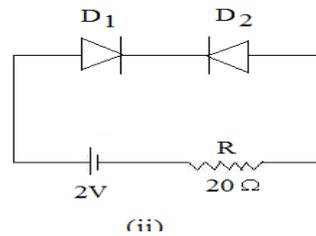
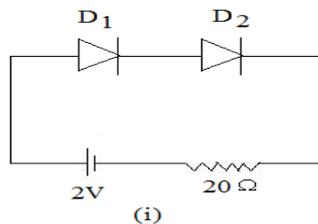
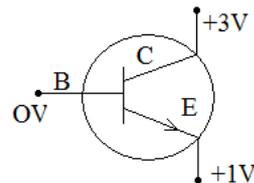


Solid and Semiconductor Devices Test 1

1. How does width of depletion layer of p.n junction diode change with decrease in reverse bias? [1]
2. Under what condition does a junction diode work as open switch? [1]
3. Which type of biasing gives a semiconductor diode very high resistance? [1]
4. What are the advantages and disadvantages of semiconductor devices over vacuum tubes? [2]
5. The base of a transistor is lightly doped. Explain why? [2]
6. Determine the currents through resistance R of the circuits (i) and (ii) when similar diodes D_1 and D_2 are connected as shown in the figure. [2]

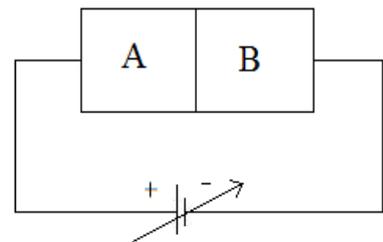


7. In the given figure, is
 (i) The emitter (ii) collector
 forward or reverse biased?
 Justify. [2]



8. Two semiconductor materials A and B shown in the figure are made by doping germanium crystal with arsenic and indium respectively. The two are joined end to end and connected to a battery as shown. [3]

- (a) Will the junction be forward biased or reverse biased? Justify
- (b) Sketch a V-I graph for this arrangement

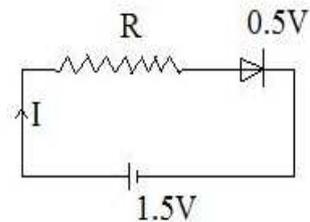


9. Draw the symbol for zener diode? Zener diodes have higher dopant densities as compared to ordinary p-n junction diodes. How does it affect the (i) width of the depletion layer (ii) electric field? [3]
10. A P-N-P transistor is used in common – emitter mode in an amplifier circuit. A change of $40\mu\text{A}$ in the base current brings a change of 2mA in collector current and 0.04V in base – emitter voltage. Find (i) input resistance (ii) current amplification factor (β). If a load resistance of $6\text{k}\Omega$ is used, then find voltage gain? [3]

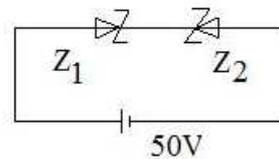
Solid and Semiconductor Devices Test 2

1. If The output of a 2-input NAND gate is fed as the input to a NOT gate
(i) name the new logic gate obtained and (ii) write down its truth table? [1]
2. Define current amplification factor in a common – emitter mode of transistor? [1]
3. Why is a semiconductor damaged by a strong current? [1]
4. What do you mean by hole in a circuit? Write its two characteristics? [2]

5. Diode used in the figure has a constant voltages drop at 0.5V at all currents and a maximum power rating of 100mW. What should be the value of the resistance R, connected in series for maximum current? [2]



6. Zener diode Z_1 has saturation current of 20A and reverse breakdown voltage of 100V where as the corresponding value of Z_2 are $40 \mu A$ and 40. Find the current through the circuit? [2]



7. Calculate emitter current for which $\beta = 100$ and $I_\beta = 20 \mu A$? [2]
8. Draw the circuit diagram for common – emitter transistor characteristics using N-P-N transistor? Draw the input and output characteristic curve? [3]
9. A semiconductor has equal electron and whole concentration of $6 \times 10^8 / m^3$. On doping with certain impurity, electron concentration increases to $8 \times 10^{12} / m^3$.
(i) Identify the new semiconductor
(ii) Calculate the new whole concentration.
(iii) How does the energy gap vary with doping? [3]
10. Draw a labeled circuit diagram of a common emitter transistor amplifier. Draw the input and the output wave forms and also state the relation between input and output signal? [3]