

Aircraft electrical and electronic systems

Contents

Preface

Acknowledgements

Chapters

1. Electrical fundamentals
 - 1.1 Electron theory
 - 1.2 Electrostatics and capacitors
 - 1.3 Direct current
 - 1.4 Current, voltage and resistance
 - 1.5 Power and energy
 - 1.6 Electromagnetism and inductors
 - 1.7 Alternating current and transformers
 - 1.8 Safety
 - 1.9 Multiple choice questions
2. Electronic fundamentals
 - 2.1 Semiconductor theory
 - 2.2 Diodes
 - 2.3 Transistors
 - 2.4 Integrated circuits
 - 2.5 Multiple choice questions
3. Digital fundamentals
 - 3.1 Logic gates
 - 3.2 Combinational logic systems
 - 3.3 Monostable devices
 - 3.4 Bistable devices
 - 3.5 Decoders
 - 3.6 Encoders
 - 3.7 Multiplexers
 - 3.8 Bus systems
 - 3.9 Computers
 - 3.10 Multiple choice questions
4. Electrical machines
 - 4.1 Generator and motor principles
 - 4.2 AC generators
 - 4.3 Three phase generation and distribution
 - 4.4 AC motors
 - 4.5 Aircraft generating systems
 - 4.6 Multiple choice questions
5. Batteries
 - 5.1 Overview
 - 5.2 Storage cells
 - 5.3 Lead-acid
 - 5.4 Nickel-cadmium
 - 5.5 Lithium
 - 5.6 Nickel-metal hydride
 - 5.7 Battery locations

- 5.8 Battery venting
- 5.9 Battery connections
- 5.10 Multiple choice questions
- 6. Power supplies
 - 6.1 Regulators
 - 6.2 External power
 - 6.3 Inverters
 - 6.4 Transformer rectifier units
 - 6.5 Transformers
 - 6.6 Auxiliary power unit
 - 6.7 Emergency power
 - 6.8 Multiple choice questions
- 7. Wiring and circuit protection
 - 7.1 Overview
 - 7.2 Types of wires and cables
 - 7.3 Construction and materials
 - 7.4 Specifications
 - 7.5 Shielding/screening
 - 7.6 Circuit protection
 - 7.7 Multiple choice questions
- 8. Distribution of power supplies
 - 8.1 Single engine/General aviation
 - 8.2 Twin engine general aviation aircraft
 - 8.3 Larger aircraft systems
 - 8.4 Split bus system
 - 8.5 Parallel bus system
 - 8.6 Split/parallel bus system
 - 8.7 Standby and essential power
 - 8.8 Battery charging
 - 8.9 Control and protection
 - 8.10 Load shedding
 - 8.11 Multiple choice questions
- 9. Controls and transducers
 - 9.1 Switches
 - 9.2 Relays and contactors
 - 9.3 Variable resistors
 - 9.4 Linear displacement transducers
 - 9.5 Fluid pressure transducers
 - 9.6 Temperature transducers
 - 9.7 Strain transducers
 - 9.8 Rotary position transducers
 - 9.9 Multiple choice questions
- 10. Engine systems
 - 10.1 Starting and ignition
 - 10.2 Indicating systems overview
 - 10.3 Primary indicating systems
 - 10.4 Secondary indicating systems
 - 10.5 Electronic indicating systems
 - 10.6 Multiple choice questions

- 11. Fuel management
 - 11.1 Storage overview
 - 11.2 Fuel quantity measurement and indication
 - 11.3 Fuel feed and distribution
 - 11.4 Fuel transfer
 - 11.5 Refuelling/defuelling
 - 11.6 Fuel jettison
 - 11.7 Fuel system venting
 - 11.8 Fuel tank inerting
 - 11.9 Multiple choice questions
- 12. Lights
 - 12.1 Lighting technologies
 - 12.2 Flight compartment lights
 - 12.3 Passenger cabin lights
 - 12.4 Exterior lights
 - 12.5 Multiple choice questions
- 13. Cabin systems
 - 13.1 Passenger address system
 - 13.2 Galley equipment
 - 13.3 In-flight entertainment
 - 13.4 Satellite communications
 - 13.5 Multiplexing
 - 13.6 Fibre optics
 - 13.7 Air conditioning
 - 13.8 Pressurisation
 - 13.9 Airstairs
 - 13.10 Multiple choice questions
- 14. Airframe control & indicating systems
 - 14.1 Landing gear
 - 14.2 Trailing edge flaps
 - 14.3 Control surfaces
 - 14.4 Electronic indicating systems
 - 14.5 Multiple choice questions
- 15. Warning and protection systems
 - 15.1 Stall warning and protection
 - 15.2 Airframe ice detection and protection
 - 15.3 Windscreen ice and rain protection
 - 15.4 Antiskid
 - 15.5 Configuration warnings
 - 15.6 Aural warnings
 - 15.7 Multiple choice questions
- 16. Fire and overheat protection
 - 16.1 Overview
 - 16.2 Engine/APU
 - 16.3 Cargo bay/baggage area
 - 16.4 Fire extinguishing
 - 16.5 Multiple choice questions
- 17. Terrain awareness warning systems (TAWS)
 - 17.1 System overview

- 17.2 System warnings and protection
 - 17.3 External references
 - 17.4 Ground proximity modes
 - 17.5 Forward looking terrain awareness
 - 17.6 Rotorcraft systems
 - 17.7 Architecture and configurations
 - 17.8 Future developments
 - 17.9 Multiple choice questions
18. Flight data and cockpit voice recording
- 18.1 Flight data recorder history
 - 18.2 Mandatory equipment requirements
 - 18.3 Flight data recorder specifications
 - 18.4 Cockpit voice recorders
 - 18.5 Health and usage monitoring system
 - 18.6 Multiple choice questions
19. Electrical and magnetic fields
- 19.1 Electromagnetic interference
 - 19.2 Electromagnetic interference reduction
 - 19.3 High intensity/energy radiated fields
 - 19.4 Lightning
 - 19.5 Grounding and bonding
 - 19.6 Electrostatic sensitive devices
 - 19.7 Multiple choice questions
20. Continuing airworthiness
- 20.1 Wire and cable installations
 - 20.2 Bonding
 - 20.3 Static charges
 - 20.4 Earth returns
 - 20.5 Aircraft manuals
 - 20.6 Circuit testing
 - 20.7 Automatic test equipment
 - 20.8 On-board diagnostic equipment
 - 20.9 Multiple choice questions
- Appendices
- 1. Abbreviations and acronyms
 - 2. Revision papers
 - 3. Answers to multiple choice questions
 - 4. Quantities, symbols and units
 - 5. Formulae
 - 6. Decibels
 - 7. Wire gauge sizes
 - 8. ATA chapters
 - 9. Electrical and electronic symbols
 - 10. Wire numbering/coding

Index