STUDENT LAB SAFETY, HIRARC, DATASHEET VERIFICATION CHECKLIST, AND BRIEF REPORT SUBMISSION

EXPERIMENT EM1: MAGNETIC INDUCTION AND FERROMAGNETIC HYSTERESIS

STUDENT NAME : _____
MATRIC NO. : _____
GROUP : _____
DATE : _____

A. EQUIPMENT AND SYSTEM VERIFICATION CHECKLIST

Item	Verification Requirement	✓
Cobra3 Unit	Connected and functioning correctly	
Tesla Measuring Module	Connected securely to Cobra3 unit	
Hall Probe	Installed correctly and positioned as instructed	
Variable Transformer / Power Supply	Output initially set to 0 V before energisation	
Function Generator	Operating parameters configured correctly	
Rheostat (10 Ω)	Resistance setting verified	
Commutator Switch	Connection verified before operation	
Coil Assembly	Connections checked before energising	
Iron Core (Massive)	Installed securely	
Iron Core (Laminated)	Installed securely	
Induction Coil	Correct coil selected and connected	
Analog Input Connections	Verified before measurement	
Computer Interface	Software communication established	
Measurement Software	Parameters configured according to laboratory instructions	
Data Acquisition System	Test measurement performed successfully	

B. HIRARC CHECKLIST

Hazard / Unsafe Condition	Potential Consequence	Control Measure	✓
Strong magnetic field near equipment	Measurement errors and interference	Keep coil assembly away from computer and Cobra3 unit	
Switching commutator under load	Voltage spikes and equipment damage	Reverse commutator only when supply voltage is 0 V	

Energising circuit with incorrect connections	Equipment malfunction	Verify all wiring before power ON	
Excessive current through coils	Overheating of coils and core	Increase current gradually and monitor operation	
Improper Hall probe positioning	Invalid magnetic field measurements	Position Hall probe according to instructions	
Contact with energized terminals	Electrical shock risk	Avoid touching exposed conductors during operation	
Loose cable connections	Data acquisition errors	Inspect all connections before measurement	
Unstable iron-core assembly	Measurement inaccuracies	Ensure core and probe are securely mounted	
Magnetic materials near apparatus	Distortion of experimental results	Keep unnecessary ferromagnetic objects away	
Failure to demagnetize residual magnetism	Inaccurate hysteresis measurements	Perform demagnetization procedure before testing	

C. ENGINEERING PRACTICE VERIFICATION

Requirement	✓
Experimental setup checked against Figure 3 and Figure 6	
Hall probe position verified before measurement	
Measurement software configured correctly	
Function generator settings verified	
Iron-core type verified before testing	
Residual magnetism checked and removed if required	
Magnetic induction measurements recorded systematically	
Experimental observations compared with theoretical concepts	
Data recorded accurately and honestly	
Equipment returned to zero-voltage condition after testing	

D. STUDENT DECLARATION

I CONFIRM THAT:
☐ ALL EQUIPMENT CONNECTIONS HAVE BEEN CHECKED BEFORE ENERGISATION.
☐ HALL PROBE POSITIONING HAS BEEN VERIFIED.
☐ MEASUREMENT SOFTWARE SETTINGS HAVE BEEN CONFIGURED CORRECTLY.
☐ MAGNETIC CORES AND INDUCTION COILS HAVE BEEN INSTALLED CORRECTLY.
☐ THE COMMUTATOR SWITCH WILL ONLY BE OPERATED WHEN THE SUPPLY VOLTAGE IS 0 V.
☐ HAZARDS HAVE BEEN IDENTIFIED AND APPROPRIATE CONTROL MEASURES IMPLEMENTED.
☐ NO DAMAGED EQUIPMENT OR CABLES ARE BEING USED.

STUDENT SIGNATURE : _____

DATE : _____

E. Experiment Data Results and Discussion

Test 1: Ferromagnetic Hysteresis Data Table

	Massive Iron Core	**Laminated Iron Core**
Reading	**Current, I (A)**	**Flux Density, B_0 (T)**
Increasing Voltage		
V1=		
V2=		
V3=		
V4=		
V5=		
V6=		
Decreasing Voltage		
V6=		
V5=		
V4=		
V3=		
V2=		
V1=		

Reverse Polarity		
V1=		
V2=		
V3=		
V4=		
V5=		
V6=		
Return to 0V		
V6=		
V5=		
V4=		
V3=		
V2=		
V1=		

Test 2: Magnetic Induction Data Tables

Coil Type	Cross-Section Area (m^2)	Number of Turns	Slope (V/A)
Coil 1			
Coil 2			
Coil 3			

DISCUSSION:

CONCLUSION:

LAB LECTURER SIGNATURE : _____

DATE : _____

INSTRUCTOR SIGNATURE : _____

DATE : _____