

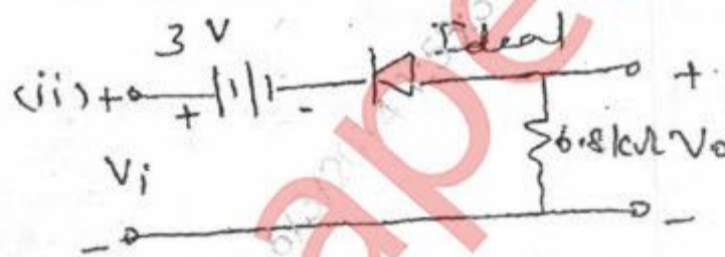
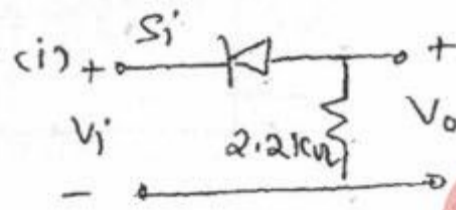
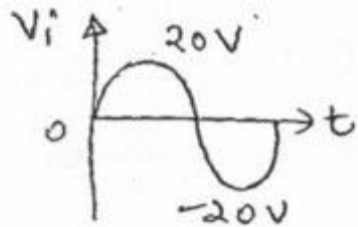
- N.B.: (1) Question No. 1 is compulsory.  
 (2) Attempt any three questions from the remaining five.  
 (3) Figures to the right indicate full marks.  
 (4) Assume suitable data, if necessary.



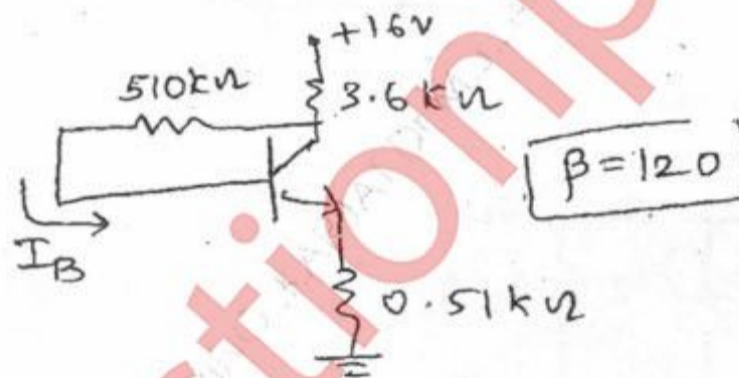
1. Attempt any four :—

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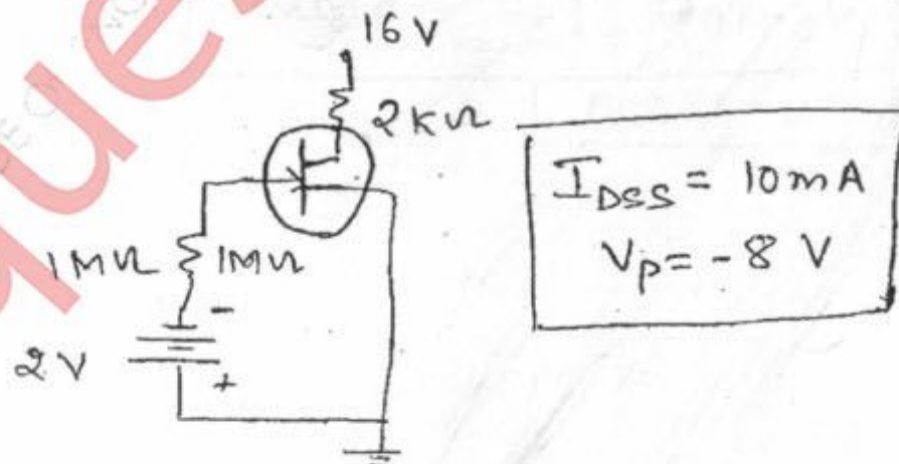
(a) Determine  $V_o$  for each network.



(b) Find  $I_B$  and  $I_C$  for the following.



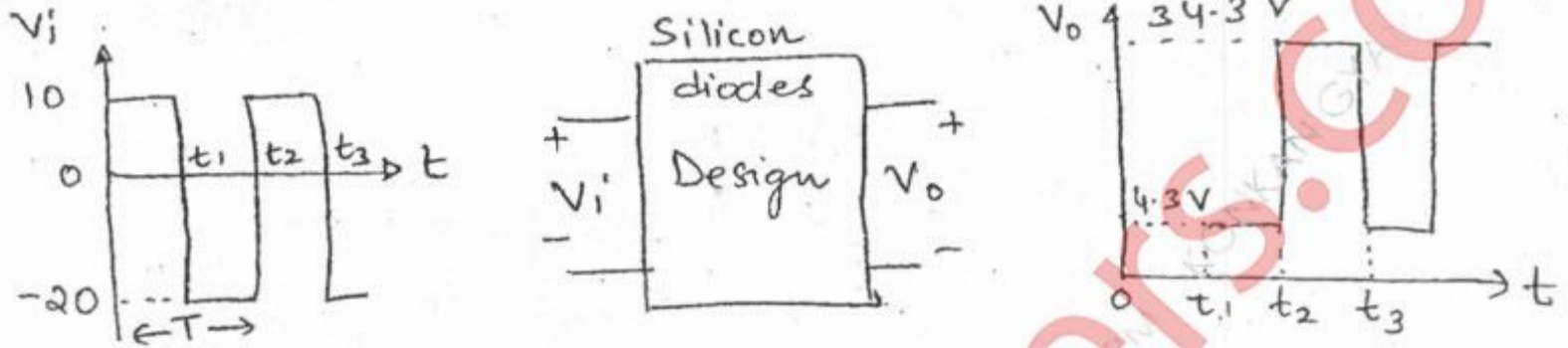
(c) Find  $I_{DQ}$  and  $V_{DS}$  for the following.



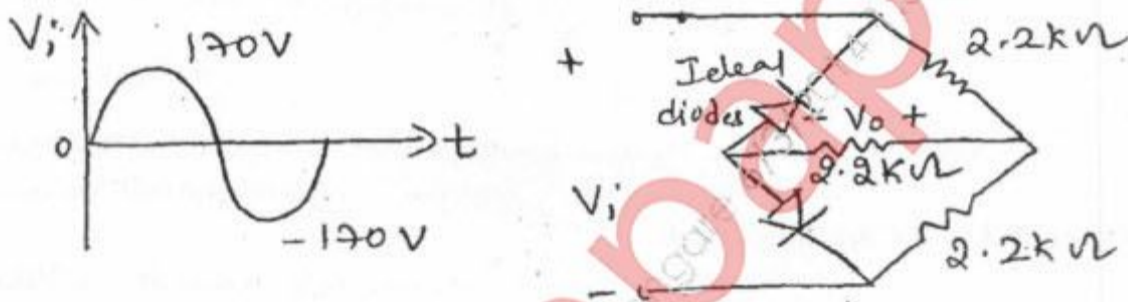
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- (d) Draw and explain a comparator circuit using opamp.
- (e) Explain harmonic distortion in power amplifiers.
- (f) Explain thermal runaway.

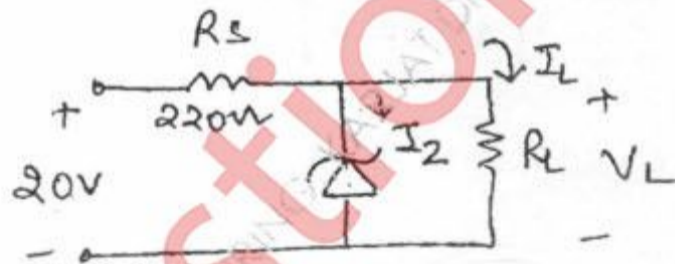
2. (a) Design a clamper circuit to perform the function as indicated. 8



(b) Sketch  $V_o$  for the network. 8



(c) Find  $V_L$  and  $I_L$  for the network. 4



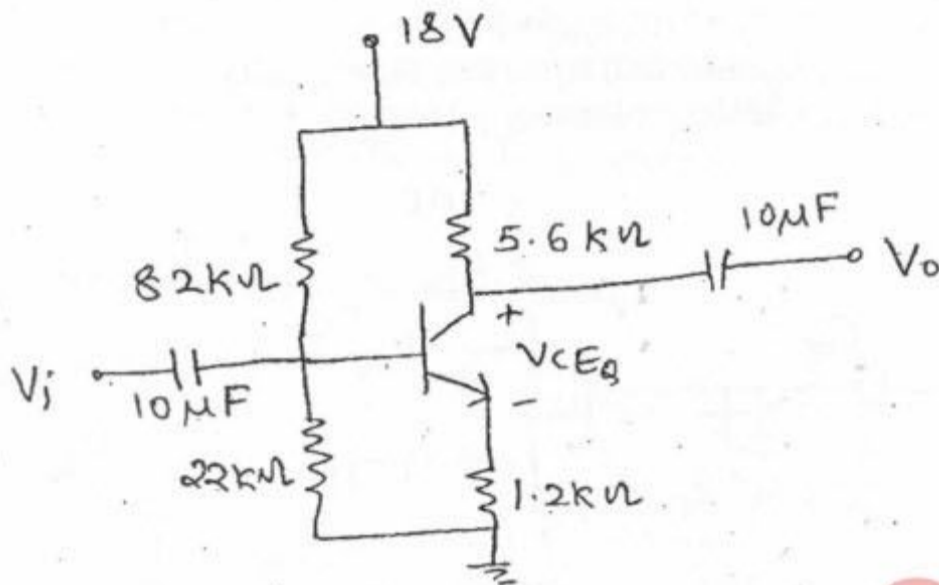
$$V_2 = 10V, P_{2_{max}} = 400mW$$

$$R_L = 180\Omega$$

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3. (a) Find  $I_B$ ,  $I_{CQ}$ ,  $V_{CEQ}$  and  $V_C$  for the following.

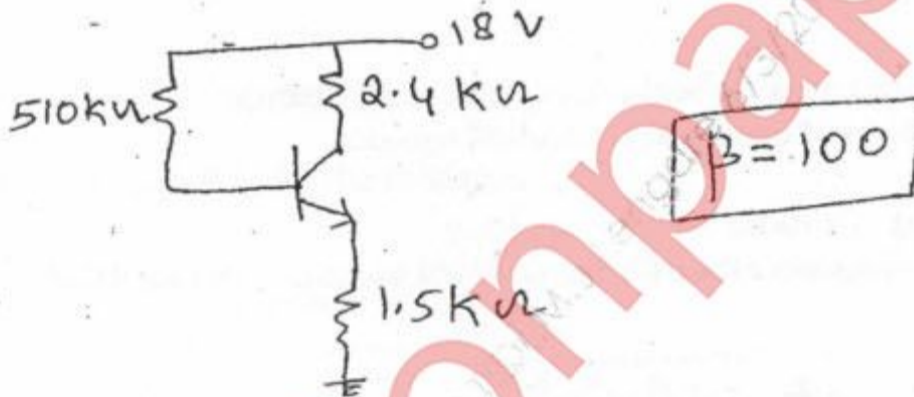
10



$\beta = 50$

- (b) Derive  $S(I_{CO})$  and find the value for the following network.

10



$\beta = 100$

4. (a) Explain the structure, operation and current-voltage characteristics of an enhancement-type MOSFET.

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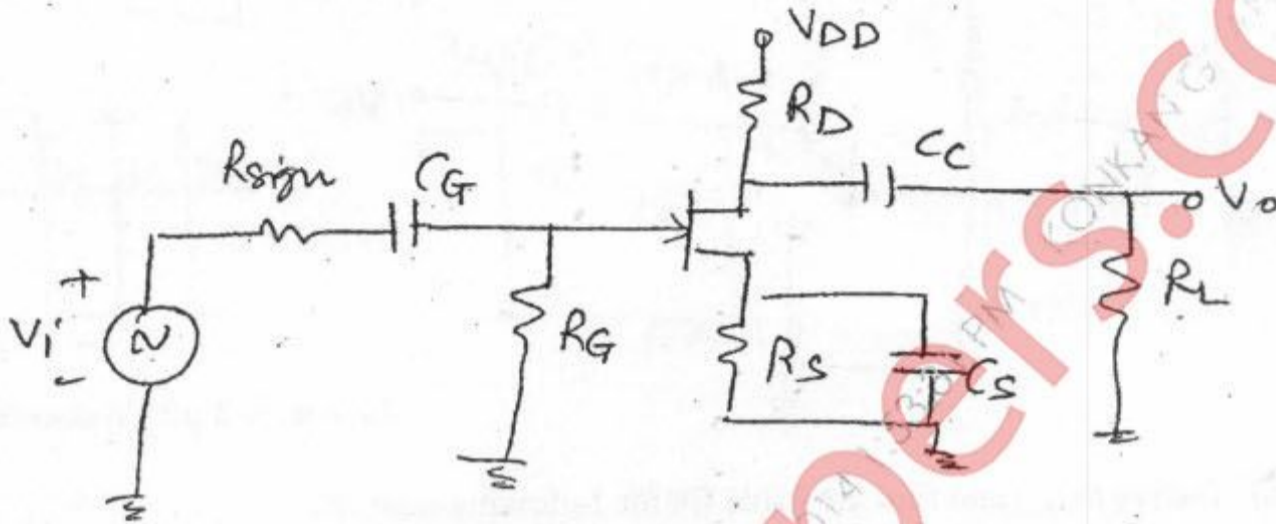
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- (b) For the network given below find the lower cutoff frequency using the following 10 parameters.

$$C_G = 0.01 \mu\text{F}, C_C = 0.5 \mu\text{F}, C_S = 2 \mu\text{F}, I_{DSS} = 8 \text{ mA},$$

$$R_{\text{sig}} = 10 \text{ k}\Omega, R_G = 1 \text{ M}\Omega, R_D = 4.7 \text{ k}\Omega, R_s = 1 \text{ k}\Omega, R_L = 2.2 \text{ k}\Omega$$

$$V_P = -4 \text{ V}, r_d = \infty \Omega, V_{PP} = 20 \text{ V}, g_m = 2 \text{ ms}, g_{mo} = 4 \text{ mS}$$



5. (a) Explain the integrator and differentiator circuits using opamps. 10  
 (b) Explain the application of opamp as controlled sources. 10
6. (a) Explain the working of a series voltage regulator. 10  
 (b) Explain with a neat diagram a transformer coupled audio power amplifier. 10

Con. 12826-14.