Q.P. Code :37284

[Time: 3 Hours] **[Marks: 80]**

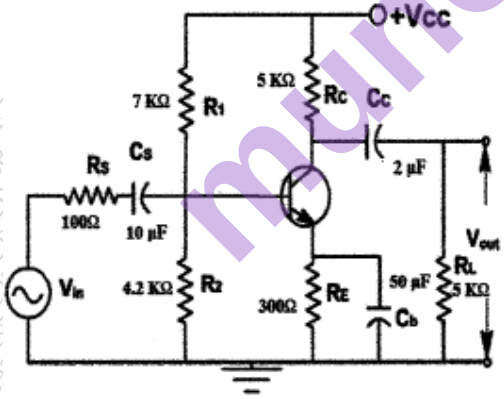
Please check whether you have got the right question paper.

N.B: 1. **Q.1** is **compulsory.**
2. Solve **any three** questions from **Q.2 to Q.6**
3. Assume suitable data

1. Write any **four** 20
   (a) Explain high frequency equivalent circuit of BJT.
   (b) Explain Barkhausen criteria
   (c) Draw MOSFET differential amplifier with active load.
   (d) Calculate max. power dissipation with and without heat sink
   $\theta_{JC} = 1.75^0$ C/W , $\theta_{CS} = 1^0$ C/W , $\theta_{CA} = 50^0$ C/W
   $\theta_{SA} = 5^0$ C/W , $T_{JMAX} = 150^0$ C and $T_{AMB} = 30^0$ C
   (e) Explain PNPN diode.

2. (a) Explain class B push pull power amplifier and cross over distortion also derive expression for efficiency. 10
   (b) Explain small signal analysis for MOSFET active load circuit 10

3. (a) Calculate lower cut off frequency for given circuit. 10
   $\beta = 80$, $r_\pi = 1.3$ KΩ , $g_{m2} = 50\mu$ A/V , $C_\pi = 15$pF, $C\mu = 1$pF



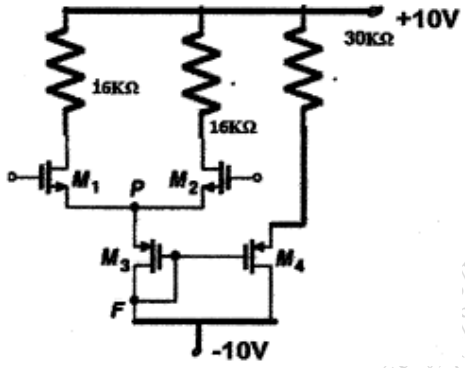
   (b) Explain working of SCR with V-I characteristics and its applications. 10

4. (a) Explain Hartley oscillator. Design the same for 50KHz. 10

(b) Find I_Q for given circuit. 10

$K_{n1} = K_{n2}=0.1$ mA/V^2 , $K_{n3}=K_{n4}=0.3$mA/V^2, $V_{TN}= 1$ V,

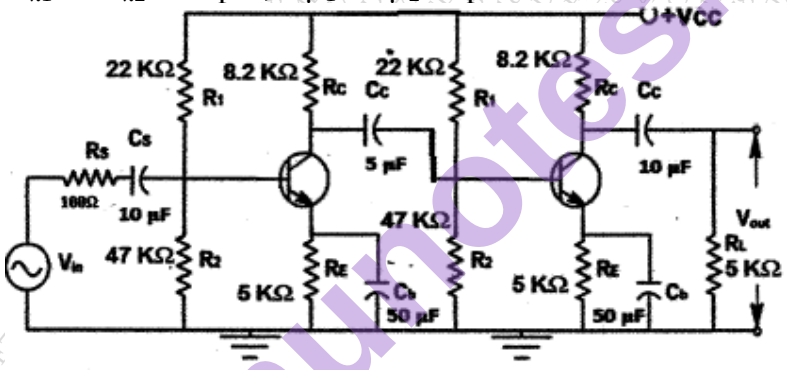
$\lambda= 0$ for M_1 , M_2 , M_3 and $\lambda = 0.01$/V for M_4



5. (a) Calculate bandwidth for two stage RC coupled CE amplifier. 10

$\beta_1 = 100$, $\beta_2 = 150$, $r_{\pi1} = r_{\pi2} = 1.3$ KΩ , $g_{m1} = g_{m2} = 50$mA/V

$C_{\pi1} = C_{\pi2}= 15$ pF , $C\mu_1= C\mu_2= 1$pF



(b) Explain feedback topologies with the help of neat block diagram. 10

6. Solve any **three** 20

(a) Cascode MOSFET amplifier

(b) UJT relaxation oscillator

(c) Darlington configuration

(d) Power BJTs
