19.0 BUILDING CONSTRUCTION (446)

Building construction had been phased out from the syllabus in the year 2006. It was tested for the first time in the year 2008 after it was re-introduced in the syllabus. It is tested using one theory paper and a project paper which is administered and scored by the subject teachers.

19.1 CANDIDATES' GENERAL PERFORMANCE

***Table 24**: Candidates' Overall Performance in Building Construction for the Years 2003, 2004, 2005 and 2008.*

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
2003	1		60	22.15	8.70
	2		40	28.93	4.39
	Overall	**721**	**100**	**51.08**	**10.93**
2004	1		60	21.72	11.50
	2		40	30.35	4.07
	Overall	**661**	**100**	**51.30**	**14.00**
2005	1		60	24.99	10.25
	2		40	30.52	4.07
	Overall	**629**	**100**	**54.99**	**13.00**
2008	1		60	15.78	5.36
	2		40	33.83	2.47
	Overall	**18**	**100**	**49.61**	**5.98**

From the table above, it can be observed that:

19.1.1 Very few candidates ***(18)*** sat for the Building construction examination in the year 2008 when compared to the year 2005 when the candidature was ***629***.

19.1.2 Performance in the ***theory paper (446/1)*** declined from a mean of ***24.99*** in the year 2005 to ***15.78*** in the year 2008.

19.1.3 Performance of the ***project paper (446/2)*** was much better than that of the year 2005. This could be attributed to the fact that external assessors were not sent to assess the projects.

19.1.4 Overall performance for the subject declined by about ***6.00*** points but as schools pick up in the next few years', performance is expected to improve.

Questions which were performed poorly are briefly discussed below:

19.2 PAPER 1 (446/1)

Question 2

Figure 1 shows a T-junction wall.

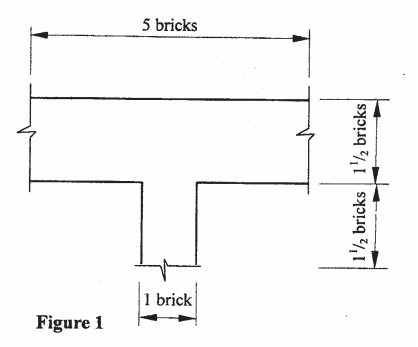


Figure 1

Sketch the bonding details of two alternative plan courses in English bond.

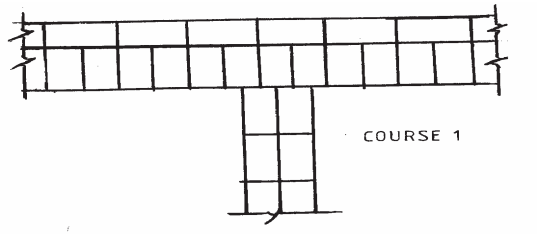
The question required the candidates to sketch alternate plan courses of a T-junction wall of different thicknesses. It also demanded the bonding details, detail of joining the two different wall sizes at the T-junction, plan course one and plan course two of bricks wall in English bond.

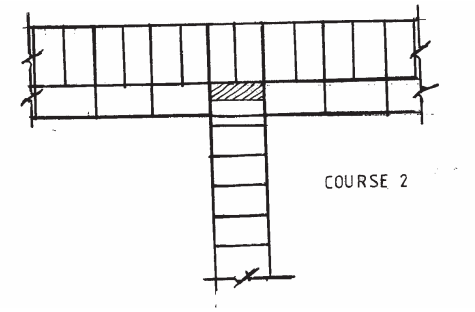
Weaknesses

Candidates were unable to layout the bonding details as required in English bond, interpret the drawing in order to provide the plan courses one and two and bond the point at the T-junction.

These weaknesses could have been as a result of teachers avoiding the teaching of this part of the syllabus and the use of theoretical as opposed to practical teaching of the syllabus where laying out the bricks in the workshop in order to master the bonding skills is not practically done.

Expected Response:





Advice to Teachers

The teachers should cover the syllabus fully, sketch the bonding details in Stretcher, English and Flemish Bonds and encourage students to layout and practically construct such walls in the workshop in order to master the required skills.

Question No. 4

(a) Name **two** methods of overcoming damp penetration into a building by rain beating against the external wall and soaking through the fabric.

(b) State **four** places where vertical damp-proof courses are used.

Part (a) of the question required the candidates to give ***TWO*** methods which would help in avoiding dampness on external walls. The candidates had just to remember the methods and provide them; while in part (b) of the question, the candidates were to give the exact positions the damp-proof course are used. The candidates therefore had to have the knowledge of what a damp proof course was, the types of damp proof courses and where there they are used.

Weaknesses

The students were unable to name the methods of damp-proofing, show which type of material is applied and show which type of material goes with which method of damp-proofing. These weaknesses could have been caused by lack of practical identification of the types of damp-proofing and lack of practical application of the damp-proofing methods for the candidates to have a grasp of the skill.

Expected Responses

(a)
- Use of mastic asphalt tanking.
- Use of a hot layer of bitumen laid on walls.
- Placement of coppings on free standing walls.
- Use of D.PC on jambs and reveals.

(b)
- On jambs.
- On Reveals.
- On basement wall construction.
- On flat-roofs.
- In between free standing walls and copings.

Advice to Teachers

Apart from naming the damp-proofing materials and methods of damp-proofing, teachers should apply these methods during practical lessons such that the candidates will construct the walls and damp-proof them practically.

Question 7

(a) List **two** roof covering materials for each of the following types of flat roofs:
  (i) concrete flat roof
  (ii) timber flat roof.

(b) Name **two** occupational hazards that a mason may be exposed to.

The question expected the candidates to understand the principle of construction of flat-roofs, differentiate between concrete flat roofs and Timber flat roofs and list the materials for constructing both the concrete and timber flat roofs.

Weaknesses

The candidates were unable to differentiate between the materials used for constructing timber flat roofs and concrete flat roofs. This could have been as a result of learning of the different types of flat roofs theoretically and not even sketching the different types of the flat roofs.

Expected Responses

(a) (i)
- Stone chippings mixed with tar.
- Stopping screed.
- Built up roofing flat.

(ii)
- Two coat asphalt.
- Aluminum paint on asphalt.
- Sheet metal work.

(b)
- Inhaling of dust particles of both cement and lime.
- Collapsing buildings
- Falling objects
- Scaling of high heights.

Advice to Teachers

Students should sketch both the concrete flat roofs and the timber flat roofs and make scale drawings of concrete flat-roofs and timber flat roofs with the assistance of their teachers.

Question 10

Figure 3 shows a block in isometric view.

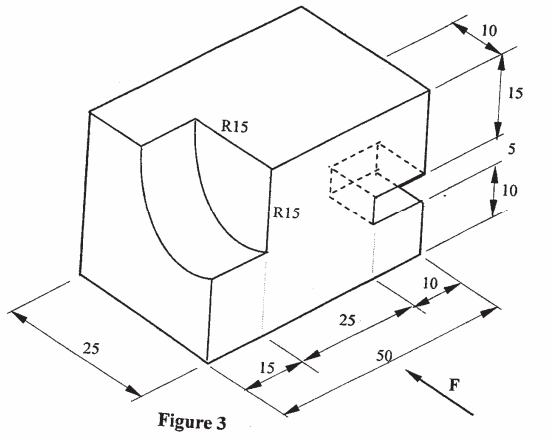


Figure 3

Draw the figure in first angle orthographic projection.

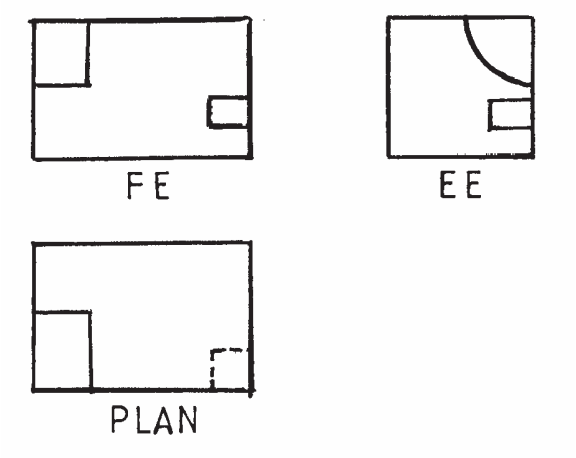
The question required the candidates to draw the object in first angle projection. The candidates were to interpret angle orthographic projection, come up with the plan, front elevation and end elevation of the figure provided and sketch objects in isometric views.

Weaknesses

The candidates were unable to extract the exact view from the object given and interpret the object to have a clear picture of the views required.

These weaknesses could have been caused by lack of sufficient exercises in the area, poor exposure to such work and lack of syllabus coverage.

Expected Responses



Advice to Teachers

Teachers are advised to give students more exercises on this topic, give enough examples for students to master the concepts and cover the syllabus exhaustively.

Question 13

(a) State **two** principles that make a drainage pipe to discharge through gravity effectively.

(b) State **five** advantages of P.V.C. rain water pipes over sheet metal pipes.

(c) Sketch and label a shallow concrete inspection chamber.

This question called on the candidates to have knowledge on the principle of free flow through gravity, modes of discharge and its process and method of drainage.

Weaknesses

The candidates were unable to clearly state the principles of free flow through the effects of gravity and state modes of drainage discharge. This could have been as a result of candidates concentrating only on methods of drainage and lack of emphasis on principles of drainage through gravity.

Expected Responses

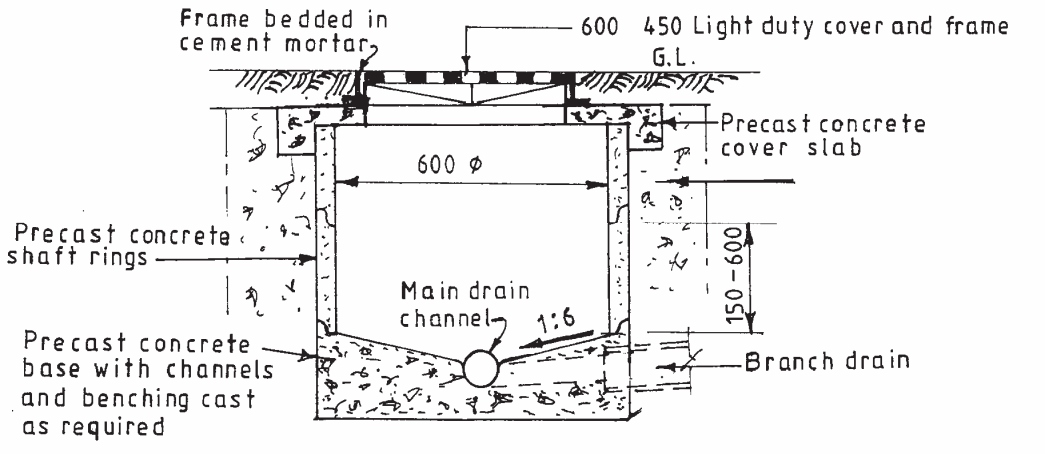
(a)

- The correct pipe size to use.
- Proper selection of correct gradient to use.
- Correct jointing.

(b)

- Easier to join.
- Gutter bolts not required.
- Has self sealing joint due to the joining comp used.
- Corrosion is eliminated.
- Breakages are reduced.
- Better flow properties which usually allow smaller sections and lower falls to be used.

(c)



Advice to Teachers

Teachers should expose students to sketches on drainage through gravity, cover the methods of drainage and practically build a sample of a drainage system of a small residential house.

Question 15

(a) State **four** methods of dropping concrete safely into a trench bottom more than 1.2 metres deep.

(b) Sketch and label a cross-section of a trench boning rod in position as used in levelling the bottom of the trench.

(c) With the aid of labelled sketches, show **three** methods of reducing levels on a slopping site.

In this question, candidates were required to state methods of concreting and its placement at a depth of 1.2 metres, provide a sketch of a cross-section of a trench bottom with boning rods in position and to show methods of reducing levels.

In part (a) of the question, candidates had to have mastered the knowledge and principles on concrete mixing, its preparation, transportation and placement. The main issue being how to place it after undergoing the listed process. When placing it, one should avoid segregation. This must be mastered by the candidates. In part (b) of the question, the candidates had to be well prepared on how leveling of the trench bottom is done. They had to know how the preparation of leveling the trench bottom is done using boning rods. Candidates were required to have mastered the use of pegging the foundation bottom, maintain level and the effective use of boning rods. In part (c) of the question, candidates were required to show by sketching methods of reducing levels.

Weaknesses

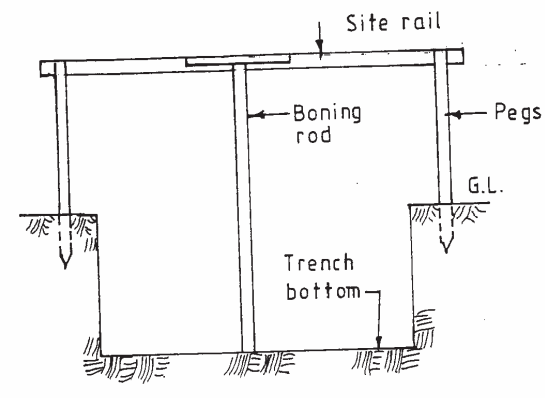
In part (a) of the question, candidates did not understand the concrete mixing, preparation, transportation and placement principles, while in part (b), candidates lacked concepts on how to level trench bottoms coupled with the use of boning rods. In part (c) of this question, candidates could not show by sketching the different methods of reducing levels. These weaknesses were as a result of candidates not having mixed, transported and placed concrete practically. It was also evident that candidates lacked practical knowledge on the leveling of a trench bottom using boning rods and lack of practice in sketching the different methods of reducing levels.

Expected Responses

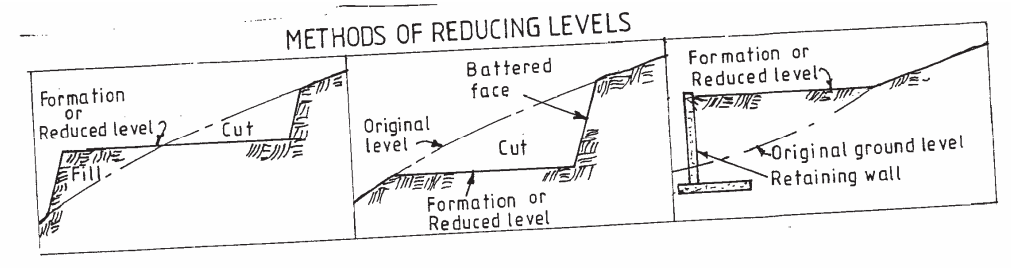
(a)

- Chutes.
- Hoist.
- Convey belt.
- Cranes.
- Steped platform.
- Men with Karai on linen.

(b)



(c)



Advice to Teachers

Teachers should practically mix, transport and place concrete, level trench bottoms and when leveling use both the sprite level and straight edge method, as well as the boning rods method