Worksheet: Semiconductor Electronics

ISC · Class 12 · Physics · 9 questions · 25 marks

Name: _____ Date: _____ Score: _____ / 25

Q1. Silicon is doped with indium. State the type of semiconductor formed and name its majority carriers. *[1 mark]*

Q2. An alternating input of 60 Hz is applied to a full-wave rectifier. Find the output frequency. *[2 marks]*

Q3. A solid has a band gap of 4.5 eV. Classify it and justify your answer. *[2 marks]*

Q4. Explain why no net current flows through an unbiased p-n junction even though carriers are diffusing across it. *[3 marks]*

Q5. State what happens to the width of the depletion region and to the barrier potential when a p-n junction is reverse biased. *[3 marks]*

Q6. In a sample the intrinsic carrier concentration is 1.5 x 10^16 per cubic metre. After doping the electron concentration becomes 4.5 x 10^22 per cubic metre. Find the hole concentration. *[3 marks]*

Q7. Explain why germanium conducts better than silicon at room temperature, referring to their band gaps. *[3 marks]*

Q8. Explain why a full-wave rectifier output is easier to smooth than a half-wave output, and state the role of the capacitor in the filter. *[4 marks]*

Q9. A silicon diode is connected in series with a 500 ohm resistor across a 5.0 V supply in forward bias. Estimate the current, taking the diode drop as 0.7 V. *[4 marks]*