



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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NATIONAL CERTIFICATE

BUILDING AND STRUCTURAL CONSTRUCTION N4

(8060004)

22 November (X-Paper)
09:00 – 13:00

This question paper consists of 4 pages and a 1-page diagram sheet.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
BUILDING AND STRUCTURAL CONSTRUCTION N4
TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Write neatly and legibly.

PTO

QUESTION 1

Your FET College manager (principal) wants to hang a huge board bearing the name of your college. Advise the manager by means of a neat, well-drawn and detailed STANCHION that can be used as a pillar to hang the FET College name board, using the following specifications:

A 254 mm x 254 mm x 72.9 kg/m H-section, with 8.6 mm and 14.2 mm web and flange thickness respectively is secured to a 1,100 mm x 1,100 mm x 450 mm thick chamfered edge concrete foundation through a base plate of 530 mm x 530 mm x 40 mm thick, by means of M22 hold-down hook bolts, cast 150 mm into the concrete slab. 15 mm thick gusset plate are welded to the stanchion flanges, and are secured to the base plate by 150 mm x 90 mm x 10 mm thick angle iron cleats, riveted to the gusset plates and base plates by means of Ø20 mm shop-driven rivets.

Draw, to scale 1:10, a vertical section through two hold-down bolts, with one column flange facing, and clearly show the method employed to provide for the adjustment (wedging) of hold-down bolts position, during installation. Specify the type and position of the rivets used. Show the correct welding symbols on the drawing.

[20]

QUESTION 2

FIGURE 1, on the attached DIAGRAM SHEET, shows an isometric view of a welded construction column beam cleat. The cleat plate and side plate are welded in the workshop by means of a half-round arc weld. The cleat side plate is welded to the H-profile (parallel flange) 254 mm x 254 mm x 88.9 kg/m column all around with a corner fillet with leg lengths of 8 mm x 8 mm.

Draw to scale 1:10, the front view of the column beam cleat shown by arrow 'F' as well as the top view. Add ALL dimensions and the correct welding symbols.

(10)

Draw, to scale 1:5, the elevation of the foot of a 10 000 m span steel roof truss 30°, constructed of 80 mm x 80 mm x 10 mm x 11.9 kg/m angle iron rafters, the beam and support cleats with 10 mm thick gusset plate.

2.2

Use Ø20 mm rivets throughout the construction. Show the positions of the holes to receive the mild steel rivets and ALL the dimensions for these holes positions in the drawing.

[25]
(15)

PTO

QUESTION 3

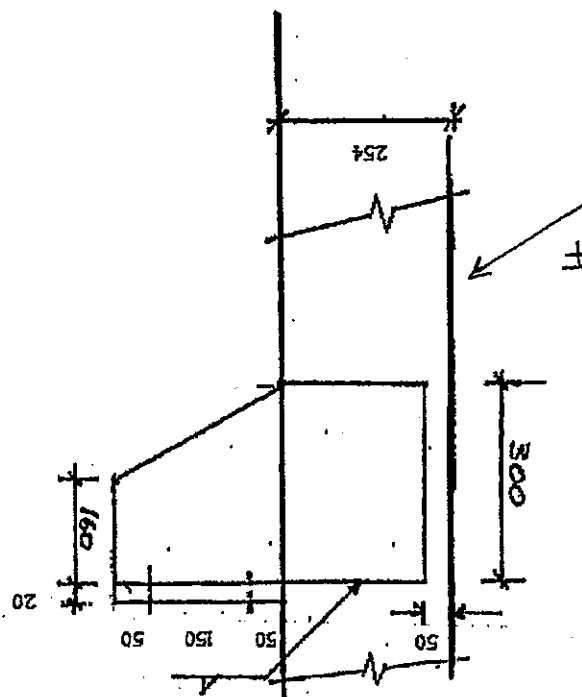
- 3.1 Your father is thinking of building an arch between the dining room and the kitchen at your house. He does not know how to temporarily support the arch structure while he is busy building.
- Explain to him, by means of a drawing and name ALL the components of a temporary structure that he can use (telescopic metal struts).
- (15)
- 3.2 State ONE advantage and ONE disadvantage of each of the following types of glass:
- | | | |
|-------|-------------------|-----|
| 3.2.1 | Clear sheet glass | (2) |
| 3.2.2 | Laminated glass | (2) |
| 3.2.3 | Float glass | (2) |
- 3.3 Explain the following terms (not by means of sketches) with regard to steel door-frames:
- | | | |
|-------|-------------|-----|
| 3.3.1 | Catch plate | (2) |
| 3.3.2 | Transome | (2) |
- [25]

QUESTION 5

- Draw, to scale 1:1, a vertical section of a steel casement window only set in a one-brick wall. The wall is plastered on the inside. A window-sill is finished off with a brick on edge on the outer or outer-side and a wooden window board on the inner side. The inside is finished off with a quarter round underneath the window board. Clearly show the damp-proof course and also show a portion of the clear glass pane with putty in the steel-frame. A prestressed lintel is used above the steel-frame.
- [15]
- 5.1 Where a strut forms a 90° angle to the rafter
- (7)
- 5.2 Where two struts are connected to the tie beam, each forms a 60° angle to the tie beam, at the same point on the tie beam.
- (8)
- [15]
- Draw, to scale 1:20, a detailed elevation at the riveted connections at the following positions:
- A steel roof truss is built up of 100 mm x 100 mm x 8 mm angle iron sections rafter, 60 mm x 60 mm x 8 mm struts and 8 mm thick gusset plates.

TOTAL: 100

DIAGRAM SHEET



FRONT VIEW / VOORAANSIG

SCALE F10
SKAT F10

