



1933

Building Construction (4th Year): Technical School Examinations 1933

Department of Education: Technical Instruction Branch

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COURSE IN BUILDING.

(36)

AN ROINN OIDEACHAIS
(Department of Education).

BRAINSE AN CHEARD-OIDEACHAIS
(Technical Instruction Branch).

TECHNICAL SCHOOL EXAMINATIONS.
1933.

BUILDING CONSTRUCTION
(Fourth Year).

Wednesday, May 17th— 7 to 10 p.m.

Examiner—W. S. BLAIR, ESQ.

Co-Examiner—J. P. HACKETT, ESQ., B.E., A.R.C.S.C.I.

GENERAL INSTRUCTIONS.

You are carefully to enter on the Answer Book and Envelope supplied your Examination Number and the subject of examination, but you are not to write your name on either. No credit will be given for any Answer Book upon which your name is written, or upon which your Examination Number is not written.

You must not have with you any books, notes, or scribbling-paper.

You are not allowed to write or make any marks upon your paper of questions.

You must not, under any circumstances whatever, speak to or communicate with another candidate; and no explanation of the subject of the examination may be asked for or given.

You must remain seated until your answer-book has been taken up, and then leave the examination-room quietly. You will not be permitted to leave before the expiration of twenty minutes from the commencement of the examination, and will not be re-admitted after having once left the room.

If you break any of these rules, or use any unfair means, you are liable to be dismissed from the examination, and your examination may be cancelled by the Department.

Three hours are allowed for this paper. Answer-books, unless previously given up, will be collected at 10 p.m.

INSTRUCTIONS.

Read the General Instructions on page 1.

- (a) Not more than SIX questions are to be attempted.
- (b) Answers must be written in INK ; diagrams may be in PENCIL.
- (c) Small diagrams and sketches, to illustrate written descriptions, should be made upon the squared paper.
- (d) Write the number of the question before the answer.
- (e) Equal values are assigned to the questions.

1. A steel stanchion with a base plate of 2 feet square has to carry a total load of 250 tons. The ground under it is good clay capable of carrying a safe load of 2 tons per square foot. Draw a plan and section of a grillage foundation (concrete and steel) carrying the stanchion. Show the total area of the foundation and give reasons for the dimensions you adopt. Scale one forty-eighth.

2. Answer both (a) and (b).

(a) Sketch full size a carefully dimensioned view of a standard briquette of neat Portland cement prepared for testing the tensile strength. State the probable strength of the cement at 28 days.

(b) Describe, carefully and fully, a tensile test for a round bar of mild steel and state the results in elongation and ultimate strength you would expect.

3. A billiard room, with a flat concrete roof 9 inches thick, is lighted by a lantern light 10 feet wide. The lantern is carried on a curb which rises 9 inches above the roof level. The vertical side sashes are hung to open for ventilation and the lower part is finished internally with framed and moulded wood panelling to ceiling level. Make a cross section of the lantern to beyond the ridge to a scale of $\frac{1}{16}$ th showing the roof and curb in outline only. Write a brief specification for the lantern and lining including fitment for opening and closing side sashes and necessary lead work at sill.

4. A four storey building, 28 feet frontage and 43 feet high to eaves of roof, has to be taken down from between two similar buildings in contact with it. Describe and illustrate the precautions you would take to ensure the safety of the adjacent buildings. Give enlarged details where necessary.

5. A lecture hall, 24 feet clear width inside walls (which are $13\frac{1}{2}$ inches thick with projecting piers where the roof trusses occur) is to have an open timber roof without tie beams and a pitch of $52\frac{1}{2}$ degrees. Draw to a scale of $\frac{1}{32}$ th a cross section of about half the width showing wall and pier and an elevation of the truss to beyond the ridge. Make enlarged working drawings of the construction at the wall head.

6. Answer (a) or (b).

(a) Make drawings illustrating the difference between a bricklayer's scaffold and a mason's scaffold.

Or (b) Make drawings to show the timbering of a three-tower derrick. Show how stability is ensured.

7. A modern two storey house nearing completion is to be provided with electrical service on modern lines. What system of wiring would you recommend and why? In the actual work of installation describe in detail the precautions that should be taken to avoid injury to the existing structure and to secure sightliness of finish and security of fittings.

8. Show to a scale of $\frac{1}{32}$ th a design for an entrance doorway in cut stone, suitable for a bank or suite of offices.

9. Draw to a scale of $\frac{1}{32}$ th a design for a vestibule screen in mahogany and glass for the bank or office entrance of the previous question. Take over all dimensions 9 feet wide and 13 feet high with a pair of swing doors. Give details of the hanging. Write a specification for the work which is to be of high quality throughout.

10. A warehouse is to have a basement 9 feet below ground level, with rubble walls 3 feet thick to over ground level. In getting out the foundations running sand is met with at a depth of 6 feet. Boring shows a bed of hard

gravel at a depth of 22 feet below ground level. Make working drawings showing sheet and bearing piles and suitable foundations to carry the wall where running sand occurs. Give details, to a scale of $\frac{1}{8}$ th, of the toe of a sheet pile and of a bearing pile. What is the object of sheet piling?

11. Make detail drawings of two systems of construction for fireproof floors suitable for large public buildings.

12. A three storied house is to be fitted with a hot water supply, on the cylinder system, from the kitchen range. The draw-offs may be taken as follows:—

Ground floor: Scullery sink 15 feet from boiler.

1st floor: Bath, lavatory basin, towel rail, also a lavatory basin in bedroom 10 feet away.

2nd floor: H.W. pipe rises close to housemaid's sink and a lavatory basin 9 feet away.

Make a skeleton diagram showing the working of the system.

13. Answer both (a) and (b).

(a) Make sectional drawings illustrating the difference between wash-out and wash-down water closet pans. Give your opinion as to their relative merits.

(b) Sketch a good type of flushing cistern which will prevent waste of water and describe the conditions such a cistern should fulfil.

14. Describe the manufacture of mild steel, its characteristics, uses and chief market forms. Illustrate by sketches.