

# Table of Contents



## INTRODUCTION

### 1 BASIC ELECTRICAL AND MAGNETIC PRINCIPLES

1.1 Introduction to the Aircraft Electrical System | 1-1

1.2 Introduction to Electrics Theory | 1-2

1.3 Concepts and Definitions | 1-4

1.4 Voltage, Current and Resistance | 1-5

1.5 Series Connection | 1-7

1.6 Parallel Connection | 1-9

1.7 Dependence of Resistance on Temperature | 1-11

1.8 Electrical Power and Energy | 1-12

1.9 Magnetism and Magnetic Field | 1-14

1.10 Electric Fields | 1-26

### 2 CAPACITORS AND COILS

2.1 Capacitors | 2-1

2.2 Coils | 2-5

2.3 Capacitor and Coil and AC Voltage | 2-8

2.4 Power in AC Circuits | 2-11

2.5 Mathematics of AC Voltage and Current | 2-14

## 3 BATTERIES

- 3.1 Introduction | 3-1
- 3.2 Purpose of the Battery | 3-2
- 3.3 The Lead-Acid Cell | 3-2
- 3.4 Nickel-Cadmium Batteries | 3-4
- 3.5 Battery Capacity | 3-7
- 3.6 Charging of Batteries | 3-9
- 3.7 Ni-Cd versus Lead-Acid Batteries | 3-10
- 3.8 Battery Temperature | 3-10
- 3.9 Battery Handling | 3-10

## 4 CIRCUIT CONTROL AND PROTECTION

- 4.1 Circuit Control | 4-1
- 4.2 Circuit Protection Devices | 4-9

## 5 SEMICONDUCTORS

- 5.1 Conductors, Insulators and Semiconductors | 5-1
- 5.2 Purity | 5-2
- 5.3 Temperature Effect | 5-3
- 5.4 Holes | 5-3
- 5.5 P-Type and N-Type Material | 5-4
- 5.6 Diodes | 5-5
- 5.7 The Transistor | 5-12

## 6 DC GENERATORS

6.1 DC Generators | 6-1

6.2 DC Alternator | 6-6

6.3 Generator Regulation | 6-9

6.4 DC Motors | 6-17

## 7 AC GENERATORS

7.1 Single Phase Generator | 7-1

7.2 Three Phase Generator | 7-6

7.3 Constant Frequency Generation | 7-16

7.4 Other Constant Frequency Supplies | 7-22

7.5 AC Motors | 7-23

## 8 TRANSFORMERS, RECTIFIERS AND INVERTERS

8.1 Transformers | 8-1

8.2 Rectifiers | 8-6

8.3 Inverters | 8-7

## 9 DISTRIBUTION, CONSUMPTION AND MONITORING

9.1 Distribution - General | 9-1

9.2 DC Distribution and Monitoring | 9-3

9.3 AC Distribution - General | 9-8

9.4 AC Split Bus System | 9-11

9.5 AC Parallel System | 9-14

9.6 Load Shedding | 9-17

## **10 BONDING AND SCREENING**

10.1 Causes Of Static Electricity | [10-1](#)

10.2 Bonding | [10-1](#)

10.3 Prevention of Static Charge Hazards | [10-2](#)

## **11 LOGIC CIRCUITS**

11.1 Solid State Circuit Technology | [11-1](#)

11.2 Logic Gates | [11-2](#)

11.3 Truth Table | [11-3](#)

11.4 Common Types of Logic Gates | [11-4](#)

11.5 The Flip Flop | [11-8](#)

11.6 Logic Gates in Circuit Wiring Diagrams | [11-10](#)

## **ELECTRICS AND ELECTRONICS GLOSSARY**

## **EASA SYLLABUS INDEX**