

29th may 2007

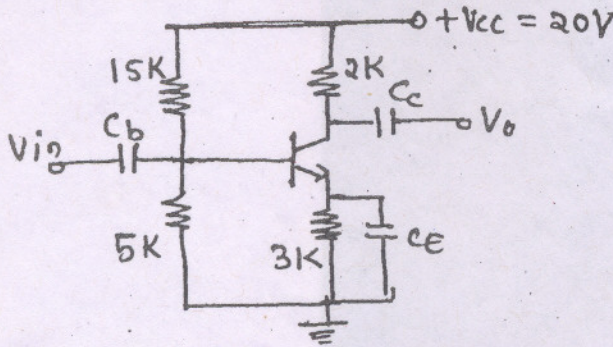
(3 Hours)

[Total Marks : 100

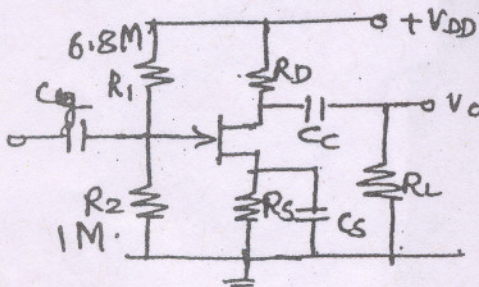
N.B. (1) Question No. 1 is compulsory.

- (2) Solve any four from remaining questions.
 (3) Assume suitable data if necessary.

1. (a) Compare BJT and FET amplifiers. 8
- (b) Determine I_{CBO} at 75° if it has a value of $10 \mu A$ at $30^\circ C$. 4
- (c) What is the role of circuit resistance R in clipping circuits. Find its value if the diode used in clipper has forward resistance of 50Ω and reverse resistance of $10 M \Omega$. 5
- (d) Why CE configuration is preferred over CB and CC, when used as a switch. 3
2. (a) Draw a circuit diagram of a full wave rectifier with π filter. Derive expressions for ripple factor. Explain the basic rectifier operation. 10
- (b) For CE amplifier derive the expressions for A_v , A_i , Z_i and Z_o . 10
3. (a) Determine the Q point and draw the dc load line for the circuit shown below :— 10



- (b) For the circuit shown below determine A_v , Z_i and Z_o . 10



$V_{DD} = 20V$
 $R_D = 1.5K \Omega$
 $R_S = 1K \Omega$
 $R_L = 10K \Omega$

$I_{DSS} = 10mA$
 $V_{as(OFF)} = V_P = 3V$
 $r_d = 50K \Omega$
 $I_{DQ} = 3.8mA$

4. (a) Design a single stage RC coupled CE amplifier to meet the following specification. 16
 $V_o = 2V$, $A_v \geq 70$, $S \leq 10$, Audio frequency range. $R_L \approx 10K \Omega$. Use BJT BC 147A.
- (b) For above designed circuit determine maximum expected voltage gain Z_i and Z_o . 4
5. Design a single stage RC coupled CS amplifier to meet the following specifications :— 20
 $f_L = 20Hz$
 $V_o = 2V$
 $I_D = 3.3 \pm 0.6mA$
 $|A_v| = 11$
 $BW = 11$ (FET Type)
 Calculate R_i , R_o and $V_{o,max}$ for the designed amplifier.

6. (a) What is clipping ? Explain. How a diode circuit can be used for single level and double level clipping ? 10
- (b) Compare EMOSFET and DMOSFET on basis of their construction, working principle, characteristics and biasing circuits. 10
7. Write short notes on any **three** :— 20
- (a) Thermal stabilization and compensation
 - (b) Photo diode
 - (c) Condition for zero temp. drift in FET
 - (d) Avalanche and zener breakdown mechanism
 - (e) Hybrid π equivalent circuit of BJT.
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