ISTRUCTE CHARTERED MEMBER EXAM

GUIDANCE PACK : SECTION 1A AND 1B

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Table of Contents

1 Introduction

This booklet contains detailed guidance on how to answer Section 1a and 1b of the IStructE Chartered Membership Examination.

The IStructE exam is a long, arduous and challenging test of a structural engineer's abilities. At The Structural Exam, we believe that giving you the best tools and resources possible to help prepare for the exam will greatly improve your chances of passing, and this will benefit the whole structural engineering community, by having better-informed, better-prepared structural engineers who can go out and solve the world's problems.

The guidance in this booklet will help you to :

1) Prepare to sit the IStructE exam
2) Format your exam answer
3) Spend your exam time productively, enabling you to answer each section methodically and efficiently.

We recommend that you print out this guidance booklet to place in your reference folder which you can take into the exam.

Please note: the guidance in this booklet does not attempt to teach you how to become a structural engineer, and is no substitute for hard-won, real-world knowledge.

2 Exam Answer Format

In this guidance booklet, we follow the format as listed below. It helps to set out exactly how to format your exam answer so that you can tackle each section in small chunks, allowing you to work quickly and productively.

You can adjust our format to suit your own individual preferences.

- Section 1a
  - Initial thoughts
  - Assumptions
  - Design codes and reference materials
  - Scheme design report
  - Scheme design sketches
  - Scheme recommendations
- Section 1b
  - Client letter

3.8 Scheme Design Report

You need to clearly communicate both of your scheme options, using text and diagrams.

This is the largest single element of the exam, worth 40 marks, so it is important to spend sufficient time on it, and to practice what is required for this section.

Your scheme design report can be based on the standard format shown below. We will cover each item in detail:

- Introduction
- Scheme option 1:
    - Description
    - Vertical loads
    - Lateral loads
    - Other details
    - Scheme sketches
- Scheme option 2:
    - Description
    - Vertical loads
    - Lateral loads
    - Particular details
    - Scheme sketches
- Scheme recommendations

3.8.1 Introduction

A variation on the wording below is often written by candidates to introduce their scheme design report:

'In the following design appraisal, two schemes have been prepared for discussion. The solutions presented have been chosen to be as distinct as possible in form, construction and materials as the constraints of the brief and site will allow.'

3.8.2 Description

This is simply a brief description of the elements that make up this scheme. How it all works will be covered in the following paragraphs. You are likely to end up repeating yourself a bit over the next three sections but that is not a problem.

You will probably write the description after completing your design, on a separate sheet of paper, then re-arranging it to the front. Think of it as creating a 30-second sales pitch to the client for each option.

For example:

'Option 1 is a braced steel frame, with columns generally on an 8m square grid, and a composite metal deck spanning between primary beams.

There is vertical steel cross bracing in each of the four external corners, and plan steel cross bracing at roof level between the primary roof beams, which are long span cellular steel beams.

The foundations are shallow pad and strip foundations, with a reinforced concrete ground bearing slab.'

3.8.3 Vertical Loads

You must clearly describe the load path that vertical loads follow from the superstructure down to the foundations.

You can describe each level separately if appropriate, for example; roof; level 2; level 1; etc.

This should be complemented by a load path diagram.

For example:

'Permanent and variable actions act upon the structural slab, which is a composite metal deck, one-way spanning up to 4m between secondary steel beams.

The secondary steel beams span 8m between primary steel beams. The primary steel beams span from the column line on the external wall, 8m to the internal column line, and cantilever a further 2m to the inside edge of the upper floor slabs.

The long span steel roof beams span 20m and are simply supported between steel columns.

The external cladding is supported on steel edge beams, which span 8m between steel columns.'

3.8.4 Vertical Load Path Diagram

The load path diagram is a simple stick diagram which visually shows the transfer of vertical forces from the superstructure down to the foundations.

This can be done with arrows showing the direction that forces are travelling, or by showing the forces and moments in the members, as in the diagram below. Drawing the bending moment diagram demonstrates that you understand how your structural elements are behaving.

Using different coloured pens helps with visual clarity.

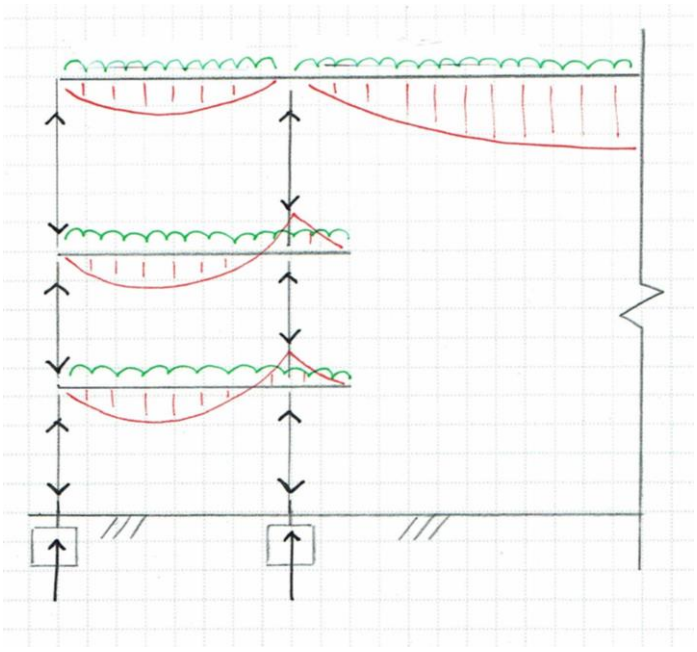

Figure 1: Example of a vertical load takedown section. Note the section only needs to show one half of a symmetrical building.