

Advice to failed candidates

Chartered Membership examination 2010

1. Advice for candidates failing section 1(a)

Section 1(a), requires candidates to prepare two structural schemes which would meet the clients requirements as set out in the brief.

Each of the two schemes must show all the main parts of the structural frame together with the foundations and each scheme must be entirely different, and complete.

Candidates must include neat sketches showing the layout of all the main load-bearing members and indicate the paths that carry the loads to the foundations or other supports.

Candidates must prove to examiners that both of their proposals for the structure have sufficient bracing to be safe against any instability.

Candidates are also required to recommend one of the two schemes as the one which best fulfils the clients brief giving reasons for the choice.

Your script did not gain an acceptable mark for this section and you should practise the necessary skills against the clock and under examination conditions before you take the examination again.

Allow yourself 40% of 7 hours, i.e. 2 hours and 48 minutes to complete this section using questions from old examination papers.

Do not panic in the real examination because there are long spans, high wind loads, areas specified to have no columns, large openings in floors, etc. You know there are likely to be such things so practise beforehand.

Check afterwards that you have complied with every part of the paragraph above and the particular brief for the question attempted.

Seek help from a senior engineer and ask for advice on how to improve your work. Attend a good preparation course for the examination if you can.

Spend time working through the interactive examination preparation CD. Practise answering many past papers under examination conditions.

In the examination itself, read the clients requirements several times before you start and make a note of any site constraints or limitations to make sure you do not ignore any of them.

Each of the two schemes must be viable, sufficiently braced to be stable in every direction, not unreasonably expensive, as simple as possible, as fire resistant as required by the question, and not buoyant if submerged in groundwater.

It is probably advisable to carry out very quick rough calculations to size members approximately early on so that you do not need to revise your scheme radically at a later stage wasting time and effort.

Choose materials most easily available to the site to give short lead-in times. Consider any difficulties of access or plant availability.

Notice that equal marks are available for each of the two schemes and do not skimp your explanations, sketches, etc. of the second one.

The recommendation of the scheme which best fits the clients requirements should discuss how the schemes compare and differ yet still both match the brief. Explain why one scheme should be chosen rather than the other bearing in mind the site as well as the client's brief.

2. Advice for candidates failing section 1(b)

Your script did not obtain a pass mark in section 1.b that concerns a matter sometimes occurring in practice.

After the design has been completed the client requests some change, or new data is discovered which might require changes in your scheme for engineering reasons.

Candidates are asked to write a letter which would explain to the client what effect the change or new data would have on their design.

There are 10 marks available which might well make the difference between Pass and Fail.

The letter must be written in standard office format and be neat, brief and professional.

It must explain the structural reasons to the client, possibly mentioning delays because of resubmission requirements, costs arising from the delay, as a likely percentage of the overall cost, and delays and costs due to requiring any extra services of other professionals like quantity surveyors, or services engineers.

Examiners often complain that the letter is deficient in the simple explanations suitable for a layman and moreover it is so untidy it simply cannot be read or given a mark,

Practise will make this task easier and quicker.

You need to grasp quickly the structural problems which would arise from the anticipated changes and explain in simple language what is needed to overcome them.

Avoid trying to persuade the client not to have the change but rather tell him how he can have what he wishes - but comment on any extra costs and delays.

3. Advice for candidates failing section 2(c)

Section 2.c, of the paper requires candidates to calculate the form and size of all the principal structural elements, including the foundations, for the scheme recommended in section 1.a, but you did not obtain a satisfactory mark.

At the beginning of this section candidates should state which design codes they intend to use and any assumptions they may have made.

The examiners are looking for an understanding of fundamental engineering concepts rather than over-elaborate calculations of member sizes or of code values. Establishing the form and size of structural members means ensuring that they comply with all relevant criteria of the code used i.e. bending, shear, axial load, limiting deflections, etc.

Examiners award good marks to sound structural designs which satisfy the brief and the site; look right aesthetically, and are not over-expensive to build.

Use approximate formulae and rules of thumb methods to establish member sizes.

Provide calculations for all the principal members.

Mention other design checks you might carry out, given time.

Remember that there will be more than one load case, especially if you use a combination of limit state and elastic methods to speed the design.

Show calculations in the normal standard form.

Ensure that your structure is adequately braced against instability.

In preparing for the examination, background reading and practice are essential.

Try to get help from a chartered structural engineer to look over your work and offer suggestions.

Prepare a collection of reference material to take into the examination but make it the minimum necessary amount. You will not have time to choose from a whole library of material!

You will need your design code details, unit weights of materials, common loadings etc. and a practised ability to carry out approximate analysis.

If you store data on a laptop make sure you have enough battery power to last 7 hours.

Practise this section on past questions and against the clock (20% of 7 hours is 1 hour and 24 minutes) to gain the necessary expertise.

In the examination, use line diagrams to demonstrate your knowledge of the real structural behaviour as well as the approximate solution.

4. Advice for candidates failing section 2(d)

Your script did not obtain a pass mark in section 2.d, that requires candidates to prepare general arrangement drawings of the structure showing all plans, sections, and elevations required for estimating the cost of their scheme.

The sketches should be to a suitable scale and show all salient features of the design and all relevant details.

Candidates are no longer required to draw specified details but must choose for themselves the critical details of their own design and this is a more onerous task.

Drawings must show all principal dimensions and be clear and tidy.

They look well presented if you use a title box and a border.

This makes a good impression on the examiner who will have ploughed through untidy, scrappy and incomplete drawings from other candidates.

Use stencils, circles and grid lines where required.

Even though you may not have `designed` all the items you show, you can rely on your experience and judgement to gain marks.

Read the examiners reports on previous examinations.

You must be able to complete this section in 1 hour and 24 minutes. Practise many times on previous questions under examination conditions to make sure you can.

5. Advice for candidates failing section 2(e)

Section 2.e, requires candidates to prepare a detailed method statement for the safe construction of the proposed structure and an outline construction programme.

Your script did not obtain a pass mark in this section.

Site experience is a start towards a good answer but needs to be backed by reading and practice because your experience cannot include every possible form of construction.

Candidates should provide what is required starting with the site outlined in the question and including any temporary structures required.

You need to be conversant with foundations and how they are constructed.

You need to be able to estimate how long it will take to complete all the separate parts of your scheme so that you can produce a realistic outline construction programme.

This is where reading; branch meetings where local projects are described; papers in the Journal; and case studies; are useful.

Ask questions of speakers at branch meetings if they have not fully answered what you wish to know.

You need to be familiar with safety regulations and good practice and to know what temporary construction and equipment will be necessary for projects.

All this will require much time and preparation before the examination.

6. Advice for candidates showing general weakness

Your script did not gain sufficient marks to pass overall because it was weak in several sections. It is necessary to obtain pass marks in both sections of the paper and this is not easy.

You will find it essential to practise on questions from past papers and discuss your answers with a chartered structural engineer.

Good preparation for the examination is essential and success will depend both on examination technique and structural ability.

Try answering many past questions against the clock and under examination conditions.

To obtain 100 marks in 7 hours is equivalent to earning one mark every four minutes so a part which carries 20 marks is worth 80 minutes of examination time.

Practise until you can answer that part properly in 80 minutes and every other part in their respective times.

Of course you also need to know what is required to answer each part so reading and practice are essential.

If you possibly can, take a preparation course for the examination and seek advice from a senior engineer about the quality of your performance.

7. Advice for candidates who attempted question 8

Question 8 requires the candidate to consider that the structure is located in an area where earthquakes must be taken into account.

Your answer did not demonstrate a sufficient grasp of current international practice in earthquake resistant design, which includes the need to account for:

- a) the dynamic response of the structure to seismic motions
- b) the effect of yielding on response to strong ground motions
- c) the need to provide ductility and to identify plastic yielding mechanisms in the structure
- d) the importance of detailing on seismic performance

8. Your script shows that you had the ability to pass

Nevertheless your examiner(s) saw that your structure was insufficiently braced and this being upheld by the chief examiner must result in failure.

9. Your script shows that you had the ability to pass

Nevertheless your examiner(s) saw that your structure contravened the client's brief and this being upheld by the chief examiner must result in failure.