

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 aids in the performance of the specified aircraft. Having a bad design of the aircraft can cause the wind to drag the plane, which is never adviseable. Fluid mechanics power the flaps, ailerons, rudder etc, they also ~~also~~ supply the engine with fuel. Without the fluid mechanics, the plane would not even take off. Engineering materials are always emerging, the new copper aluminum is used in present day planes, the lighter the aircraft, the less power required by the engines. There are numerous legal and ethical issues through the development of all new ideas, issues that could cause the manufacture harm through law suits, and legal battles.

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 height of the structures ~~is~~ has been a significant step. 200yrs ago, ~~the~~ engineers could not even have imagined what has been developed now, due to the use of new composites, and steel ~~to~~ the height of structures may still rise. The length of unsupported spans has greatly improved due greatly to the strength ~~and~~ and design of new materials, through these materials and joining methods, which have improved the length of unsupported beams.

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

Society has been affected primarily by the height of the skyscrapers, these buildings are apart of society's everyday life, ~~also~~ the length of unsupported. Another way in which society has directly been affect is the expected lifespan of these designs, it is significant as these buildings will be around for large periods of time (extensive periods) meaning that the buildings will hold significant value in the minds of society.

End of Question 11