

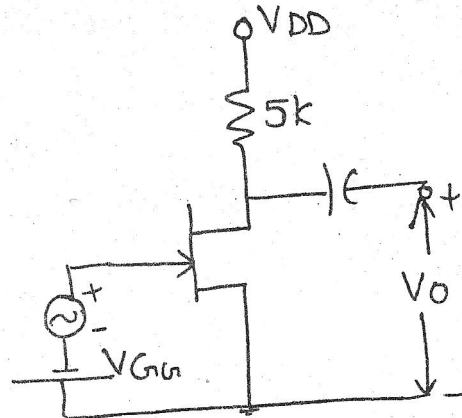
N.B. (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions out of the remaining **six** questions.

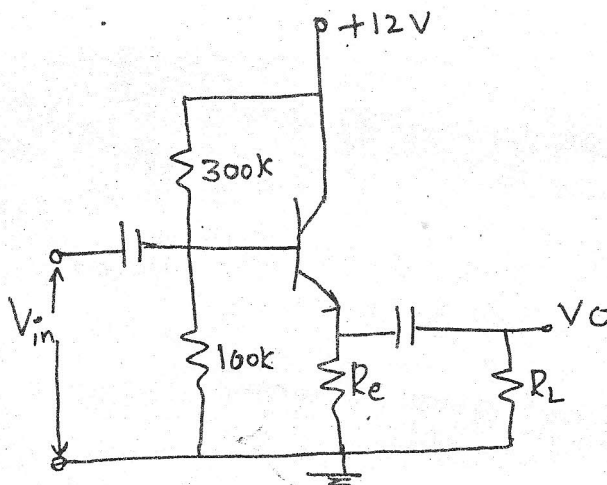
(3) Answer to questions should be **grouped** and written **together**.

(4) Assume any **suitable** data wherever **required** but justify the **same**.

1. (a) Derive the expressions for  $A_v$ ,  $Z_i$ ,  $Z_o$ ,  $A_i$  for CE Amplifier. 10  
 (b) Compare JFET and BJT. 5  
 (c) Consider the following circuit. Determine  $I_D$ ,  $V_{GS}$  for  $(I_{DSS}) = 4 \text{ mA}$  5



2. (a) Explain the Graphical determination of the h-parameters using characteristic curves of CE Amplifier. 10  
 (b) For the amplifier shown in below **figure**. Determine the following parameters :— 10  
 (i) DC bias Q-point ( $V_{CEQ}$  and  $I_{CQ}$ )  
 (ii) Current gain ( $i_o/i_n$ )



Assume :

$$r_e = 100 \Omega$$

$$V_{BE} = 0.6 \text{ V}$$

$$\beta = 100$$

$$R_e = 3 \text{ k} \Omega$$

$$R_L = 5 \text{ k} \Omega$$

3. (a) Draw the block diagram of typical Op-Amp. Explain function of each block. 6  
 (b) Explain the following terms for an Op-Amp :— 4  
 (i) Input offset voltage  
 (ii) CMRR.  
 (c) Explain three Op-Amp Instrumentation Amplifier and also derive the overall gain  $A_v$ . 10

4. (a) Explain how an Op-Amp can be used as : 15  
(i) Integrator (ii) Differentiator (iii) Summing amplifier.  
(b) Using practical Op-Amp realize the following relation :— 5  
$$V_O = 5V_1 - 5V_2 + 3V_3.$$
5. (a) Explain the operation of Monostable multivibrator using IC 555. 10  
(b) Explain any two applications of Astable multivibrator. 10
6. (a) Explain a high voltage Low Current Regulator and Low Voltage High Current Regulator. 10  
(b) Design a regulator using LM 723 for  $V_O = 9V$ ,  $I_O = 3A$ . 10
7. Write short notes on any **three** of the following :— 20  
(a) PLL  
(b) Non-Inverting Schmitt Trigger  
(c) Digital to Analog Converter using R-2R Resistors.  
(d) Properties of Ideal Op-Amp.