1. Question No. **1** is **compulsory**.
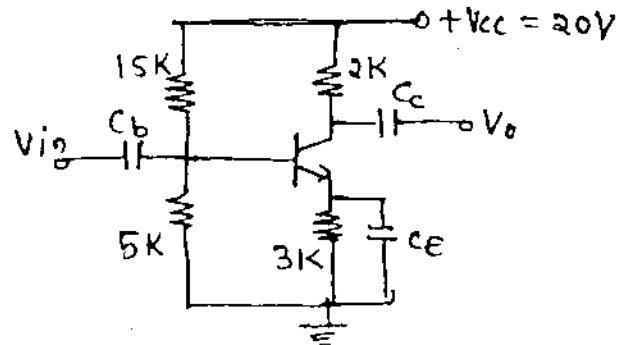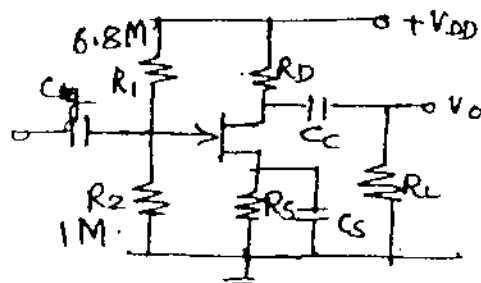2. Solve any **four** from remaining questions.
3. Assume **suitable** data if **necessary**.

a. Compare BJT and FET amplifiers.   8

b. Determine I_{CBO} at 75° if it has a value of 10 μA at 30°C.   4

c. What is the role of circuit resistance R in clipping circuits. Find its value if the diode used   5
in clipper has forward resistance of 50 Ω and reverse resistance of 10 M Ω.

d. Why CE configuration is preferred over CB and CC, when used as a switch.   3

a. Draw a circuit diagram of a full wave rectifier with π filter. Derive expressions for ripple   10
factor. Explain the basic rectifier operation.

b. For CE amplifier derive the expressions for A_v, A_i, Z_i and Z_o.   10

Determine the Q print and draw the dc load line for the circuit shown below :—   10

For the circuit shown below determine A_v, Z_i and Z_o.   10

$V_{DD} = 20V$ $I_{DSS} = 10$ mA

$R_D = 1.5K$ $V_{as(OFF)} = V_P = 3$ V

$R_s = 1$ K Ω $r_d = 50$ K Ω

$R_L = 10$ K Ω $I_{DQ} = 3.8$ mA

a. Design a single stage RC coupled CE amplifier to meet the following specification.   16
$V_0 = 2$ V, $A_V \geq 70$, S ≤ 10, Audio frequency range. $R_L \sim 10$ KΩ. Use BJT BC 147A.

b. For above designed circuit determine maximum expected voltage gain Z_i and Z_o.   4

a. in a single stage RC coupled CS amplifier to meet the following specifications :—   20
$f = 20$ Hz
$V = 2$ V
$= 3.3 \pm 0.6$ mA
$A_I = 11$
$A_V = 11$ (FET Type)
b. ate R_i, R_o and $V_{o\,max}$ for the designed amplifier.

a. What is clipping ? Explain. How a diode circuit can be used for single level and double level   10
clipping ?

b. Compare EMOSFET and DMOSFET on basis of their construction, working principle,   10
characteristics and biasing circuits.

Write 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. h - parameter equivalent circuit of BJT.