Examiners' Report on ICT Exams held in 2023

Detailed reports on exam performance are prepared by the examiners and moderator for each of the stages of the ICT scheme and are used confidentially to inform decisions taken by the Examinations Committee. In order to provide feedback to course providers and individual candidates planning to re-sit, the ICT's Exams Committee has compiled an aggregated report which, on application to ExecutiveOfficer@theict.org.uk, is available with a copy of the corresponding question paper.

Summary

Stage 1: Concrete Practice (June)
2 fail, 11 pass, 13 credit, 24 distinction

Stage 1: Concrete Practice (Dec)
3 fail, 6 pass, 20 credit, 36 distinction
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5 fail, 17 pass, 33 credit, 60 distinction (2023 totals)

Stage 2: General Principles
23 fail, 22 pass, 13 credit, 5 distinction

Stage 3: Practical Applications
15 fail, 10 pass, 1 credit, 0 distinction

Aggregates in Construction:
1 fail

Stage 4: Advanced Concrete Technology
Paper 1: 2 fail, 2 pass
Paper 2: 5 fail, 3 pass
Project: 2 submitted
Diplomas: 2 awarded

Stage 1: Concrete Practice

Candidates for the Stage 1 examinations continue to perform well, with 96% passing in the June exam. The December exam is yet to take place.

Stage 2: General Principles

Overview

63 papers were returned.
Grading was as follows: ≥50 Pass, ≥60 Credit, ≥70 Distinction
Candidate statistics: 23 fail, 22 pass, 13 credit, 5 distinction

In general, the overall distribution of final marks for the 63 papers marked is as expected for a cohort of this size. 40 out of 63 candidates (63%) passed the exam, with final scores for these students ranging from 50-81%. This pass rate is down from 2021 and 2022 (86% and 66% respectively). The quality of submissions by 23 of the 63 candidates (37%) was not high enough to pass the exam. For this body of candidates, final scores were in the range 28-49%. Clearly in some cases the level of knowledge fell significantly below what is expected at this level.

Below is the average mark (out of 10) and the number of candidates attempting each question:

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Average	6.1	4.8	2.6	4.6	5.1	4.8	4.9	4.9	4.4	5.3	4.9	5.7	5.7	5.5	6.6
Count	60	33	17	48	59	58	38	39	16	36	26	46	46	44	60

Comments on individual questions

Q1 – Health & Safety
Generally answered well.

Q2 – a) Binder terminology and b) typology of common cements
In many cases, candidate reviewed the performance of one cement type only and/or failed to consider both fresh and hardened properties.

Q3 – Secondary and manufactured aggregates
Universally answered poorly, with candidates failing to distinguish between secondary and manufactured aggregate.

Q4 – Effect of aggregate properties on fresh and hardened concrete
In many cases, candidates focussed on fresh or hardened properties without sufficiently discussing both. Some candidates incorrectly focussed on aggregate properties rather than concrete properties.

Q5 – Definition and classification of admixture types
Many candidates failed to both define and classify admixture types.

Q6 – Definition and causes of false and flash setting
Generally answered well, albeit some candidates failed to understand the terms.

Q7 – Resistance of concrete to four causes of potential deterioration
Generally answered well.

Q8 – Mechanism and mitigation of Alkali Silica Reaction
Generally answered well.

Q9 – a) Items of pre-stressing equipment and b) the properties of different types of tendons
Generally answered well.

Q10 – a) Distribution of reinforcement, b) its role in crack control and c) concreting practice
Generally answered well, albeit that answers to parts b) and c) were of lower quality that part a).

Q11 – a) Testing procedures and b) calculating average compressive strength
Generally answered well, although some candidates were clearly unable to undertake the task set.

Q12 – Define 'characteristic strength', 'design margin' and 'target mean strength'
Generally answered well.

Q13 – Factors affecting the choice between precast and in site construction
Generally answered well.

Q14 – a) Types of compaction equipment and b) their advantages and disadvantages
Generally answered well.

Q15 – a) Curing methods and b) effect of curing on plastic cracking with remedies
Generally answered very well.

Stage 3: Practical Applications

Overview

Twenty-six scripts were returned.
The average mark was 42.0, the highest 61.0 and the lowest 9.0.
Eleven candidates passed the exam. Of these, one gained a credit (between 60 and 69), but nobody gained a distinction (70 or higher). Fifteen candidates failed. Four low-scoring scripts were reviewed.

General

Section A

Q1 – 25 answered, 1 did not answer or scored 0, low marks by 7 (<5).
Q2 – 19 answered, 7 did not answer or scored 0, low marks by 19 (<5)
Q3 – 25 answered, 1 did not answer or scored 0, low marks by 14 (<5)
Q4 – 20 answered, 6 did not answer or scored 0, low marks by 7 (<5)
Q5 – all answered, low marks by 10 (<5)

Section B

Q6 – answered by 12 candidates.
Q7 – answered by 10 candidates.
Q8 – answered by two candidates.
Q9 – answered by two candidates.

	Section A					Section B			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Average	6.3	3.1	4.3	5.42	5.85	19.5	12.7	17.5	20.0
Count	25	19	25	20	26	12	10	2	2

Comments on individual questions

Section A

Q1 – Non-destructive testing

Average mark 6.35
This question was on defective concrete and non-destructive testing, so I would have expected some knowledge of testing without coring the concrete. The marks were where I would have expected: above 7, or really low.

Q2 – Shewhart control charts

Average mark 3.15
Stage 3 candidates should have some knowledge of statistic control, but most students that received a 0 mark just tried to draw a plot and nothing else. A poor showing by all students.

Q3 – Heavyweight & Lightweight concrete

Average mark 4.31
Standard concrete technology which was very poorly answered by most students.

Q4 – Durability

Average mark 5.42
Durability and Carbonation, something I feel a stage 3 student should know. A few good marks but again some very low scores.

Q5 – Volume
Average mark 5.85
A simple mix design calculation with volumes. Candidates gained either high marks as expected, or really low ones, as they couldn't work out the mix proportions.

Section A summary. I'm a bit worried about the knowledge candidates have in regard to practical applications. The syllabus is clear about what needs to be studied, so I would expect a little more in-depth writing. Candidates are often comfortable in their own field, but don't look too far out of it.

Section B

Average mark for all candidates was 16.88

Q6 – Readymix Concrete Plant
Attempted by twelve candidates.
Average mark 19.5. Lowest mark 10; highest 30.
Nobody really had a good go. It seemed as though students answered only what they could and didn't try to answer other parts of the question.

Q7 – Concrete Floor
Attempted by ten candidates.
Average mark 12.7. Lowest mark 3; highest 25.
The question was set up for a laser screed mass pour, but nobody answered it that way. We had bays from 3m to 10m, and time periods of up to a month. Very poorly answered.

Q8 – Precast
Attempted by two candidates.
Average mark 17.5. Lowest mark 15; highest 20.
It is surprising that candidates didn't go for this question, as it was a design-and-plan question. The two that did attempt it just drew the simplest of sketches with no real thought of the layout.

Q9 – New Site set-up
Attempted by two candidates.
Average mark 20. Lowest mark 20; highest 20.
A question that would be good for materials people, so it was surprising that only two candidates attempted it, with average marks that could have been better.

Section B summary, section B should be a belt-and-braces question to get the candidate from a pass to a distinction. If the question is considered logically then the concrete technology knowledge they have attained should get them above 30%. It is clear that when candidates are outside their area of expertise they usually have very little understanding of the rest of construction, yet all these questions are covered in the learning objectives and I would expect that candidates would at least have a little understanding of all the topics covered.

Overall. I was very disappointed with the standard this year. Whereas some students tried, it was clear that others were just hoping to pass; more questions were not attempted this year and the standard of a lot of answers was very poor. I gave quite a few 0 marks as the candidates didn't read the question or give an answer relating to the question. I don't know if the candidates are covering the whole of the learning objectives in the lead-up to the exams but, going forward, I think we should ensure a copy is circulated for consultation so they can see the scope of the subject.

Stage 4: Advanced Concrete Technology

Paper 1

The overall standard was disappointing, with just two of the four candidates producing scripts of ACT standard. The examiner noted that one candidate was of higher calibre, but none of the work was at distinction level. The question paper was at the typical level of difficulty for this examination and gave a free choice of four from the seven questions. Two questions (crushed concrete aggregate and thermal risks) were answered by all four candidates, and one (alternative cementitious materials) had no takers at all. The questions on thermal risks and consistence/tests/rheology were answered best, whereas the question on crushed concrete aggregate was generally poorly answered.

Question 1 – Strength conformity / CUSUM
1 answer. The candidate made a decent job of what is normally an unpopular topic.

Question 2 – Alternative cementitious materials
0 answers. This was a surprise. Perhaps it was because the candidates were not familiar with different materials, or perhaps the subsection on activators was off-putting?

Question 3 – Crushed concrete aggregate
4 answers. One very good answer, three poor answers. There appeared to be an issue with comprehension of the English in the question. Most of the ICT's candidates don't have English as a first language, and it seems that this question had been read as "crushed natural aggregate for concrete", not "crushed concrete for use as aggregate in concrete". Three of the four candidates appeared to have read it in this way, and so an allowance has been made in the marking.

Question 4 – Thermal risks with mass pours
4 answers. Well answered by all four candidates.

Question 5 – Key variable for durability/Carbonation
2 answers. One fair and one very poor answer. Points were missed that might have been expected in a General Principles answer. No one capitalized on a straightforward question.

Question 6 – Consistence tests/Rheology
3 answers. Generally decent, but not outstanding answers. It is surprising that candidates don't do better on a subject that is examined in virtually every paper.

Question 7 – Impact of deleterious materials on admixtures/Curing compounds
2 answers. One fair and one poor answer.

Paper 2

The standard of papers was again disappointing, with three scripts at ACT standard, three somewhat below the standard required and two rather poor. The question paper was at a typical level of difficulty for this examination, but did not focus on practical aspects as much as many earlier Paper 2s. There was a reasonable spread of takers across all the questions. Marks were gathered fairly evenly across most questions, but the final question (Sea wall) and last question (Plastic cracking) the best of the bunch.

Question 1 – Sea wall
7 answers. The most traditional Paper 2 question here, and the candidates generally did a reasonable, though not outstanding job. Only one candidate really got to grips with the seasonality issues implied from a 12-month contract and up to 70% GGBS.

Question 2 – Lightweight aggregate
3 answers. One very good answer, two very poor indeed. It is surprising that the question wasn't more popular or better answered, since it was topical and straightforward.

Question 3 – Abrasion resistance
4 answers. Generally poorly answered, with lots of superfluous padding to bulk out the work.

Question 4 – SCC in precast and readymix
5 answers. Two very good and two poor answers. It was very similar to a question asked last year, so could have expected better.

Question 5 – Steel fibres/Explosive spalling
4 answers. Generally good but not outstanding answers. Diagrams often scruffy or worse.

Question 6 – Young's modulus/Shrinkage/Creep/Thermal
2 answers. One fair and one poor answer. Graphs generally scruffy. No real insight into linkage with the water-retaining structure in the question.

Question 7 – Plastic cracking
7 answers. With one exception well answered, but nothing outstanding. Practical Applications-type answers generally, which is not a bad thing, but does mean that opportunities for a full-bodied Paper 2-type answer were largely missed.

Summary

The marking of three project reports, one submitted by a candidate from a previous cohort and two from the above, resulted in two Diplomas being awarded in 2023, with one pending while awaiting minor amendments.

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