

Engineering Studies

Section III

20 marks

Attempt Questions 17–18

Allow about 40 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 17 — Engineering and the Engineering Report (10 marks)

Shade areas are to be added to a major harbourside transport interchange. The interchange is also a popular tourist destination.

- (a) An engineering report is to be produced for the development of shade areas near the interchange. Outline a technical issue and a social issue that would need to be considered in such a report. 2

Technical:

A technical issue that should be considered is the materials used for construction of the shade area. Materials must be adequately strong and weather resistant so as to ensure the harbourside is not polluted by faulty materials.

Social:

The positioning of shade areas must be carefully considered so as to not visually pollute, congest traffic or cause a drop in tourist numbers coming to the harbourside.

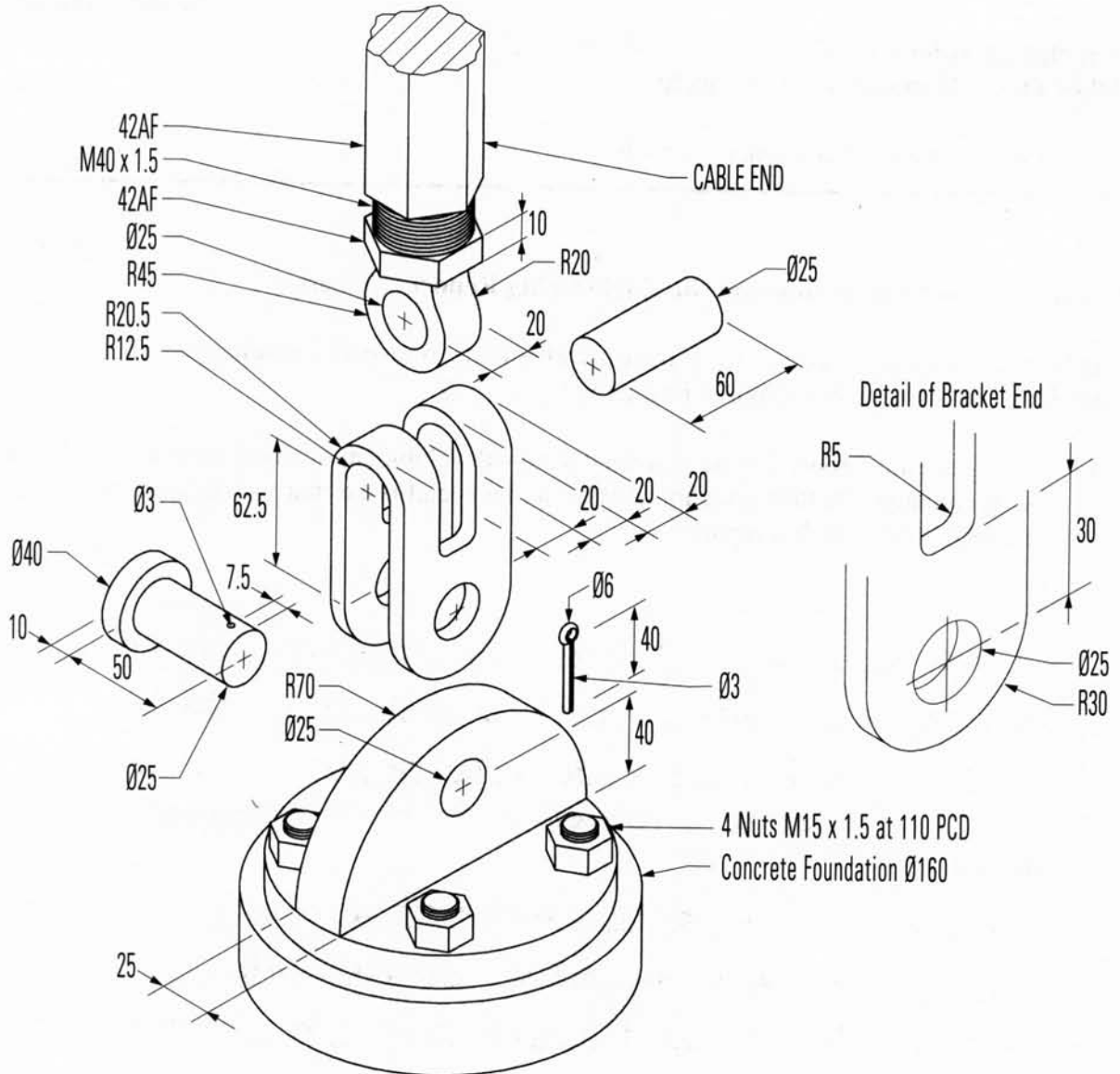
Question 17 continues on page 28

Question 17 (continued)

Marks

(b) Details of a domestic shade area cable tensioning system are given.

4

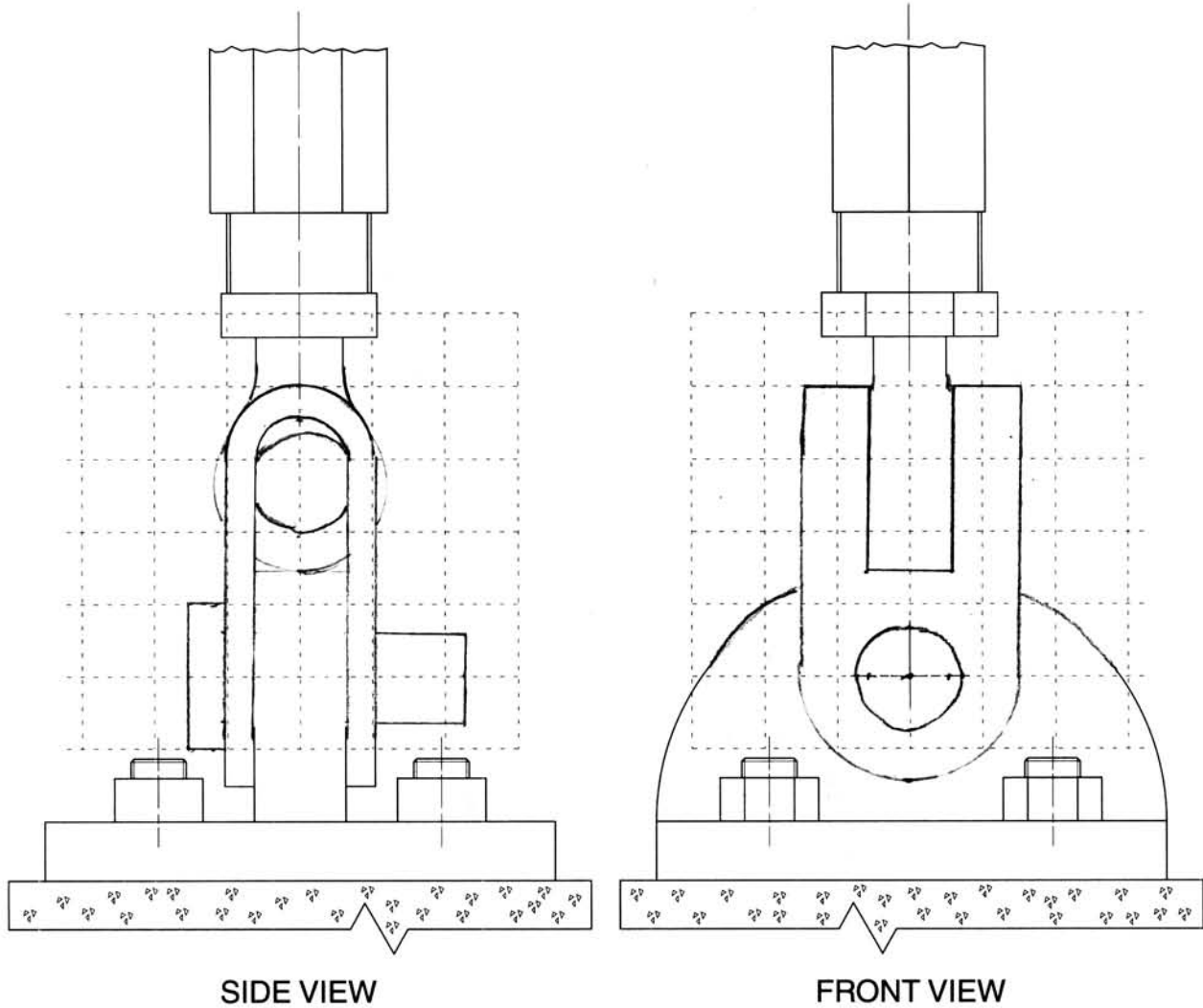


Question 17 continues on page 29

Question 17 (continued)

A partially completed orthogonal sketch of the front and side views of the assembly is shown, drawn to a scale of 1 : 2.

Complete the assembled orthogonal sketch on the grid. Apply AS1100 drawing standards where appropriate. DO NOT show hidden outline. DO NOT dimension.



Question 17 continues on page 30

Question 17 (continued)

(c)



- (i) A support for a public shaded area is shown in the photograph. Two types of members, A and B, are used to distribute the forces created by the weight of the fabric. 2

Explain the structural reasons for the difference in the shape and size of the members.

Member B is supporting the majority of the compressive force supplied by the shade fabric. Therefore member B ^{has a} significantly larger cross sectional area and is reinforced with horizontal beams. Members A are in tension however to support member B. ~~so~~ therefore they have smaller, circular cross sections.

- (ii) PVC coated polyester fabric is widely used as the cover for shade areas. Discuss how developments in engineering textiles have influenced the design of public shade structures. 2

The development of engineering textiles with a breathable surface (allowing air to pass through) ~~is~~, ~~as~~ well as a greater strength to weight ratio as well as being lighter has altered the design of shade structures. Supports and beams can now be lighter and cheaper due to decreased forces acting on them.

End of Question 17