

Structural Engineers Chartered Membership Exam Preparation Pack



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SAMPLE

Version History

Rev	Description	Date
00	First official release of exam preparation pack	September 2026

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An Introduction

First of all, thank you very much for purchasing our chartered examination preparation pack.

This pack, along with the accompanying checklists and calculation examples, is intended to arm candidates with a broad arsenal of tools that enable them to produce distinct concept level scheme designs for the exam. A lot of common questions arise when attempting exam questions, such as:

- How might this specific soil or site condition affect my choice of foundation design?
- What kind of basement excavation and construction strategy should I pursue?
- Do I need to consider seismic design?
- What level of detail should I consider for my answers and calculations?

With almost 100 pages of curated content, we hope this pack answers all these questions, and that it doesn't pigeonhole candidates into producing homogeneous designs. Instead, it should help create a framework for candidates to confidently answer questions and foster creative thinking.

Although it contains various design recommendations, nothing can replace practice and mock exam sessions. Candidates are strongly recommended to do at least a minimum of 2-3 mock sessions under strict timed conditions. Even with a framework, individual engineering judgement is key.

The current examination preparation pack is largely limited to building questions; it does not include advice for bridge questions. Furthermore, the current iteration of the pack does not include guidance on timber construction, although with the increased focus on sustainable construction, it is hoped that this can be included in future iterations.

Candidates are encouraged to supplement their exam preparation packs with some of the following:

- ☐ Steel section property tables, including buckling lengths
- ☐ RC column normalised interaction curves
- ☐ CLT span tables
- ☐ Concrete on metal deck (composite slab) span tables
- ☐ Steel roof deck span tables
- ☐ Precast concrete planks span tables
- ☐ Span tables for purlins

A few other tips:

- ☐ Write fast but write neatly!! It doesn't help if the examiners can't read your answer. Help them to help you, and make everyone's life a little bit easier.
- ☐ When you're answering your question, be sure to lay down your every thought. Why are you opting for a piled solution instead of a shallow foundation solution? How are diaphragm forces being resolved? Is your core slip-formed, jump-formed, or potentially even precast?
- ☐ Practice, practice, practice! Become intimately familiar with answering exam questions, look at examiner feedback from previous years to see recurring themes and review what makes a good answer vs. a poor answer.
- ☐ Following on from the previous point, timing is **CRITICAL**. Most candidates do not fail the exam due to poor answers, but because they were unable to finish in time, and therefore failed to address key parts of the question (or provided incomplete answers).

On a final note: Although the exam preparation is very taxing, just like many other chartered engineers before you, we hope you find that the experience of preparing and studying for the exam generally shapes you into a better structural engineer with more rounded considerations.

We wish you all the best in your exam preparation!!! Finally, we welcome any and all feedback on this document. If you have any thoughts or suggestions, please feel free to reach out via our website's [contact form](#).

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1: Structure of the Exam

1.1. General Overview

Historically always 5 questions, which typically take the following form:

Q1	Building / Workshop	Q2	Building / Renovation	Q3	Bridge
Q4	Building / Industrial	Q5	Building / Other		

Your answer will typically follow the following format and number of pages...

1(a) [40]	Salient Points 2 - 3 Scheme #1 min. 5 Scheme #2 min. 5 Appraisal 2
1(b) [10]	Client Email 2
2(c) [20]	Calculations 7 - 9
2(d) [20]	Drawings (A3) 2
2(e) [10]	Method Statement 2 - 3

A more detailed breakdown on each of these is provided on the following pages.

1.4. Section 1(a): Scheme Designs

40 marks out of 100

In the context of the design criteria and summarised initial thoughts, you can now begin trying to develop two distinct schemes. Quickly explore two or three different solutions on the back of some paper... any particular quirks of the question may also reveal themselves.

A few other general tips for developing your schemes:

1. Write out all your rationale for adopting certain structural solutions
2. Your two developed schemes need to be viable and distinct
3. Don't try to force the distinctions by opting for a structural solution in the second scheme which doesn't make sense i.e. where it seems obvious you are proposing an alternative just to force the distinction. A good example could be using piled foundations on a second solution to make it different, however, a shallow foundation would've been completely justified.
4. Keep it reasonably simple to materials you are confident with, and design solutions you are relatively comfortable at performing hand calculations for. For example, some candidates may struggle to do calculations for multi-storey moment frames.

Don't try to do a mass timber building if you do not have experience with mass timber. Unless you are confident you can learn and develop your timber design skills prior to the exam.

5. When studying various materials and framing solutions for the exam, try to arm yourself with a very wide breadth of structural typologies. This is essential in maximising your "toolkit" and makes it much easier to develop distinct scheme solutions. If you are just used to doing steel buildings, then this may be slightly difficult. Your experience should at least include two materials.
6. For foundation solutions, do not automatically opt for a safer piled foundation solution where a shallow foundation solution would have been perfectly adequate. Write out your reasoning and justifications for your design decisions. For example: "column spacing is too large to make a raft foundation economic, therefore I am proposing a piled foundation solution."

One of your schemes could be in steel framing which would favour long-spans and low foundation loads, with steel cross-bracing and shallow foundations due to the lighter way. A steel scheme is also more amenable to having top-hung solutions rather than using transfer beams to deal with discontinuous columns or cantilevers.

Efficient concrete framing (like flat slab or downstand beam solutions) could form your second scheme, with more regular column spacing, and potentially larger shallow foundations (or deep foundations like piling where appropriate). This scheme could use transfer beams, inclined/raking columns, or walking column solutions to deal with discontinuous columns or cantilevers.

1.5. Section 1(b): Client Email

10 marks out of 100

For the Client correspondence, it is nice to view it as a Value Engineering (VE) exercise where you are proposing ways to reduce material usage and therefore bring down cost (as well as embodied carbon). We have provided an example email below with a list of various possible VE solutions.

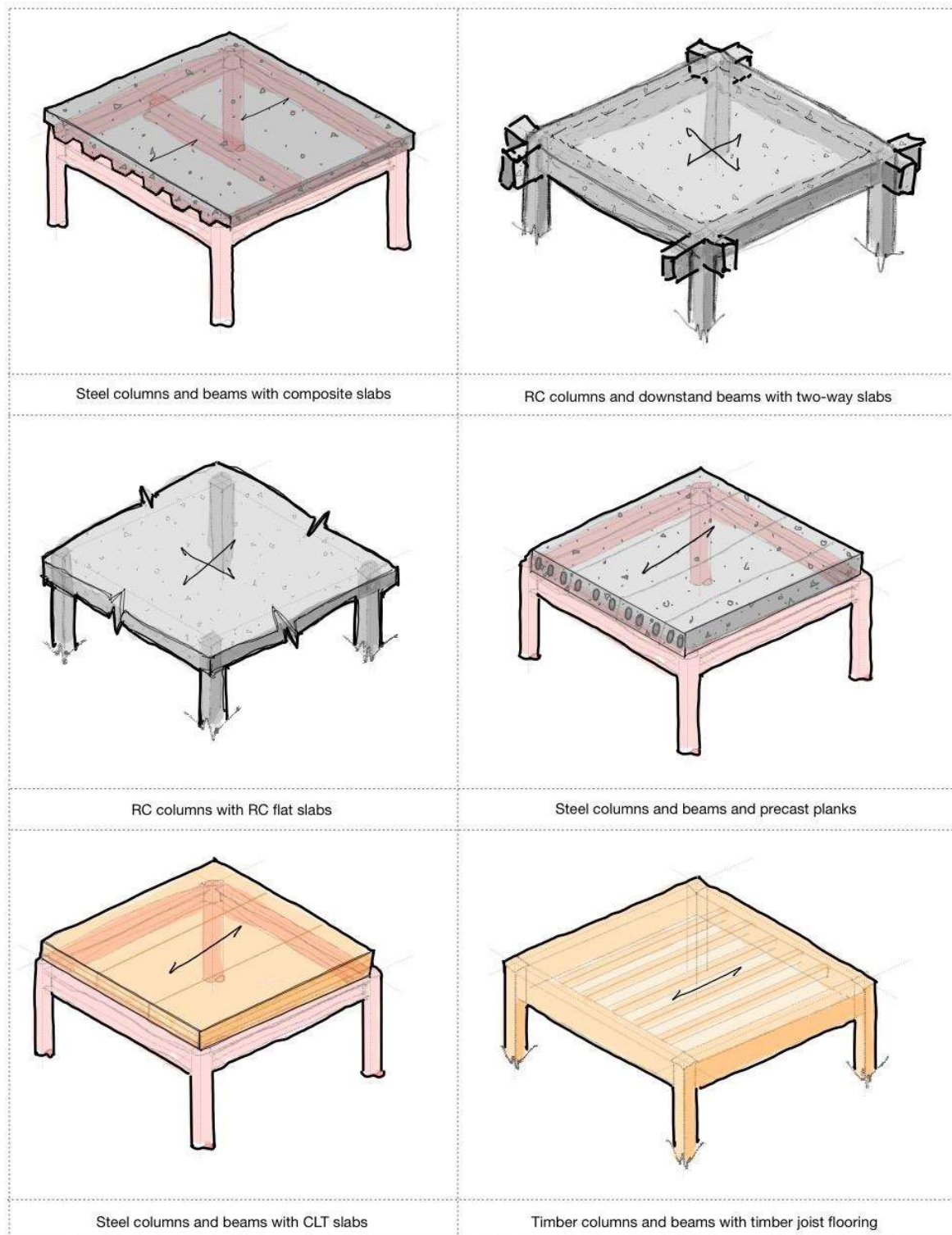
For each VE proposal, you should try to state the potential impact of it on other disciplines. Furthermore, if you have time, sketching something out would also be beneficial.

Email template example on next page:

Key recommendation(s)

- The format for older exams was slightly different to recent years. However, when you are doing past papers, you can always perform a quick VE exercise (even brainstorm) to consider what VE solutions would be applicable.

2.2. Floor Framing Optioneering



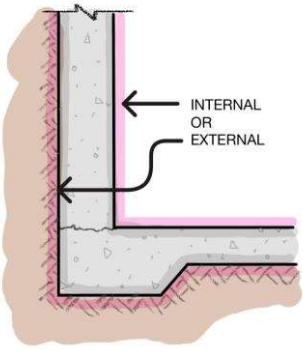
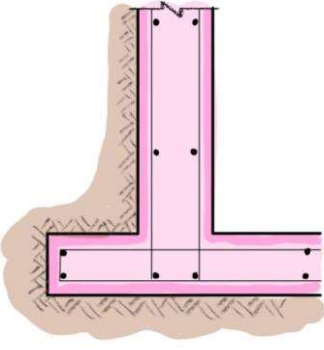
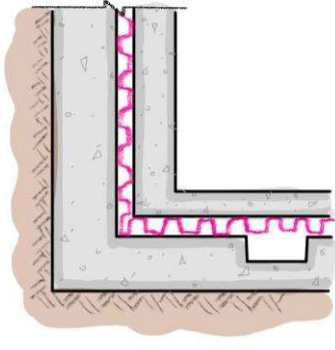
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*Can also do post-tensioned flat slabs for improved economy.

8.2. Waterproofing Grades

Grade	Performance Level	Usage / Applications
1 (basic utility)	Some leakages and damp areas tolerable. Local drainage may be required.	- Car parks - Plant rooms (excl. electrical) - Potentially workshops
2 (better utility)	No water penetration, but damp areas tolerable, dependant on the intended use. Ventilation may be required to control condensation.	- Car parks - Workshops - Plant rooms
3 (habitable)	Dry environment. No water penetration. Additional ventilation, dehumidification or air condition appropriate to intended use.	- Domestic / residential - Leisure centres - Commercial office - Commercial retail - Commercial storage
4 (special)	Totally dry environment. Requires ventilation, dehumidification, or air conditioning appropriate to intended use.	- Archives - Landmark buildings - Stores with strict environmental controls

Waterproofing grades can be achieved by different types of water-resistance construction, which BS 8102:2002 classifies into three types as below.

		
Type A	Type B	Type C
Barrier Protection	Structurally Integral	Drained Protection

Notes

For higher grades, like Grade 3, at least two types are recommended to ensure a failsafe system. Common combinations are Type B + C for new construction, and Type A + C for refurbishments.

11: Frequency Asked Questions (FAQs)

1. Which should I do first? The chartered exam or the Professional Review Interview (PRI)?

Historically candidates were required to do the PRI first before attempting the exam. Passing the PRI is almost a good indicator that you have the depth and breadth of knowledge to tackle the challenging questions in the exam.

However, we cannot offer advice on this. It is entirely up to each individual candidate which one they would like to do first. If you are attempting the PRI, be sure to check out the freely available advice and guidance available on our website and feel free to reach out for any advice.

2. How do I know if I am ready for the exam?

In general, you will need to have been a practising engineer for about 3 years or more before attempting the exam. Ideally, you will have gained a breadth of experience and knowledge in concept design and construction; and be able to develop concept designs on your own with limited guidance from a senior engineer.

3. When should I start preparing?

You should typically start preparing at least about 6 months before the exam (although some candidates begin about a year or more as well). We would suggest starting by creating your own exam preparation pack, which may encompass or adopt items in this document. Get familiar with past exam papers. At least 3- to 4 months before the examination date, you should start attempting part (a) of various exam questions and seek feedback on your answers from friends and colleagues. The initial scheme designs may take you a long time to develop, but as you begin to organise your answers and become accustomed to answering in your own style, your time taken to answer questions will significantly reduce.

By the time of the exam, you should aim to have done this for about 5-10 different questions. Furthermore, as mentioned in the beginning of this document, be sure to do at least 2 or 3 strictly timed mock exam sessions of a past paper covering all the parts of the question (that you have not attempted previously, and ignorant of the questions within).

4. How much reference material should I bring to the exam?

We would suggest taking your exam prep pack as one folder, span tables & steel section properties as another folder, and finally the checklists we have provided accompanying this pack. Avoid taking in too much material – we have observed candidates taking in suitcases filled with books. You will barely have time to look at your own exam pack and span tables / section properties, so do not spend time looking at other materials. If you think your exam prep pack falls short of some specific information, just add it to your pack. Time is of the essence!