

M.Sc. (Part-I) Semester—I (C.B.C.S. Scheme) Examination
ELECTRONICS

1-ELE-1 (Fundamentals of Semiconductor Devices)

Time : Three Hours]

[Maximum Marks : 80

Note :—(1) All questions are compulsory.

(2) Draw well labelled diagrams wherever necessary.

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| 1. | (a) Discuss generation and recombination of charges in intrinsic semiconductor. | 6 |
| | (b) Explain P-type and N-type semiconductor. | 6 |
| | (c) Explain Hall effect. | 4 |

OR

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| (p) Explain effect of temperature on electrical conductivity. | 6 |
| (q) Explain the terms : | |
| (i) Balance band | |
| (ii) Conduction band. | 6 |
| (r) Explain extrinsic semiconductor in detail. | 4 |

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| 2. | (a) What is p-n Junction diode ? Derive diode equation. | 8 |
| | (b) Explain linearly graded and abrupt junctions of diode. | 8 |

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| (p) Draw and explain static and dynamic characteristics of p-n junction diode. | 8 |
| (q) Explain break-down mechanism of p-n junction diode. | 8 |

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| 3. | (a) Explain construction and working of Tunnel diode. | 8 |
| | (b) Explain with I-V characteristics of PIN Diode. | 8 |

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| (p) Explain construction, working and I-V characteristics of Varactor diode. | 8 |
| (q) Explain construction, working and I-V characteristics of Schottky diode. | 8 |

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| 4. | (a) Differentiate between Bipolar and Unipolar semiconductor. | 4 |
| | (b) Explain construction and working of MOSFET. | 8 |
| | (c) What is amplification factor in C.E. mode of transistor ? | 4 |

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| (p) Explain construction and working of n-p-n transistor. | 6 |
| (q) What is doping ? Explain with example. | 4 |
| (r) Draw and explain static I-V characteristics of active region in transistor. | 6 |

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| 5. | (a) Explain the following terms : | |
| | (i) Drift mobility | |
| | (ii) Diffusion length. | 8 |
| | (b) Explain any four etching methods. | 8 |

OR

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| (p) Explain four-probe method for measurement of resistivity. | 8 |
| (r) Describe the process for photolithography and electron beam lithography. | 8 |

