching regulators and also mention the various types of them.
(b) Design a voltage regulator using IC 723 for 5 V output and 3 A load current. $V_{in} = 10\text{ V}$; $V_{SC}=0.65$.
