

## Module 5

# Digital Techniques

	Level				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
<b>5.1 Electronic Instrument Systems</b> Typical systems arrangements and cockpit layout of electronic instrument systems.	1	2	2	3	1
<b>5.2 Numbering Systems</b> Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	-	1	-	2	-
<b>5.3 Data Conversion</b> Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	-	1	-	2	-
<b>5.4 Data Buses</b> Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Aircraft Network/Ethernet.	-	2	-	2	-
<b>5.5 Logic Circuits</b>					
(a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.	-	2	-	2	1
(b) Interpretation of logic diagrams	-	-	-	2	-

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### 5.6 Basic Computer Structure

(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems). 1 2 - - -

(b) Computer related terminology; Operation, layout and interface of the major components in a micro computer including their associated bus systems; Information contained in single and multiaddress instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems - - - 2 -

### 5.7 Microprocessors

Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit. - - - 2 -

### 5.8 Integrated Circuits

Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large scale integration. - - - 2 -

### 5.9 Multiplexing

Operation, application and identification in logic diagrams of multiplexers and demultiplexers - - - 2 -

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5.10 Fibre Optics	-	1	1	2	-
<p>Advantages and disadvantages of fibre optic data transmission over electrical wire propagation;</p> <p>Fibre optic data bus;</p> <p>Fibre optic related terms; Terminations;</p> <p>Couplers, control terminals, remote terminals;</p> <p>Application of fibre optics in aircraft systems.</p>					
5.11 Electronic Displays	-	2	1	2	1
<p>Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.</p>					
5.12 Electrostatic Sensitive Devices	1	2	2	2	1
<p>Special handling of components sensitive to electrostatic discharges;</p> <p>Awareness of risks and possible damage, component and personnel anti-static protection devices.</p>					
5.13 Software Management Control	-	2	1	2	1
<p>Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.</p>					
5.14 Electromagnetic Environment	-	2	2	2	1
<p>Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection</p>					

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### 5.15 Typical Electronic/Digital Aircraft Systems

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General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) such as:

(a) For B1 and B2 only: ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly-by-Wire FMS-Flight Management System IRS-Inertial Reference System;

(b) For B1, B2 and B3: ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Alert Collision Avoidance System Integrated Modular Avionics Cabin Systems Information Systems.