

Aircraft Engineering Principles – third edition

Answers to Test your understanding questions in Chapter 6

6.1

1. Duty cycle is the ratio of time for which an output load is present to the total time for which a supply is available. For example, if a load is connected for a period of 15 minutes in a total flight time of 1 hour the duty cycle of the load is 25%.

2. Undercarriage system (used both at take-off and for landing).

3. Using:

(a) a bus configured power distribution together with multiple power sources (that can be dynamically configured).

(b) real-time monitoring and fault reporting

(c) improved inspection and maintenance procedures.

6.2

1. 300W

2. 336W

3. 36W

4. 0.25Ω

6.3

1. Primary sources operate independently from other electrical sources. They are considered as fundamental inputs to the aircraft's electrical system. Secondary sources convert and transform electrical energy originally derived from a primary source.

2. Primary: engine driven generators; aircraft batteries. Secondary: TRU (transformer-rectifier units); inverters (DC to AC).

6.4

432Wh (see page 501)

6.5

The output frequency of an AC generator varies with the mechanical input shaft speed. The CSD is connected between the engine output shaft and the generator's input shaft. It helps maintain the AC frequency constant by regulating the speed at which the generator is driven so, while the CSD input speed varies widely its output speed is held within a close range.

6.6

Breaker	(a)	(b)
GCB1	Open	Open
GCB2	Open	Open
GCB3	Closed	Open
BTB1	Closed	Closed
BTB2	Closed	Closed
ECB	Open	Closed

6.7

1. The TRU (transformer rectifier unit) converts DC input power taken from the DC non-essential services bus to AC power needed for AC bus 2.

2.

GCB1	Closed
GCB2	Open
BTB1	Closed

CB1	Open
CB2	Open
CB3	Open
CB4	Closed
CB5	Closed
CB6	Closed

Note: IDG1 alone is providing power to the aircraft.

6.8

1. Logical OR (2 inputs)
2. BTB1 Open; GCB1 Open (isolation and off states are indicated on the electrical panel).

6.9

1411.8W

6.10

45.6A

6.11

1. Single phase
2. 375VA
3. F
4. 15.7A (total input power is 440W).

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