BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT: ENGINEERING AND PHYSICS

APR 2025

PROGRAMME: BSc Honours Degree in Electronics Engineering

EEE2208: ELECTRONIC DRIVES AND POWER ELECTRONICS APPLICATIONS

DURATION: 3 hours TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES

The paper contents 7 questions, answer any FIVE questions. Each carries 20 marks

Only calculator is permitted

Question 1

a) Why is it important to maintain a high power factor in electrical systems? [4]

b) Explain the working principle of a diode. [6]

c) What are the advantages of Schottky diodes in power electronics applications? [10]

Question 2

a) Describe the operation of a thyristor. [10]

b) Explain industrial applications of thyristors. [10]

Question 3

a) Compare the advantages and disadvantages of MOSFETs and IGBTs in power switching. [12]

b) Explain why MOSFETs are preferred for high-frequency applications. [8]

Question 5

a) Explain the types of Uninterruptible Power Supplies (UPS) systems. [14]

b) Functional Block Diagram of switch-mode power (SMPS) supplies in UPS. [6]

Question 6

a) Describe the working principle of static VAR compensators. [10]

b) Explain their role in reactive power management. [6]

c) Explain the effects of harmonics on power system components. [4]

Question 7

a) Describe the speed control of a shunt motor using rheostatic methods. [10]

b) Calculate the speed if the back EMF is 220V, armature resistance is 0.5Ω, and armature current is 10A. [10]

END OF EXAM