1934

Building Construction (2nd Year): Technical School Examinations 1934

Department of Education: Technical Instruction Branch

COURSE IN BUILDING.

AN ROINN OIDEACHAIS.
(Department of Education.)

BRAINSE AN CHEARD-OIDEACHAIS.
(Technical Instruction Branch.)

TECHNICAL SCHOOL EXAMINATIONS.
1934.

BUILDING CONSTRUCTION.
(Second Year.)

Tuesday, May 15th—7 to 10 p.m.

Examiner—W. DAVIDSON, ESQ.

Co-Examiner—F. W. SINCLAIR, ESQ.

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 book, 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 should 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 squared paper.

(*d*) Write the number of the question before the answer.

(*e*) Equal values are assigned to the questions.

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1. Show by means of a sketch the method of timbering a long trench, 12 feet deep and 3 feet 6 inches at the bottom in wet loose earth. In arranging the sheeting have regard to the convenience of removal in sections.

Give a brief description of the removal of the earth from the trench and the prevention of collapse during the process.

2. Draw to a scale of an inch to a foot the front elevation of one-half of a gauged camber arch 12 inches deep over a 3 feet window opening in a 1½ brick wall built in Flemish bonds. The reveal is 4½ inches deep. On the other side of the Ope show the half internal elevation, which should include the wood lintel with rough relieving arch 9 inches deep. A little of the brickwork above and below the arches to be shown.

3. How do you determine the following: (*a*) thickness of wood lintels, (*b*) the rise of a rough brick relieving arch over a lintel, (*c*) the camber for a flat gauged arch? How can you ensure that all the voussoirs in a camber arch can be cut from one templet?

4. What is the composition of granite? In selecting a piece of granite for hard wear, to what would you pay particular attention?

Make sketches of the following:—(*a*) Saddled or water joint in a stone cornice, (*b*) metal cramp suitable for a 6-inch coping (show the cramp in position), (*c*) joggle joint in stone landing, (d) a rebated joint between two hanging stone steps and showing the nosings returned on the ends.

5. In a double floor with 9 inches × 2 inches joists, the binder is of I Section rolled steel, 12 inches deep, with 5-inch top and bottom flanges. There is a 1¼-inch floor above and the lath and plaster ceiling is attached to the under-side of the bridging joists. Make a vertical cross-section through the steel binder showing the bridging joists properly supported and the portion of binder showing below the ceiling neatly cased in.

What is the object of a binder?

6. Make a front elevation to a scale of ½ inch to a foot of a timber centre for a semi-circular arch of 10 feet span. Show on the left laggings suitable for supporting stone voussoirs and on the right show laggings for supporting a gauged brick arch. Dimension all the timbers.

The wall is 18 inches thick. Make a vertical cross-section through the centre showing the position of the arch at the top and the method of supporting, easing and striking the centre.

The height from the ground to the springing of the arch is about 12 feet, show how the centre is secured in an upright position during the building of the arch.

7. Make a horizontal section to a scale of 3 inches to a foot through one side of a moderate size window in a 14 inch brick wall. Show a cased frame and double-hung sashes 2 inches thick; also jamb lining, architrave and all necessary details and trimmings complete. Show the plan of the stone sill in position.

What is your opinion of this class of window as compared with the newer steel windows?

What is a fox-door or pocket? Make a small sketch vertical section of this, showing how it is shaped at top and bottom ends.

8. Make a broken vertical section through a cased frame and double-hung sashes. At the head show all details of the frame, sash, lintel, soffit and the outline of the surrounding brickwork. At the bottom of the window give all details of the frame and sash, window board, stone sill and an outline of the brickwork and the other necessary details.

9. Draw to a scale of an inch to a foot the details at the end of a wooden roof truss to the following particulars:—The wall is 13½ inches thick and the tie-beam which is 9 ins. × 4 ins., rests on a stone template, 9 inches broad by 6 inches deep. The parapet wall is 9 inches thick and rises to a height of about 18 inches above the level of the gutter and is surmounted by a feather-edged coping 4 inches thick. The pitch of the roof is 30°, the principal rafter 5 ins. × 4 ins., common rafter 4½ ins. × 2 ins. Distance from top of principal to underside of common rafter = 6 inches. Pole plate = 11 ins. × 3 ins.

Arrange at the back of the parapet a box or parallel gutter about 12 inches broad, with all the necessary timber work for supporting the gutter boards. The roof

is close boarded. Show all the necessary leadwork in connection with the gutter. The roof is covered with head nailed Duchess slates (24 ins. × 12 ins.), show about three rows of these on your section.

10. Without making any allowance for breakages, how many Countess slates (20 ins. × 10 ins.), 4 inch lap and centre nailed, would you require to cover one plain piece of sloping roof measuring 20 feet long and 8 feet from eaves to ridge, allowance is made in the measurement for the projection at the eaves.

Set out to a scale of 1½ inches to a foot, one of these slates, showing it dressed and holed. Dimension the margin and also the distance from the margin to the nail hole. Make a sketch of a slater's ripper and state for what purpose it is used.

11. Sketch and briefly describe the following:—(*a*) lead dot, (*b*) secret tack, (*c*) solid roll, (*d*) lead drip in gutter. Show by a sketch the difference between a bossed-up and a dog-ear joint in leadwork.

12. State the diameter of the drain pipes that should be used in the drainage system of an ordinary dwelling house. What do you consider a suitable fall for these pipes?

Make a sketch vertical section through the joint between two glazed stoneware drain pipes properly laid at the bottom of a trench. Show the direction of the flow. Scale, about 1½ inches to a foot. State briefly how house drains are ventilated.

13. An exposed brick wall and gable of an old house show signs of admitting moisture to the interior. It is proposed to render the outside in Portland cement. Give a brief description of the various steps in the operations involved in carrying out this work.

Explain the following terms used in plastering, making sketches where you can:—(*a*) cement staff bead, (*b*) pugging, (*c*) rough-cast, (*d*) pricking-up coat, (*e*) gauged stuff, (*f*) plaster key.

14. A softwood external door, in the white, is to be given three or more coats of oil paint and finished a brown colour. Describe briefly the composition of the first and second coats, and the method of applying them. What points would you pay particular attention to before applying each coat.

Explain the following terms in relation to painting:—base, vehicle, pigment, drier, solvent.