

B.Tech-ECE
ANALOG ELECTRONICS
Subject Code: EC-202

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

Section-A is compulsory consisting of ten questions carrying two marks each.

Section-B consists of five questions carrying five marks each and students have to attempt any four questions.

Section-C contains three questions carrying ten marks each and students have to attempt any two questions.

Section-A

1.

- a) Define β_{dc} . Given $\beta_{dc} = 120$, determine the corresponding value of α .
- b) Draw the hybrid pi equivalent model of CE circuit.
- c) What do you understand by early effect in transistors?
- d) Define the term Line Regulation and load Regulation.
- e) What are the effects of negative feedback on gain and frequency response?
- f) A tuned circuit has a resonant frequency of 1600 kHz and a bandwidth of 10 kHz. What is the value of Q factor?
- g) What is thermal runaway condition for a power amplifier?
- h) Define Miller effect.
- i) While defining the cutoff frequencies of an amplifier, why do we take 70.7% of the mid-band gain?
- j) How zener diode acts as a voltage regulator.

Section-B

2. Draw the small signal model of Emitter follower and obtain the expression of voltage gain, current gain, input impedance and output impedance.
3. Explain with a neat diagram, the working of a Class A transformer coupled power amplifier.
4. With neat circuit diagram, explain RC phase shift oscillator. Also obtain its output frequency of oscillation.

5. Draw the small signal T-equivalent circuit of cascode amplifier and derive an expression for its voltage gain. Determine the voltage gain (A_V) of the cascoded amplifier. If $r_e' = 6.73\Omega$ and $R_C = 1.8\text{ k}\Omega$.
6. Explain crossover distortion. Discuss how it can be minimized.

Section-C

7. a) Explain working of tuned amplifier. Also state its merit and application.
b) What are the factors that are responsible for destabilizing the operating point of the transistor? Discuss the stability factors?
8. a) Draw the circuit diagram of a single stage RC coupled amplifier and explain the purpose of each of the components used in the circuit.
b) In the RC coupled amplifier circuit of Fig.1, determine the cut-off frequencies, $f_{LC_{c1}}$ and $f_{LC_{c2}}$ due to C_{c1} and C_{c2} respectively.

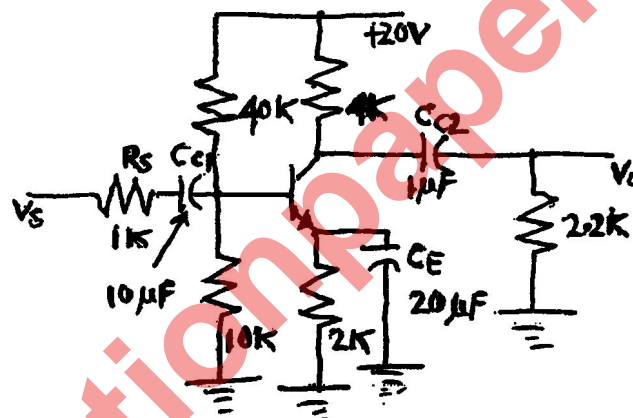


Fig. 1

9. A zener diode as shown in Fig. 2 has $V_Z = 12\text{V}$. determine the minimum and maximum Zener currents as well as the output voltage, when (i) the Zener diode is considered to be ideal one (ii) the Zener resistance of the Zener diode is 7Ω . Comment on the results of the output voltage.

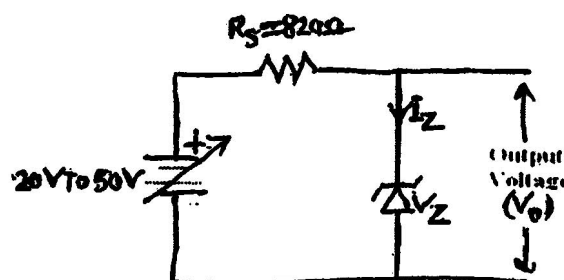


Fig.2