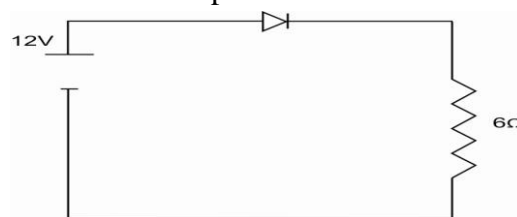


Attempt any FIVE Questions, selecting at least one from each section.  
 All questions carry equal marks

### Section-I

- 1- a) Draw half-wave rectifier circuit using PN Junction diode and show the output wave forms. 10

- b) Calculate the current and power dissipated in fig→  
 when ideal diode is used 10



- 2- a) Explain the black box concept of two port model. Show circuit diagram also. 16  
 b) What is the difference between LED & PHOTODIODE? 4

- 3- a) Explain the working of npn transistor amplifier in common emitter configuration using h-parameters and also calculate voltage gain & input resistance. 16

- b) Prove that  $\beta = \frac{\alpha}{1 - \alpha}$  4

### Section-II

- 4- a) What is meant by depletion mode MOSFET? 4  
 b) Explain the working of common drain JFET and also calculate voltage gain  $A_v$ . 16

- 5- a) What is meant by AMPLIFIER PASSBAND? 4  
 b) What is the effect of Cascading two Amplifiers with voltage gain  $A_1$  and  $A_2$  on frequency range and Overall gain of the system? 16

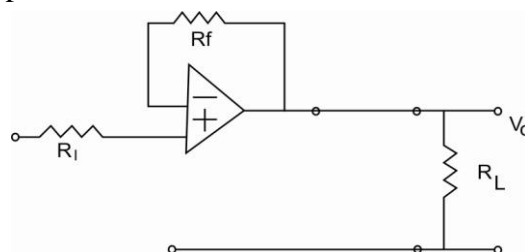
- 6- a) How Bandwidth can be improved using negative feed back. 10  
 b) An audio amplifier of  $A_v = 500$  (voltage gain) produces 11% harmonic distortion at full output. It was designed considering i/p capacitance of transistor to yield an upper frequency limit of 8 KHZ, what value of  $\beta$  is needed to reduce the distortion? What is the bandwidth extension? 10

### Section-III

- 7- a) Show with diagram and calculations how an operational amplifier can be used as  
 i) a Summer ii) Integrator 10

- b) In the subtractor circuit of op-Amp (Fig →)  
 $R_i = 1K\Omega$   $R_f = 1M\Omega$  assuming ideal op.amp.  
 determine

- i) Voltage gain  $A_v$   
 ii) Input Resistance  $R_i$



- 8- a) What is Darlington Compound Transistor? Explain its working, hence calculate  $A_v$ . 16  
 b) Explain the working of a Diode as the +Ve clipper. 4

- 9- a) Explain the difference between BCD and Binary number using some examples. 8  
 b) Convert  $(101101)_2$  into Decimal. 2  
 c) Draw wave forms for  $A = 1011$ ,  $B = 1001$ . Also find  $A + B$  and  $A.B$  and show wave forms. 10