

Engineering Studies

Section II

70 marks

Attempt Questions 11–16

Allow about 2 hours for this section

Answer the questions in the spaces provided.

Marks

Question 11 — Historical and Societal Influences, and the Scope of the Profession (10 marks)

(a) The range of knowledge in which an aeronautical engineer is trained includes: 4

- aerodynamics
- fluid mechanics
- engineering materials
- legal and ethical implications.

Demonstrate how each of these four knowledge areas may be appropriately applied to the design or construction of an aircraft or its components.

..... aerodynamics - this helps engineers to design
..... a plane that can 'cut' through air this wing
..... less ~~fuel~~ fuel
..... fluid mechanics - able to measure the plane
..... as not to blow it up in the air
..... engineering materials - it helps them use
..... materials that are light weight and strong
..... at the same time - also to use less fuel
..... legal implication - by knowing the legal
..... implication they would not copy a patented
..... design or construction
.....

Question 11 continues on page 10

Question 11 (continued)

(b) Improvements to materials over the past 200 years have changed the significant design features of civil structures. These features include:

- the height of the structures
- the length of unsupported spans
- the load carried by structures
- the stiffness of structures
- the expected lifespan of structures.

(i) Outline how the improvements to materials have affected any TWO of these features. 3

The load carried structures - today
 cranes can carry ~~up to~~ ^{many tonnes} ~~250 tonnes~~
 of weight and also they ~~are~~ have
 a long life span this is due to designing
 materials that can ~~weight~~ withstand
 the elements and tension / compressive force
 without falling.

(ii) Discuss how society has been affected by the changes to any TWO of these features. 3

Because they can lift many loads
 such as bridges people in large numbers
 can travel across seas with ease
~~the~~ The length of unsupported spans
 also ~~contributes~~ contributes to this
 where structures can cross over water
 not just cities.

End of Question 11