

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:

The materials that will be used due to the harsh environment of high wind and salty air which assists corrosion.

Social:

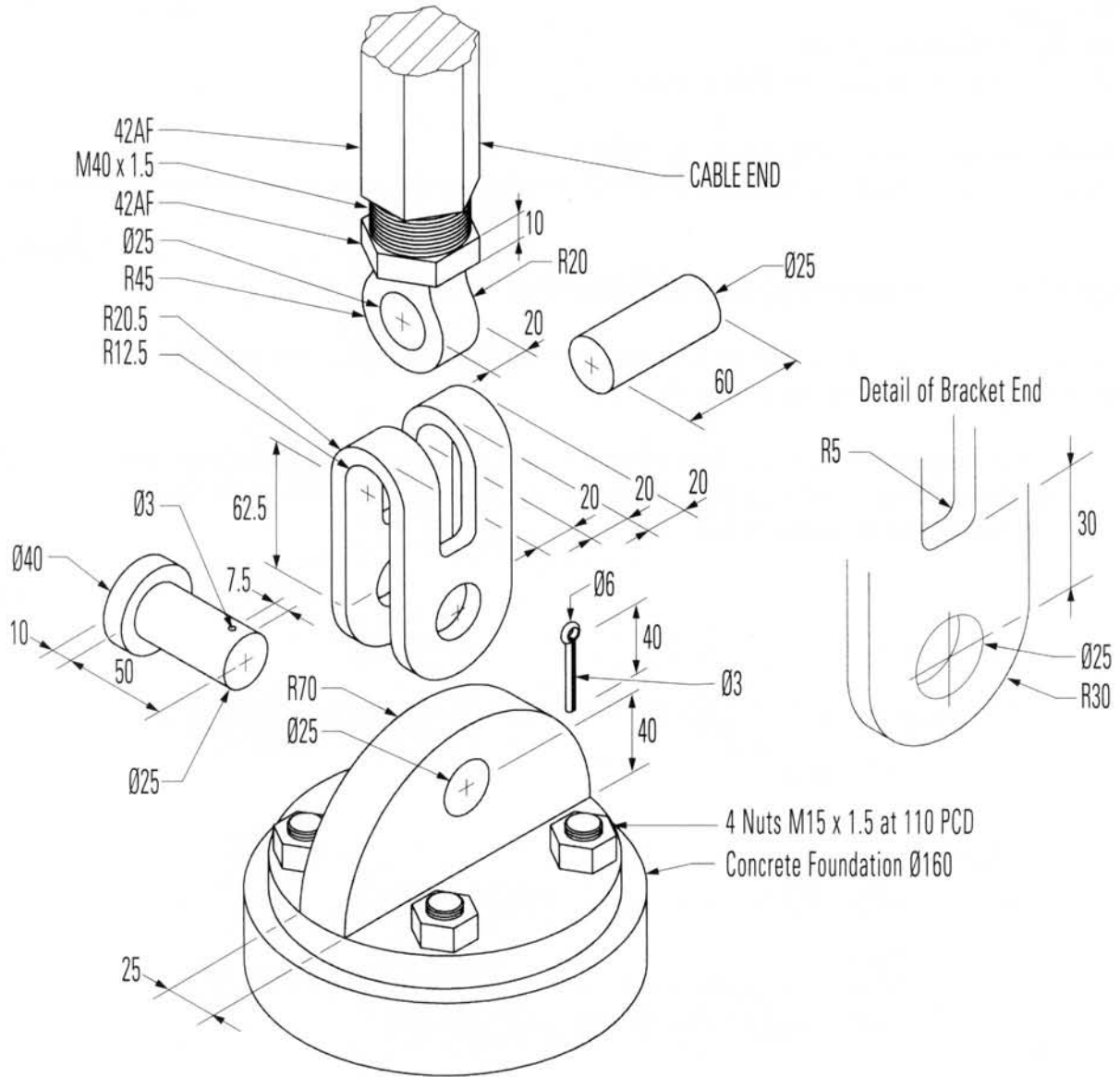
What the shades look like. If they will not be accepted as part of the landscape then people may ask for it to be removed.

Question 17 continues on page 28

Question 17 (continued)

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

4

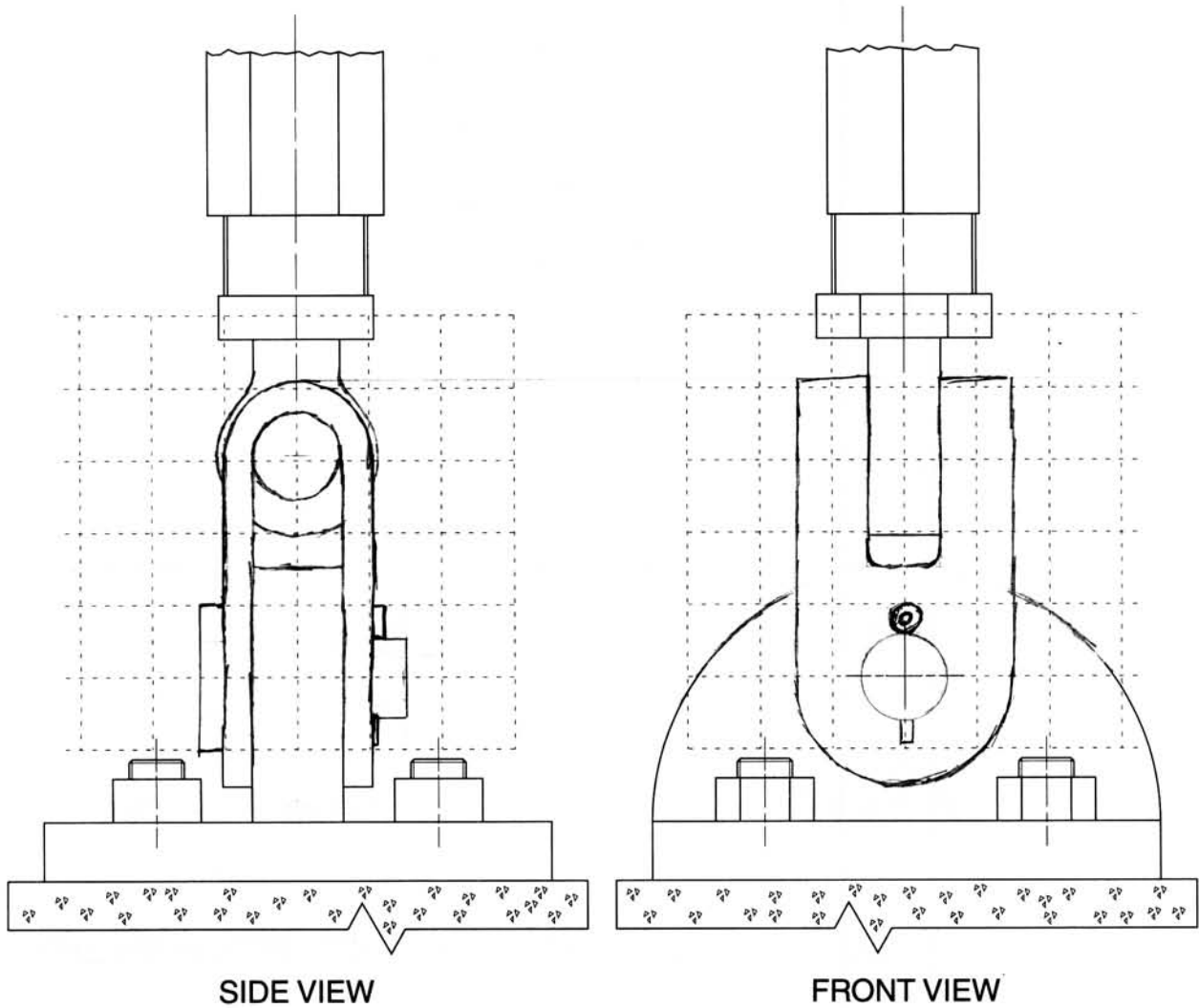


Question 17 continues on page 29

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 A does not have to be very large as steel is very good in tension and the shape could be due to the ease of connection on tensioning of the shade. Member B is like it is so that a large distance between the neutral axis and outside surface is achieved giving the beam both lighter weight and minimally less strength.

- (ii) PVC coated polyester fabric is widely used as the cover for shade areas. 2

Discuss how developments in engineering textiles have influenced the design of public shade structures.

The development of PVC textile has allowed larger areas to be spanned using cloth and also the ability to easily make it waterproof. However this in turn has made the material very heavy to support and keep tightly strung and it is also very costly.

End of Question 17