

A collage of photographs showing students in various educational settings. In the foreground, students are writing in notebooks at desks. In the background, students are in a laboratory, a classroom, and a library. The images are overlaid with a green and white diagonal banner.

**FURTHER EDUCATION &
TRAINING PHASE (FET)**

CIVIL TECHNOLOGY

SBA EXEMPLAR BOOKLET

GRADES 10-12

FOREWORD



The Department of Basic Education has pleasure in releasing a subject exemplar booklet for School Based Assessment (SBA) to assist and guide teachers with the setting and development of standardised SBA tasks and assessment tools. The SBA booklets have been written by teams of subject specialists to assist teachers to adapt teaching and learning methods to improve learner performance and the quality and management of SBA.

The primary purpose of this SBA exemplar booklet is to improve the quality of teaching and assessment (both formal and informal) as well as the learner's process of learning and understanding of the subject content. Assessment of and for learning is an ongoing process that develops from the interaction of teaching, learning and assessment. To improve learner performance, assessment needs to support and drive focused, effective teaching.

School Based Assessment forms an integral part of teaching and learning, its value as a yardstick of effective quality learning and teaching is firmly recognised. Through assessment, the needs of the learner are not only diagnosed for remediation, but it also assists to improve the quality of teaching and learning. The information provided through quality assessment is therefore valuable for teacher planning as part of improving learning outcomes.

Assessment tasks should be designed with care to cover the prescribed content and skills of the subject as well as include the correct range of cognitive demand and levels of difficulty. For fair assessment practice, the teacher must ensure that the learner understands the content and has been exposed to extensive informal assessment opportunities before doing a formal assessment activity.

The exemplar tasks contained in this booklet, developed to the best standard in the subject, is aimed to illustrate best practices in terms of setting formal and informal assessment. Teachers are encouraged to use the exemplar tasks as models to set their own formal and informal assessment activities.

A handwritten signature in black ink, appearing to read 'H M Mweli'.

MR HM MWELI
DIRECTOR-GENERAL
DATE: 13/09/2012

Contents

1. INTRODUCTION.....	3
2. INFORMAL OR DAILY ASSESSMENT (ASSESSMENT FOR LEARNING)	4
3. SPECIFIC AIMS	5
4. ASSESSMENT TASKS	6
5. GRADE 10 TERM 1 TASK	17
6. GRADE 11 TERM 2 TASK	26
7. GRADE 11 TERM 3 TASK	58

ASSESSMENT

1. INTRODUCTION

Assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. It involves four steps: generating and collecting evidence of achievement; evaluating this evidence; recording the findings; and using this information to understand and thereby assist the learner's development in order to improve the process of learning and teaching.

Assessment involves activities that are undertaken throughout the year. In Grades 10 – 12 assessment should be both informal (Assessment for Learning) and formal (Assessment of Learning). In both cases regular feedback should be provided to learners to enhance the learning experience.

Evidence of all assessments including tests, simulations and tasks should be placed in the learner's script. It is imperative that all items are marked clearly. Items that are loose should be pasted into the script to become a permanent part of a learner's record.

All items in the learner script must contain the following references:

- Date
- Topic
- Homework assignments, including a textbook page and exercise reference
- Evidence of scrutiny and interaction from the teacher in red pen
- All teacher actions/interventions in the script should be dated
- Learners are required to mark all self-assessments in pencil and all corrections must be shown in pencil.

As the script is a formal assessment document, the learner is required to cover and keep the script neat and clean. The teacher is required to provide guidance in this respect. Apart from the learner script, no additional file or portfolio is required.

2. INFORMAL OR DAILY ASSESSMENT (ASSESSMENT FOR LEARNING)

Assessment for learning has the purpose of continuously collecting information on learners' achievements that can be used to improve their learning.

Informal assessment is a daily monitoring of learners' progress. This is done through observations, discussions, practical demonstrations, learner-teacher conferences, informal classroom interactions, etc. Informal assessment may be as simple as stopping during the lesson to observe learners or to discuss with learners how learning is progressing. Informal assessment should be used to provide feedback to the learners and to inform planning for teaching, but need not be recorded. It should not be seen as separate from learning activities taking place in the classroom. Learners or teachers can mark these assessment tasks.

Self-assessment and **peer assessment** actively involve learners in assessment. This is important as it allows learners to learn from and reflect on their own performance. The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. In such instances, a simple checklist may be used to record this assessment. However, teachers may use the learners' performance in these assessment tasks to provide verbal or written feedback to learners, the school management team and parents. This is particularly important if barriers to learning or poor levels of participation are encountered. The results of daily assessment tasks **are not taken** into account for promotion and certification purposes.

3. SPECIFIC AIMS

The aim of the subject Civil Technology is to develop the skills levels of learners from Grades 10 – 12 to such an extent that they will be able to enter a career pathway at a Further Education and Training college or a university immediately after obtaining the National Senior Certificate. Learners will be ready to enter into learnerships or apprenticeships that will prepare them for a trade test.

Through the integrated completion of theoretical work and the practical assessment tasks (PAT), skills in respect of the following will be developed:

- Safe working practices
- Good housekeeping
- First-aid practices
- Interpretation of working drawings
- Erection of structures
- Working with accurate measurements
- Workshop practice

Knowledge of subject principles, combined with applied skills, equips the Civil Technology learner with a unique set of skills, placing her or him apart from other learners and in a category much desired by industry, tertiary institutions and entrepreneurs. Learners with Civil Technology as a subject fare markedly better during the first two years at tertiary level when studying engineering than learners without this background, giving them an advantage over their peers.

4. ASSESSMENT TASKS

The following outline provides teachers with informal programmes for assessment that may be followed in order to achieve effective curriculum delivery.

Informal assessment tasks do not contribute towards promotion and progression of the learner. Its sole intention is the development of knowledge and skills in preparation of formal assessment.

ASSESSMENT TASKS	TERM 1	TERM 2	TERM 3	TERM 4
Tests (class, theory and revision tests)	1	1	1	Consolidation
Assignment	1	1	1	0
Class work / case studies / work sheets	Weekly	Weekly	Weekly	0
Homework (theory and practical)	Weekly	Weekly	Weekly	Consolidation
Workshop / practical	Weekly	Weekly	Weekly	0

Evidence of informal assessment will be found in the learner's script. The nature of these tasks is described under assessment for learning.

4.1 FORMAL ASSESSMENT (ASSESSMENT OF LEARNING)

4.1.1 Formal assessment requirements

All assessment tasks that make up a formal programme of assessment for the year are regarded as formal assessment. Formal assessment tasks are marked and formally recorded by the teacher for progression and certification purposes. All formal assessment tasks are subject to moderation for the purpose of quality assurance and to ensure that proper standards are maintained.

Formal assessment provides teachers with a systematic way of evaluating how well learners are progressing in a grade and in a particular subject. Examples of formal assessments include projects, oral presentations, demonstrations, performances, tests, examinations, practical tasks, etc. Formal assessment tasks

form part of a year-long formal Programme of Assessment in each grade and subject.

PROGRAMME OF ASSESSMENT		
School-based Assessment SBA	Practical Assessment Task PAT	Final Examination
25%	25%	50%

The formal assessment requirements for Civil Technology are as follows:

- In Grades 10 and 11 all SBAs are set and moderated internally
- In Grade 12 the formal assessment (25%) is internally set and marked but externally moderated.
- **Practical Assessment Task (PAT):** PAT accounts for the skills the learner has mastered. This is assessed at intervals and requires the learner to engage in multiple practical sessions. During these weekly sessions, skills such as simulation, experimentation, hand skills, tool skills, machine skills and workshop practice are honed and perfected to the point where the learner may engage in the tasks set out for that particular term. The PAT accounts for 25% of the learner's promotion mark.
- In Grades 10 and 11 the Practical Assessment Task is set and marked internally but moderated externally.
- In Grade 12 the Practical Assessment Task is externally set, internally marked and externally moderated.
- **Final examination:** At the end of each academic year, every learner is required to write a final examination, which is compiled in such a way that it represents the entire theoretical content covered throughout the year. The final examination paper accounts for 50% of the learner's promotion mark and is externally set, marked and moderated.

Formal assessments should cater for a range of **cognitive** levels and abilities of learners as shown below:

Cognitive Levels	Percentage of Task
Lower order: knowledge	30%
Middle order: comprehension and application	50%
Higher order: analysis, evaluation and synthesis	20%

The following is the Programme of Assessment for Grades 10 and 11

GRADES 10 AND 11 ASSESSMENT REQUIREMENTS						
ASSESSMENT TASKS	TERM 1	TERM 2	TERM 3	TERM 4	% OF FINAL PROMOTION MARK	MARK Weighting
Tests	1		1		10	25
Mid-year examination		1			15	250 total converted to mark out of 100
Practical Assessment Task	b	b	b		25	
Final Examination				1	50	100
TOTAL – PROMOTION MARK					200	400

The table below shows the compilation of the school-based assessment mark:

9

Description	Timeframe	Weighting of final mark	Mark Allocation
Control test 1	Term 1 January – April	5%	50
Mid-year examination	Term 2 May – June	15%	150
Control test 2	Term 3 July – October	5%	50
Total		25%	250

The following is the Programme of Assessment for Grade 12:

ASSESSMENT TASKS	GRADE 12 ASSESSMENT REQUIREMENTS				MARK Weighting
	TERM 1	TERM 2	TERM 3	TERM 4	
Tests	1			10	25
Mid-year and preparatory examination		1	1	15	450 total converted to mark out of 100
Practical Assessment Task (PAT)	p	p	p	25	100
Final Examination			1	50	200
	TOTAL - PROMOTION MARK				400

The table below shows the compilation of the school-based assessment mark:

Description	Timeframe	Weighting of final mark	Mark Allocation
Control test 1	Term 1 January – April	5%	50
Mid-year examination	Term 2 May – June	15%	150
Control test 2	Term 3 July – October	5%	50
Total		25%	250

4.1.2 Tests

- A test for formal assessment should not consist of a series of small tests, but should cover a substantial amount of content and the duration should be at least 60 minutes with a minimum of 50 marks (allocate one mark per fact).
- Each test must cater for a range of cognitive levels.
- The forms of assessment used should be grade and development level appropriate. The design of these tasks should cover the content of the subject and include a variety of tasks designed to achieve the objectives of the subject.

4.1.3 Examinations

- Each examination must cater for a range of cognitive levels.
- For Grades 10, 11 and 12, the three-hour final examination in Civil Technology comprises 50% (200 marks) of a learner's total mark. All question papers set by the teacher throughout the year, including the final examination paper, must be moderated by the head of department at the school and approved by the district curriculum advisor/facilitator. This is done to ensure that the prescribed weightings are adhered to by the teacher.
- In the Grade 12 examination, only Grade 12 content will be assessed.

However, prior knowledge from Grades 10 and 11 may be necessary to interpret and answer some of the questions.

4.2 SBA moderation

Moderation of written tests and examinations will be conducted by the curriculum advisor/facilitator or a peer teacher. Grade 10 and 11 tasks are internally moderated except for the PAT, which is externally moderated. The curriculum advisor/facilitator must moderate a sample of these tasks during school visits to verify the standard of the internal moderation. Moderation of written tests constitutes a re-mark of the learners work to ensure assessment by the teacher is correct.

Grade 12 tasks should be moderated on three tiers: school, district and province.

School-based moderation requires the HOD to check/control the following:

(a) Learner compliance

Work done by learners should comply with the following requirements:

- Date
- Topic
- Homework assignments reflecting a textbook page and exercise reference
- Learner scripts are required to show scrutiny and interaction from the teacher in red pen
- All teacher actions/interventions in the script must be dated
- Learners are required to mark all self-assessments in pencil and all corrections to be shown in pencil.

(b) Safety

- Learners are required to dress appropriately when entering the workshop
- Personal safety should be adhered to
- Learner conduct in the workshop must be orderly and appropriate

- Learners are required to enact safety drills, practise safe operating procedures, perform housekeeping tasks and assist in workshop preventative maintenance such as cleaning, painting, sanding, etc.

(c) Practical Assessment Tasks/Session in the workshop

- Learners are required to actively engage in practical assessment tasks, assignments, simulations and experiments
- Learners who are uncooperative will receive demerits or a zero mark allocation for that particular section of work
- Learners who act unsafely in a workshop, placing other learners in danger, will be removed from the workshop and will have to perform additional tasks / engage in corrective behaviour tasks to show improvement in safety awareness and skill. This will be done outside of normal contact time.

(d) Teacher compliance

Preparation done by the teacher includes:

- Keeping to pacesetters / work schedule
- Work schedule dates are planned and achieved dates are indicated
- Lesson preparation for each topic
- Lesson preparation and dates in learners' books are aligned
- Worksheets/tasks/homework assignments in lesson preparations align with learners' books
- Work is done every day in the learners' books
- Workbooks are regularly checked and dated by the teacher
- Tests have memorandums before the test is written
- Examinations and major tests are moderated by a peer teacher / facilitator from relevant district

(e) Workshop management

- Storeroom is indexed, neat and clean
- Inventory is kept up to date every 6 months
- Workshop is clean and neat
- Preventative maintenance schedule is drawn up
- Workshop budget is prepared and ready
- Procurement schedule for PAT and consumable items are kept up to date
- Replacement of old equipment is planned and rolled out
- OHS Act adhered to at all times.

(f) Classroom management

- Classroom is neat and clean
- Posters and exhibits are evident
- Pin boards are neatly populated
- Teacher workstation/desk is neat and clean
- Filing is neat and tidy.

4.3 PRACTICAL ASSESSMENT TASK (PAT)

The Department of Basic Education issues a PAT for Grade 12 every year. The format of the Grade 12 PAT is duplicated for Grades 10 and 11.

In all grades each learner must do a practical assessment task for the year

- **Grades 10 and 11:** Teachers will set and assess the Practical Assessment Task and it will be moderated externally by the subject specialists.
- **Grade 12:** The practical assessment tasks for Grade 12 will be assessed by the teacher and will be externally moderated by provincial subject specialists.
- The date for the external moderation will be decided by the province in which the school is situated.

- The provincial education departments or schools may not change or use the task of the previous year.
- Providing the resources for the Practical Assessment Task is the responsibility of the school and schools should ensure that adequate time and funding are allocated for the completion of the Practical Assessment Task.

Practical sessions should be scheduled in such a way that learners have enough time to practise skills needed for the completion of the PAT. Weekly practise sessions are necessary for the learner to hone the needed skills. A guideline of 2 hours out of 4 hours per week (5-day cycle) is given for Grades 10 – 12.

The ratio of learners per teacher for all practical work is 1 teacher per 15 learners or part thereof. For groups exceeding 15, this means that multiple teachers would be required inside the workshop while practical work is being conducted. Alternatively, groups should be split into numbers below 15 to ensure that a ratio of 1:15 is not exceeded at any time. The motivation for smaller groups lies in the differentiation and mentoring of technical skills that require one-on-one contact between teacher and learner. The safety of learners is paramount and smaller groups would ensure compliance with the OHS Act 87 of 1993.

INSTRUCTIONS AND INFORMATION

1. This SBA Task consists of FOUR sections: SECTIONS A, B, C and D.
2. SECTION A (QUESTIONS 1, 2, and 3) is COMPULSORY for all learners.
3. Choose ONE of the following SECTIONS according to the area of specialisation that you have registered for:

SECTION B: Civil Services

SECTION C: Construction

SECTION D: Woodworking

NOTE: If you answer the questions in SECTIONS B, C and D that you have NOT registered for, they will NOT be marked.

4. Number the answers correctly according to the numbering system used in this question paper.
5. Start the answer to EACH question on a NEW page.
6. Do NOT write in the margin of the ANSWER BOOK.
7. You may use sketches to illustrate your answers.
8. Write ALL calculations and answers in the ANSWER BOOK or on the attached ANSWER SHEETS. Answers to calculations should be rounded off to TWO decimal places. Show the units of ALL answers.
9. Use the mark allocation as a guide to the length of your answers.
10. Make drawings and sketches in pencil, fully dimensioned and neatly finished off with descriptive titles and notes to conform to the *SANS/SABS Code of Practice for Building Drawings*.
11. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
12. Use your own discretion where dimensions and/or details have been omitted.
13. All dimensions are in millimetres, unless stated otherwise.
14. Answer QUESTIONS on the attached ANSWER SHEETS, as prescribed in each question where applicable.
15. Drawings in the question paper are NOT to scale due to electronic transfer.

5. Grade 10 Term 1 Task

SECTION A: GENERICS COMPULSORY

QUESTION 1: SAFETY

Write down the question number 1.1.1 to 1.1.2 in your **ANSWER BOOK** and next to it the name and one use of the tool. (4)

	Picture	Identification	Use
1.1.1			
1.1.2			

1.2 State ONE purpose of the long jointer. (1)

1.3 Carefully study the table below and match the materials to their relative properties.

Example 1. K

Materials	Properties
1. Concrete	A. High thermal and electrical conductivity
2. Plywood	B. Rustproof/ rust resistant
3. Copper	C. Requires little maintenance
4. PVC Glue/Adhesive	D. No curing is required.
5. Zinc	E. Stronger than solid wood of the same thickness
	F. Good conductor of heat and electricity
	G. Dries quickly when in contact with PVC pipes

1.4 Describe TWO safety precautions that have to be considered when working with hand tools. (2)

1.5 Describe THREE visible symptoms that a worker is under the influence of drugs. (3)

[15]

SECTION B (Civil Services)

QUESTION 2 (Specific)

SAFETY AND MATERIALS

2.1.1 What safety equipment can the visitor use to prevent injury to himself? (1)

2.1.2 Explain TWO safety measures that must be implemented to ensure the safety of visitors and workers on a site. (2)

2.2 You are working with electrical cutting tools on a site. Recommend any TWO safety equipment that you will use to protect yourself from injury. (2)

2.3 Discuss any TWO safety precautions that have to be considered when working with hand tools. (2)

2.4 Explain THREE factors that must be considered when stacking material in a workshop. (3)

2.5 FIGURE 2.5 shows TWO types of bricks. Study the figure and answer the questions that follow.



FIGURE 2.5

2.5.1 Identify A (1)

2.5.2 Identify B (1)

2.5.3 Give ONE use of each brick. (2)

2.5.4 Which brick will be plastered? (1)

[15]

QUESTION 3 (Specific)

EQUIPMENT AND TOOLS

3.1 Various options are given as possible answers to the following questions.

Choose the answer and write only the letter (A-D) next to the question number (3.3.1 – 3.3.10) in the ANSWER BOOK, for example 2.2.11 C.

3.1.1 can be used for WOODWORKING. (1)

A	Block board
B	Plywood
C	Wooden mallet
D	All of the above

3.1.2 can be used to check squareness. (1)

A	Screw driver
B	Try square
C	Long jointer
D	Tingle

3.1.3 can be used to draw parallel lines on the face of wood. (1)

A	Sliding bevel
B	Cold chisel
C	Steel square
D	Marking gauge

3.1.4 can be used to when making woodworking joints. (1)

A	Cold chisel
B	Mortice chisel
C	Short jointer
D	Club hammer

3.1.5 is the recommended tool for cutting steel pipes. (1)

A	Figure saw
B	Rip saw
C	Hack saw
D	Spade

3.1.6 is used for measuring when laying out buildings. (1)

A	Steel tape
B	Folding rule
C	Steel square
D	Line and pins

3.1.7 is used by a plasterer to place plaster in difficult corners. (1)

A	Mastic trowel
B	Long jointer
C	Short jointer
D	Pointing trowel

3.1.8 can be used to cut copper pipes neatly and accurately. (1)

A	Tenon saw
B	Hacksaw
C	Pipe cutter
D	Grinder

3.1.9 is used to tighten steel pipes. (1)

A	Spanner
B	Shifting spanner
C	Rreamers
D	Stilson wrench

3.1.10..... is used to measure horizontal and vertical distances. (1)

A	Plumb bob
B	Dumpy Level
C	Folding rule
D	All the above

3.2 Write down the question number 3.2.1 to 3.2.4 in your ANSWER BOOK and next to it the name and one use of the tool. (10)

	Tool	Identification	Use
3.2.1			

3.2.2			
3.2.3			
3.2.4			
3.2.5			

SECTION B (Construction)

QUESTION 4 (Specific)

SECTION B: CONSTRUCTION (OHS ACT 1993, MATERIALS AND EQUIPMENT AND TOOLS (SPECIFICS))

OHS ACT 1993 (SPECIFIC)

4.1 What should a worker wear on a construction site when working in a dusty area? (1)

4.2 You are working with electrical cutting tools on a site. Name any TWO types of safety equipment that you may use to protect yourself against injuries. (2)

4.3 Visibility of safety signage on a construction site is important. Why? (2)

MATERIALS

Various types of clay bricks are used in the building industry

4.4 What is a brick? (1)

4.5 Differentiate between cellular and keyed bricks (2)

4.6 Give THREE advantages of bricks having holes over a solid brick (3)

EQUIPMENT AND TOOLS

4.7 Give THREE advantages of bricks having holes over a solid brick (3)

4.8 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (4.8.1–4.8.10) in the ANSWER BOOK, for example 2.2.11 C.

4.8.1 is the tool recommended for mixing concrete and mortar. (1)

A	Pick
B	Round shovel
C	Square shovel
D	Spade

4.8.2 A is used for measuring when laying out buildings. (1)

A	steel tape
B	folding rule
C	steel square
D	line and pins

4.8.3 A is used for measuring when laying out buildings. (1)

A	steel tape
B	folding rule
C	steel square
D	line and pins

4.8.4 A is used by a plasterer to place plaster in difficult corners (1)

A	mastic trowel
B	long jointer
C	short jointer
D	pointing trowel

4.8.4 A may be used to cut copper pipes neatly and accurately. (1)

A	tenon saw
B	hacksaw
C	pipe cutter
D	grinder

4.8.5 A/An ... may be used to clamp galvanised pipes when they are being cut to size. (1)

A	pipe wrench
B	adjustable spanner
C	pipe vice
D	pipe cutter

6. Grade 11 Term 2 Task

SECTION A: GENERIC COMPULSORY

QUESTION 1: SAFETY

Write down the question number 1.1.1 to 1.1.2 in your **ANSWER BOOK** and next to it the name and one use of the tool.

1.1. **FIGURE 1.1** shows some of the OHS regulations relating to personal and general safety.



FIGURE 1.1

- 1.1.1. Which safety gear is compulsory on any building site? (2)
- 1.1.2. State the most important safety regulation when using a hand tool. (1)
- 1.1.3. Write TWO basic safety rules that should be complied to before using any power tool. (2)
- 1.1.4. What should people NOT do with mobile construction machinery? (1)

1.2 Study the sign in **FIGURE 1.2** and answer the questions that follow:



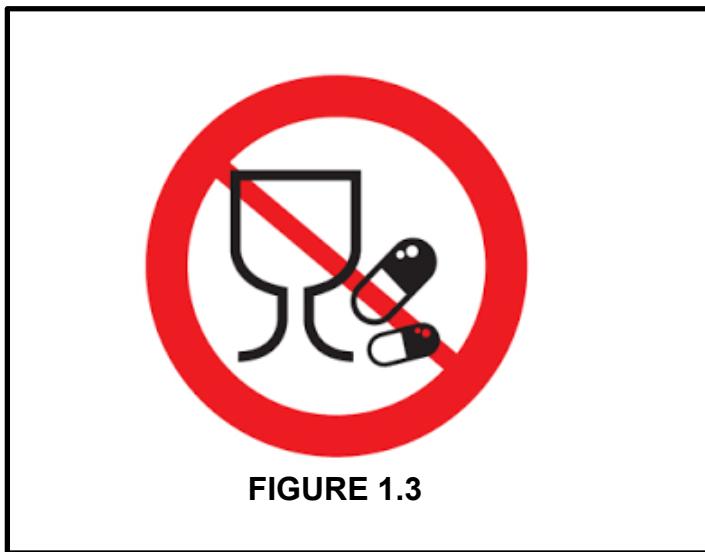
1.2.1 Where and why would this sign be placed? (2)

1.2.2 What is the colour of this sign? (1)

1.2.3 Name TWO safety regulations when storing hazardous materials. (2)

1.2.4 Explain how building material must be stacked in a workshop. (2)

1.3 Study the sign in **FIGURE 1.3** and answer the questions:



1.3.1 Describe the reason for this sign. (1)

1.3.2 Discuss what preventative measures that can be taken by employers to prevent drug abuse of their employees. (1)

[15]

QUESTION 2: MATERIALS – GENERIC (Answer on a NEW page)

2.1 Choose a description from COLUMN A that matches an item in COLUMN B.

Write only the letter (A–K) next to the question number (2.1.1–2.1.10) in the ANSWER BOOK, for example 2.1.10 - J.

	COLUMN A		COLUMN B
2.1.1		A	Can be used for modular furniture
2.1.2		B	Can be used for the galvanising of iron
2.1.3		C	Can be used to finish off floors and walls.
		D	Can be used to fill gaps in the bathroom
		E	Can be used as wooden floors and skirtings
		F	Can be used for low cost housing projects
		G	Can be used to make DPC and cisterns
		H	Can be used for pipe fittings and washers
		I	Can be used to fabricate gutters and roof covering
		J	Can be used to make soft solder
		K	Can be used as windowpanes

COLUMN A	COLUMN B
2.1.1 Screed 2.1.2 Meranti 2.1.3 Block board 2.1.4 Cement hollow bricks 2.1.5 Malleable cast iron 2.1.6 Zink 2.1.7 Lead 2.1.8 Silicon 2.1.9 Translucent glass 2.1.10 Polythene	

(10)

2.2 Use **FIGURE 2.2** to answer the questions that follow:



FIGURE 2.2

- 2.2.1 Name the type of material used to manufacture these pipes. (1)
- 2.2.2 Give the TWO properties of this material. (2)
- 2.2.3 Explain how these pipes can be joined permanently. (2)

2.3 Use **FIGURE 2.3** to answer the questions that follow:



FIGURE 2.3

- 2.3.1 Name TWO types of glass used in the picture. 2)
- 2.3.2 What type of board could be used for the cupboards? (1)
- 2.3.3 Supply ONE type of alloy that might have been used for the shower door handle. (1)
- 2.3.4 Since the wall is covered in tiles, what type of bricks did the builder use? (1)

[20]

QUESTION 3: TOOLS AND EQUIPMENT – GENERIC (Answer on a NEW page)

3.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A-D) next to the question number (3.1.1-3.1.5) in the **ANSWER BOOK**, for example 3.1.1 - B.

3.1.1 A is used for compacting soil up to 150 mm.

- A generator
- B rammer
- C plate compactor
- D club hammer

(1)

3.1.2 A is used for levelling and floating plastered walls.

- A wooden towel
- B hand hawk
- C straight edge
- D plastering trowel

(1)

3.1.3 A is used for cutting grooves into walls for pipes.

- A bolster
- B comb hammer
- C brick hammer
- D cold chisel

(1)

3.1.4 A is used for striking or removing formwork.

- A claw hammer
- B crow bar
- C cutting gauge
- D cross-pein hammer

(1)

3.1.5 is used for sharpening tools.

- A A power screwdriver
- B A rammer
- C A bench grinder
- D An angle grinder

(1)

3.2 **FIGURE 3.2** shows different tools:

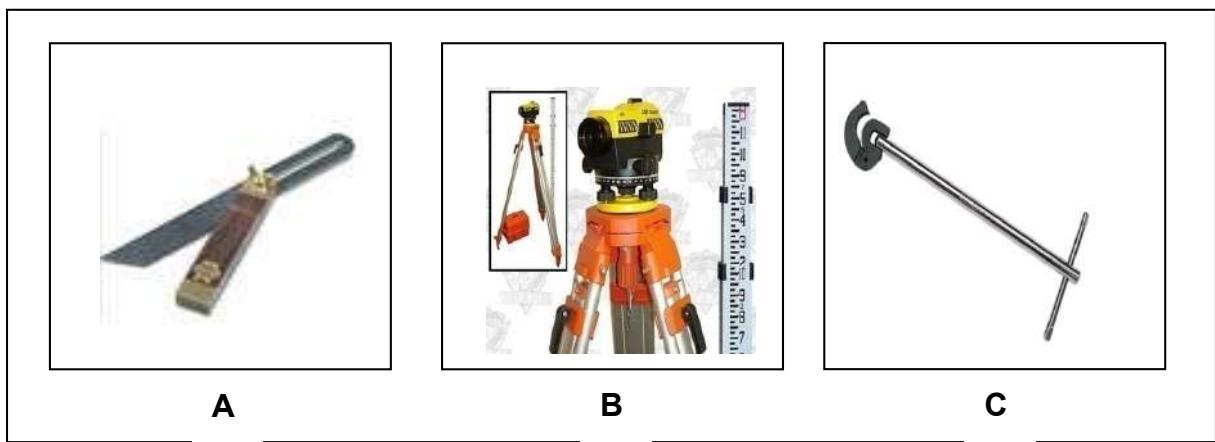


FIGURE 3.2

3.2.1 Identify tool C and give ONE use for it. (1)

3.2.2 Write the name of the tool which measures exact angles. (1)

3.2.3 Name the tool that can be used to copy angles and transfer them to other surfaces. (1)

3.2.4 Discuss how the telescope of tool B can be cared for. (1)

[10]

QUESTION 4: GRAPHICS AND COMMUNICATION – GENERIC

FIGURE 4 shows a site plan of a proposed dwelling. Study the drawing and complete the table on **ANSWER SHEET 1**.

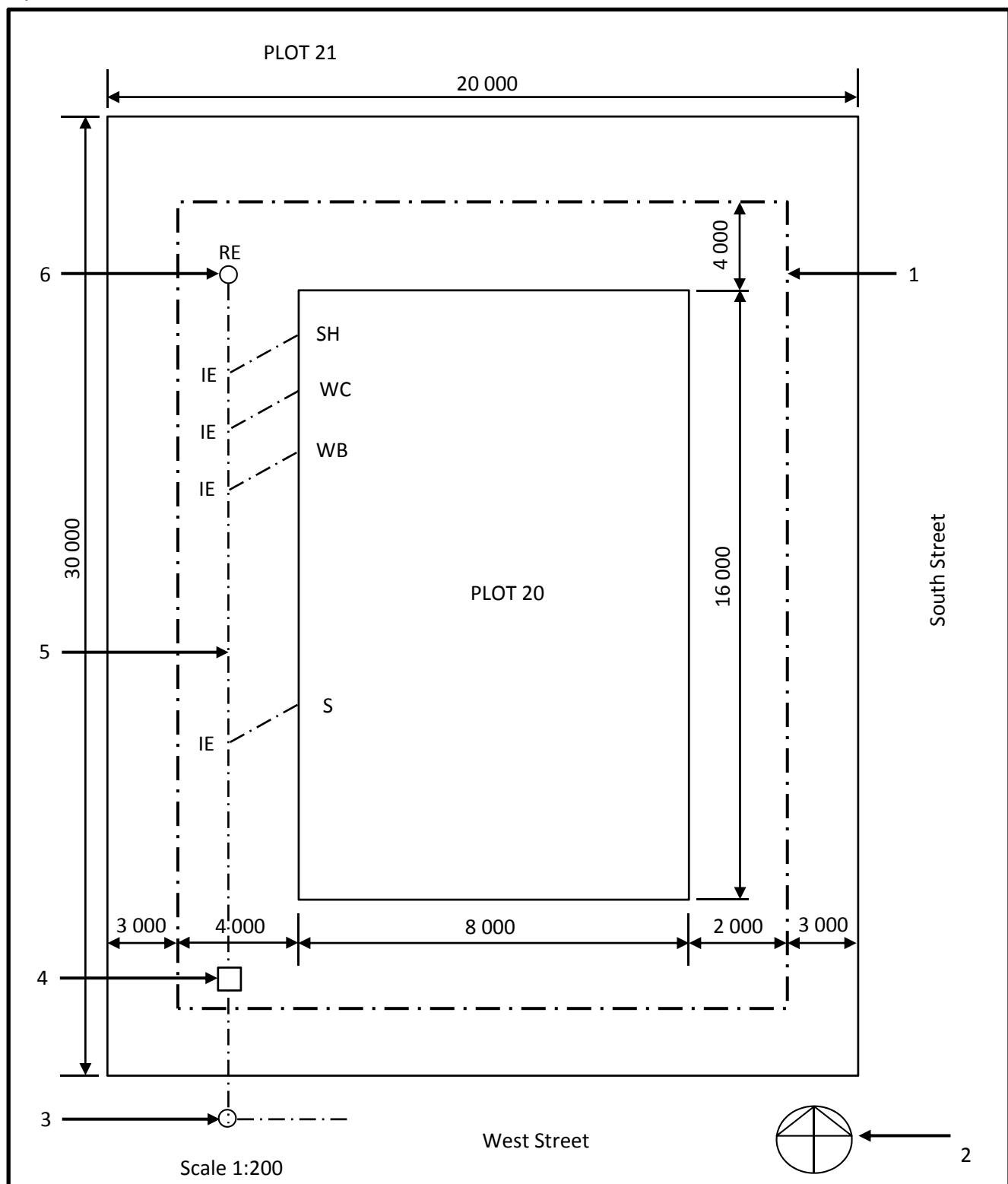


FIGURE 4

[15]

QUESTION 5: QUANTITIES AND JOINING – GENERIC (Answer on a NEW page)

5.1 Complete the following table on joining materials. Write only the number and the answer in your **ANSWER BOOK**, for example: 5.1.8 - Very strong.

Material	Use	Properties	Applications	Precautions
PVC adhesive	5.1.1.....			5.1.2.....
PVA (Polyvinyl acetate)	For bonding wood	Water-based	5.1.3	
Mastic sealant		5.1.4		
5.1.5.....	General use	Flammable	Allow to dry	Don't apply too thick
Silicone		5.1.6.....		
5.1.7.....	Good gap filler	Waterproof	Mix two parts	

(7)

5.2 **FIGURE 5.2** shows the floor plan of a single room with outer measurements of 4 300 mm x 6 200 mm.

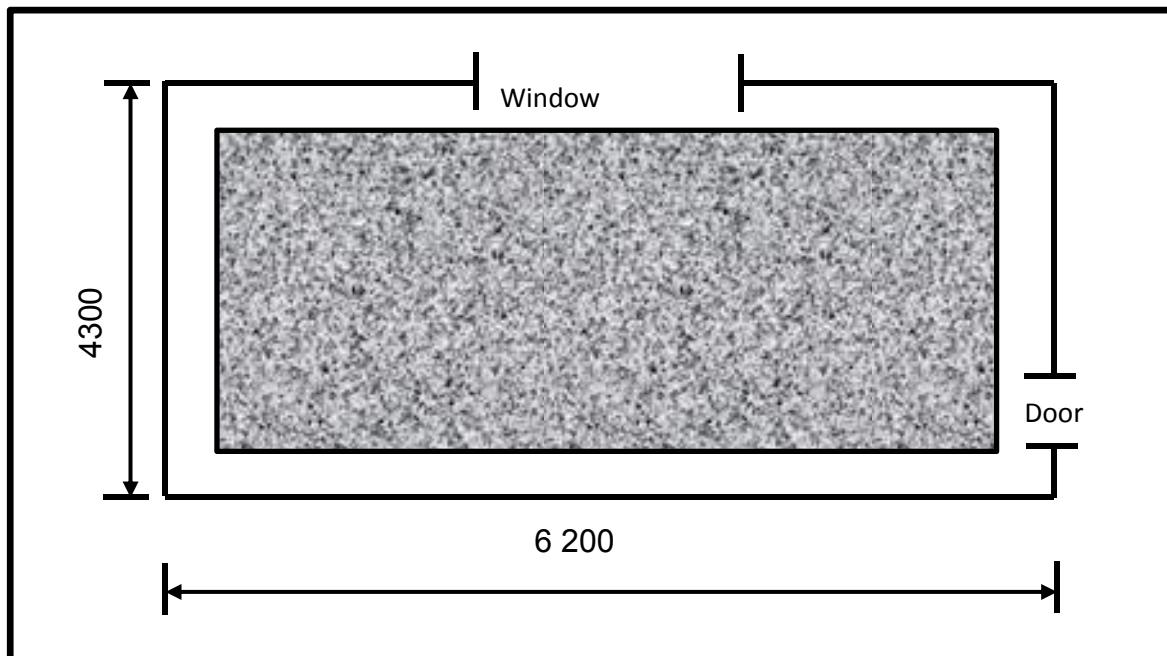


FIGURE 5.2

Specifications:

Specifications:

- The substructure is a one-brick wall, 220 mm thick.
- The concrete floor is 75 mm thick and is built between the 220 mm substructure walls.
- The door is 900 mm wide and 2 000 mm in height.

5.2.1 Calculate the following on **ANSWER SHEET 5.2**:

- 5.2.1.1 The true length of the concrete floor. (2)
- 5.2.1.2 The true width of the concrete floor. (2)
- 5.2.1.3 The volume of concrete needed for the floor. (2)
- 5.2.1.4 The total length of skirting used. (2)

[15]

SECTION C CIVIL SERVICES SPECIFIC
QUESTION 1: SAFETY – CIVIL SERVICES SPECIFIC

1.1 The picture in **FIGURE 1.1** shows a man in a sewerage system.



FIGURE 1.1

1.1.1 What health risks are associated with raw sewerage? (2)
1.1.2 Name FIVE steps that plumbers who repair sewers can take to reduce or prevent infections. (5)

1.2 Use the picture in **FIGURE 1.2** to answer the questions thereafter.



FIGURE 1.2

Explain the safety rules to be taken when you are soldering:

1.2.1.1 Burn yourself. (2)
1.2.1.2 Eat or drink something. (2)
1.2.1.3 Want to protect yourself. (2)
1.2.1.4 Are putting the soldering iron down. (2)

[15]

QUESTION 2: MATERIALS – CIVIL SERVICES SPECIFIC

2.1 In **FIGURE 2.1** a certain process is taking place. Describe the process by answering the questions that follow:



FIGURE 2.1

2.1.1 Give **THREE** materials that will be used in the process above. (3)
2.1.2 What is the process called? (1)
2.1.3 Which solder is the most commonly used? (1)
2.1.4 Give **THREE** different places where solder can be applied. (3)

2.2 **FIGURE 2.2** shows a picture of a bathroom.



FIGURE 2.2

2.2.1 What material was used for the urinals? (1)
2.2.2 Give **TWO** reasons why this material is used in bathrooms? (2)
2.2.3 Name **FOUR** uses for this material- other than urinals. (4)

[15]

QUESTION 3: TOOLS AND EQUIPMENT – CIVIL SERVICES SPECIFIC

3.1 **FIGURE 3.1** shows a cutting tool.



FIGURE 3.1

3.1.1 Name the cutting tool in **FIGURE 3.1**. (1)

3.1.2 What is the use for this tool and on what type of material is it used? (2)

3.1.3 Which holding tool is normally used with this cutting tool? (1)



FIGURE 3.2

3.2.1 Give the name of the machine in **FIGURE 3.2**. (1)

3.2.2 Explain the use of this machine and how you would take care of it. (2)

3.3 The picture in **FIGURE 3.3** shows a set of cutting tools.



FIGURE 3.3

3.3.1 Identify any TWO of these cutting tools. (2)

3.3.2 Where would you store these tools? (1)

3.4 Study **FIGURE 3.4** and write the names of the THREE different tools used. (3)

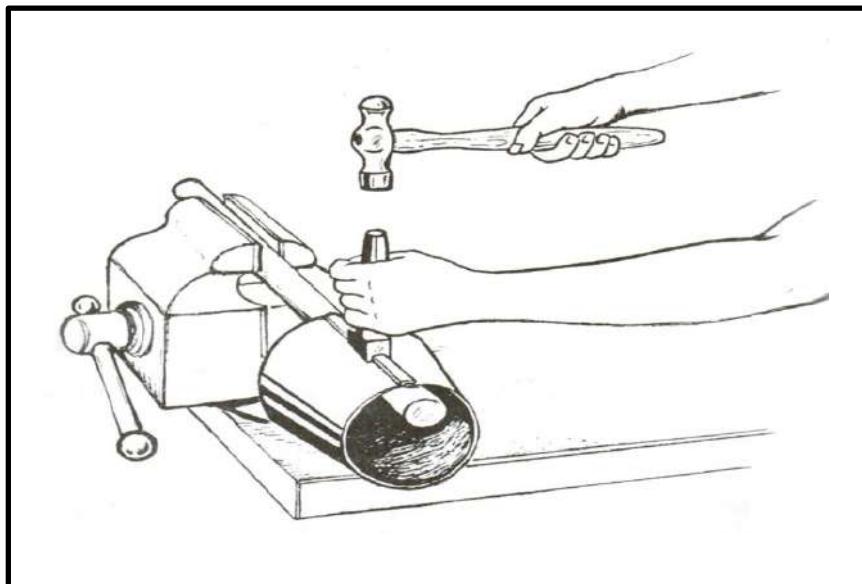


FIGURE 3.4

3.5 Name the tool in **FIGURE 3.5** and explain what it is used for. (3)



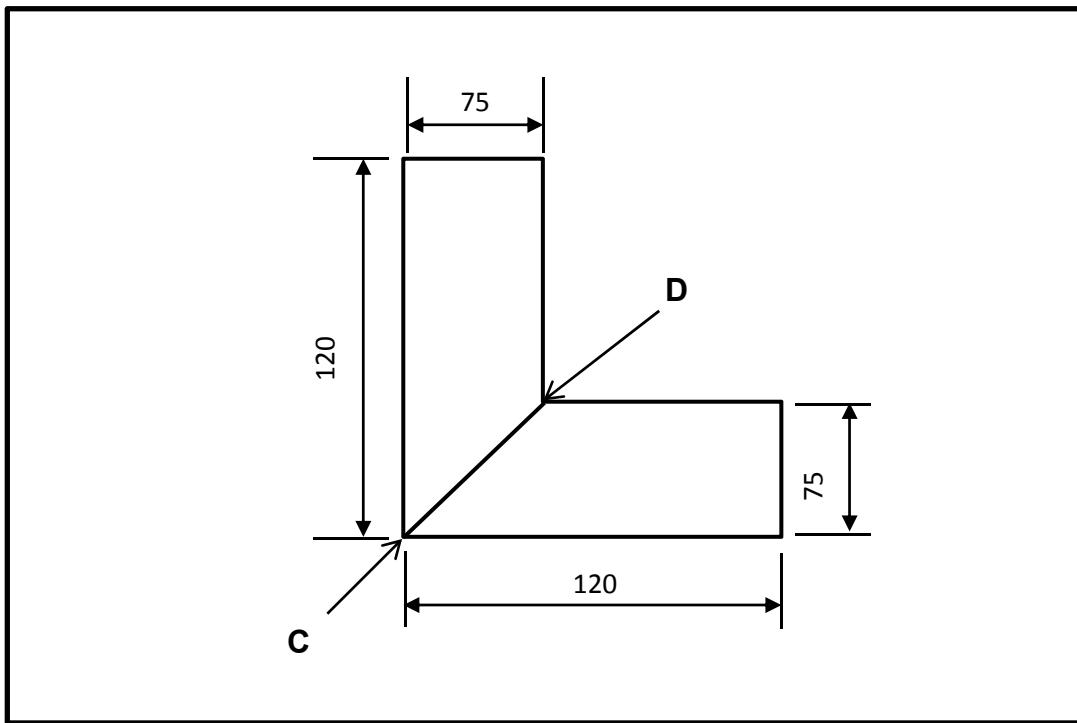
FIGURE 3.5

[15]

QUESTION 4: GRAPHICS AND DESIGN – CIVIL SERVICES SPECIFIC

(ANSWER SHEET 4.1)

4.1 **FIGURE 4:1** shows a 90° square pipe elbow.



Draw to a scale of 1:2 on **ANSWER SHEET 4:1**, the following:

- 4.1.1 The side view of the pipe elbow as shown in **FIGURE 4:1**. Start at point A. (3)
- 4.1.2 The top view of the pipe elbow. (1)
- 4.1.3 The parallel line development of the pipe elbow. (9)
- 4.1.4 Make provision for the seam. (2)

[15]

QUESTION 5 QUANTITIES AND JOINING – CIVIL SERVICES SPECIFIC

(NEW page)

5.1 **FIGURE 5.1** shows the layout of the cold- and hotwater pipes in a house. Study the drawing and complete the given table by writing only the answer next to the question number (5.1.1 – 5.1.7) in the ANSWER BOOK, for example 5.1.7 - 30 m.

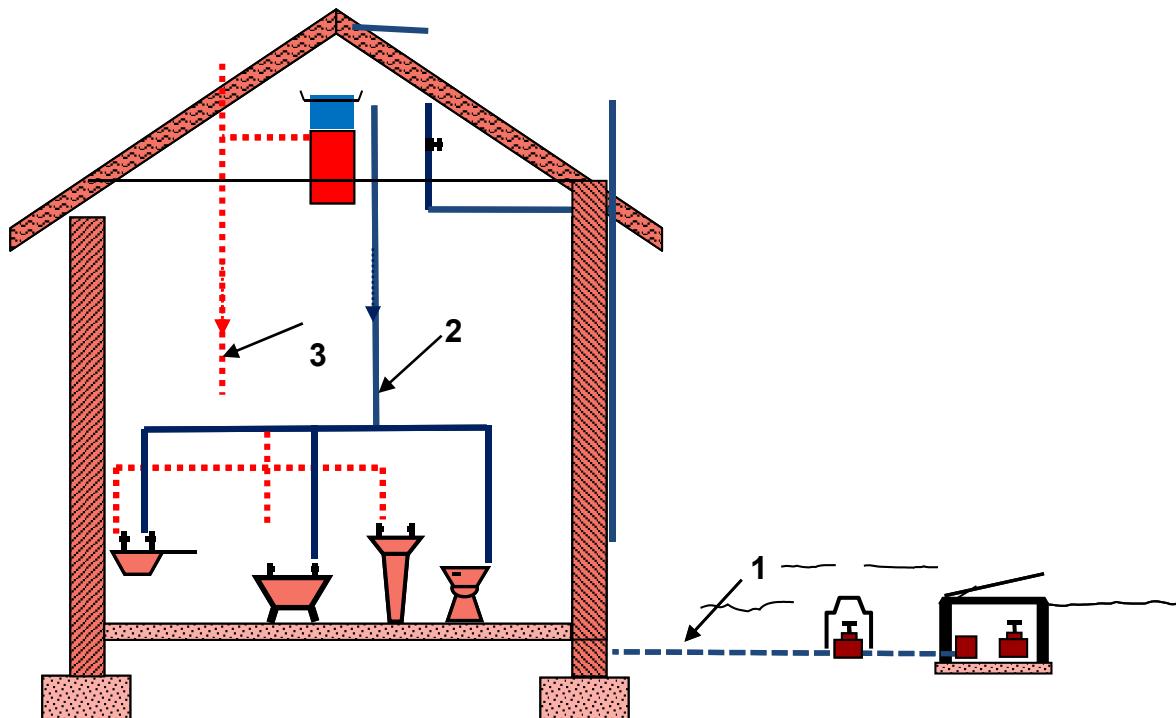


FIGURE 5.1

Specifications:

- Drawn to a scale of **1 mm : 100 mm**.
- Diameter of the main cold-water pipe (1) is 22 mm in Ø
- Diameter of cold water branch pipe (2) and hot water branch pipe (3) is 15 mm in Ø.

ITEM	DESCRIPTION	MATERIAL	SIZE	QUANTITY	LENGTH
1	Cold water main pipe	Polycop	22 mm Ø	1	5.1.1
2	Cold water branch pipe	Polycop	15 mm Ø	1	5.1.2
3	Warm water branch pipe	Polycop	15 mm Ø	1	5.1.3
4	Reducing elbow 90°	Copper	22 x 15 mm	5.1.4	
5	Elbow 90°	Copper	15 mm	5.1.5	
6	Tees	Copper	15 mm	5.1.6	

5.2 What is the best method to cut copper pipe? (1)

5.3 Explain what *tinning a soldering iron* means? (2)

5.4 Name the fixing agent in **FIGURE 5.4** and where it would be used.

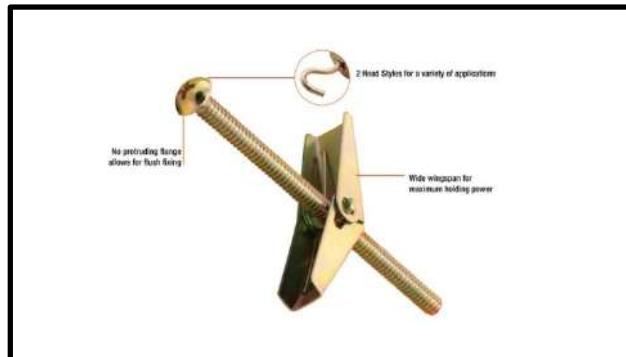


FIGURE 5.4

5.5 Show what a grooved seamed joint looks like by means of a neat freehand sketch. (1)

5.6 What method was used to join the metal pieces in **FIGURE 5.6**?



FIGURE 5.6

(1)

5.7 **FIGURE 5.7** shows a compression joint.



FIGURE 5.7

5.7.1 Name parts A and B.

(2)

[15]

SECTION B CONSTRUCTION – SPECIFIC

QUESTION 1: SAFETY

1.1 Observe the sign in **FIGURE 1.1**:



FIGURE 1.1

1.1.1 What does this sign mean? (1)

1.1.2 State **TWO** places on a construction site where this sign will be found. (2)

1.1.3 Which of the safety signs in **FIGURE 1.1.3** will be found close to **FIGURE 1.1?** (3)

Only write the correct letters, for example: 1.1.3 – **F** , **J** and **K**.

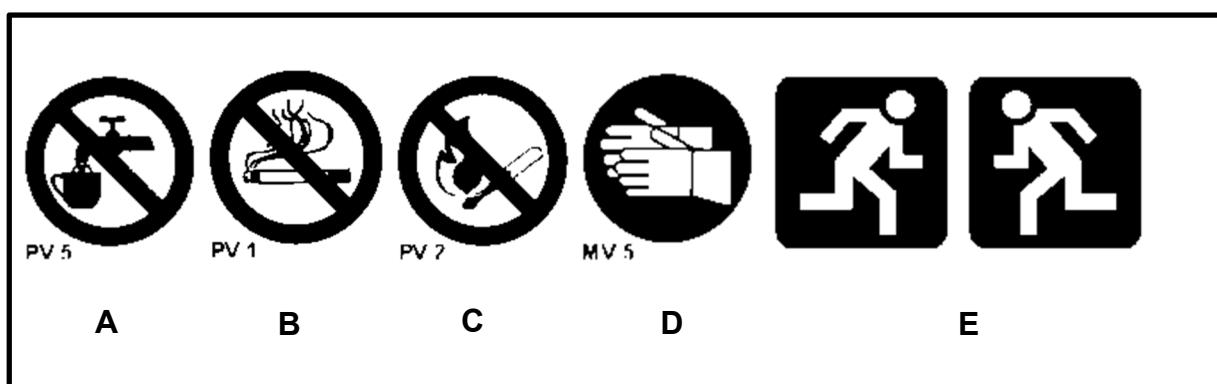


FIGURE 1.1.3

1.2 Flammable liquids have to be stored safely.

1.2.1 Give THREE regulations that **the building**, where flammable liquids are stored, should comply with. (3)

1.2.2 Name **ONE** safety sign that must be posted near this building. (1)

1.3 Describe how drug abuse can affect a worker. (2)

1.4 What type of safety clothing must be worn when using the equipment in **FIGURE 1.4**?



FIGURE 1.4

(3)

[15]

QUESTION 2: MATERIALS – CONSTRUCTION SPECIFIC

(Answer on a NEW page)

2.1 Name the THREE types of concrete bricks as shown in **FIGURE 2.1**.



FIGURE 2.1

(3)

2.2 Explain the difference between a king closer brick and a single bullnose internal return, stretcher-faced brick by drawing TWO neat, labeled freehand sketches. (4)

2.3 Study the construction done in **FIGURE 2.3**.



FIGURE 2.3

2.3.1 Describe what is taking place in **FIGURE 2.3.** (2)

2.3.2 Supply **TWO** other types of concrete used in construction. (2)

2.3.3 Define medium-strength concrete. (1)

2.4 Explain the difference between compo mortar and normal mortar. (1)

2.5 Name the properties of steel in each of the following situations:

2.5.1 When steel is easily filed, drilled and shaped by machine tools. (1)

2.5.1 When steel is resistant to environmental factors that can damage it, such as water, air acids or other chemicals. (1)

[15]

QUESTION 3: TOOLS AND EQUIPMENT – CONSTRUCTION SPECIFIC

(Answer on a NEW page.)

3.1 TWO construction machines, **A** and **B**, are shown in **FIGURE 3.1**.

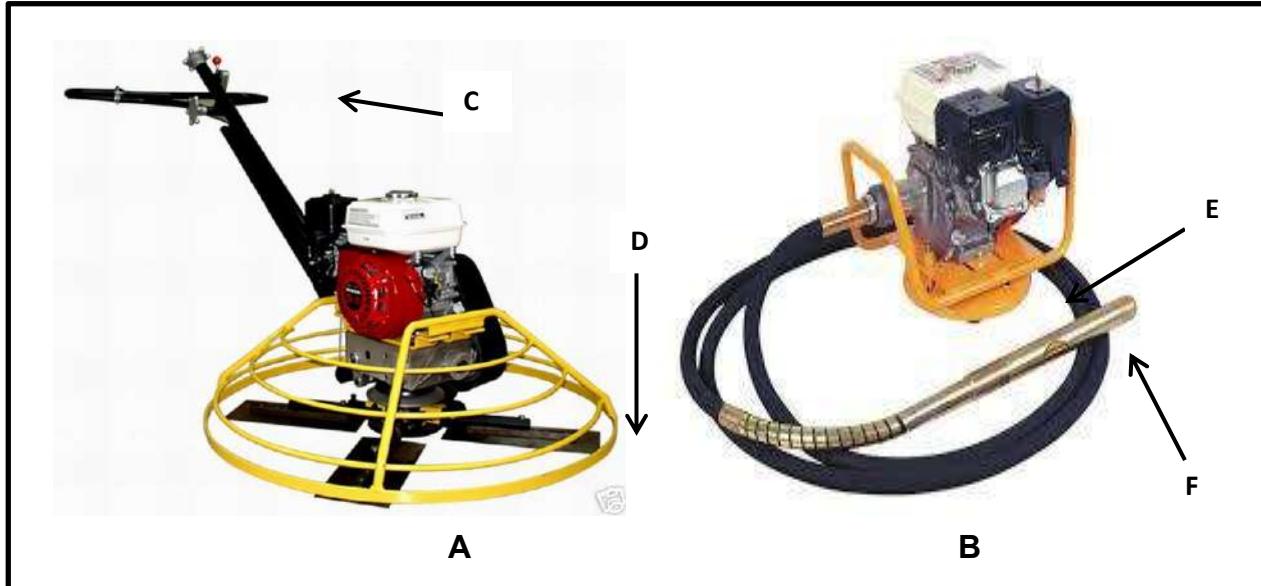


FIGURE 3.1

3.1.1 Select the machine (**A** or **B**) that is used to compact concrete and write its name. (1)

3.1.2 Give the name and use of the other tool. (2)

3.1.3 Identify the parts of the machines as indicated by **C** - **F**. (4)

3.2 Regard **FIGURE 3.2** to answer the questions that follow:



FIGURE 3.2

3.2.1 Give the collective name for the construction equipment in

FIGURE 3.2.

(1)

3.2.2 Name both pieces of equipment and describe how they would be used differently. (3)

3.3 Look at **FIGURE 3.3** and answer the questions:



FIGURE 3.3

3.3.1 What is this building equipment called? (1)

3.3.2 Explain why two of the same pieces of equipment are needed on a site. (1)

3.3.3 Identify parts **A** and **B** of the equipment. (2)

[15]

QUESTION 4: GRAPHICS AND COMMUNICATION –CONSTRUCTION SPECIFIC

(Answer on a NEW page)

4.1 **FIGURE 4.1** on **ANSWER SHEET 4.1** shows the drawing of an incomplete gauged arch.

4.1.1 Complete **the gauged arch** by drawing in the voussoirs (bricks). (3)

4.1.2 Draw and label the following on your drawing:

4.1.2.1 the rise.

4.1.2.2 the span.

4.1.2.3 the striking point.

4.1.2.4 the intrados.

4.1.2.5 the extrados.

4.1.2.6 the key voussoir (brick). (9)

4.1.3 Identify and label the following on the drawing:

4.1.3.1 The bond used in the surrounding brickwork.

4.1.3.2 The abutment and the springer. (3)

[15]

QUESTION 5: QUANTITIES AND JOINING – CONSTRUCTION SPECIFIC

(Answer on a NEW page)

5.1 **FIGURE 5.1** shows the floor plan of a storeroom with a door and a window.

Use **ANSWER SHEET 5.1** to calculate the number of bricks needed to build the **superstructure** of the storeroom. Use 50 bricks per m^2 for a half-brick wall (110 mm).

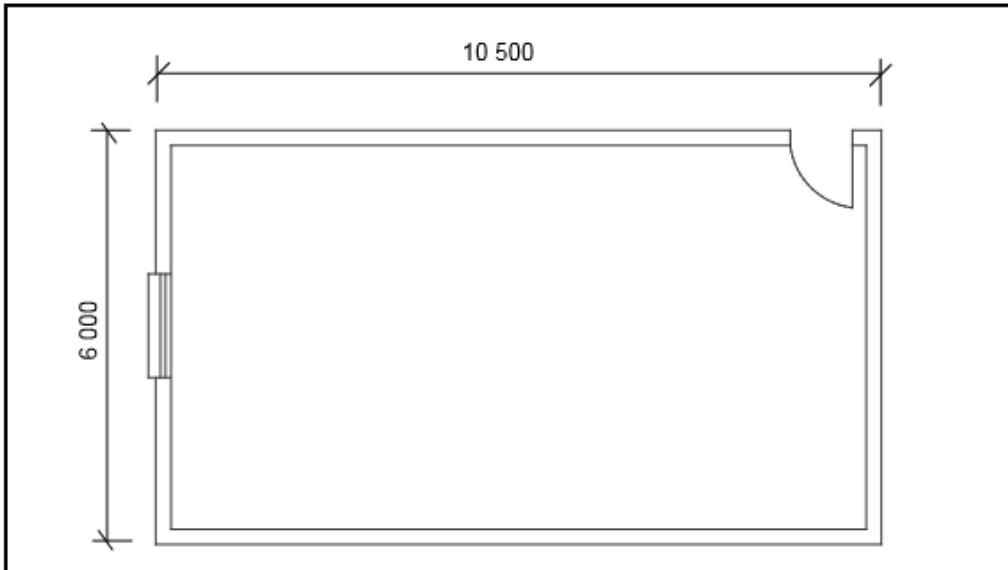


FIGURE 5.1

Use the following specifications:

- The superstructure is a one-brick wall, 220 mm wide and 2 700 mm high.
- The door opening is 2 000 mm high x 900 mm wide.
- The window opening is 1 500 mm wide x 800 mm high.

[15]

NAME:.....

QUESTION 4: GRAPHICS AND COMMUNICATION – GENERIC

NO	QUESTION	POSSIBLE MARK	ANSWER
4.1.1	What is the scale used for the drawing?	1	
4.1.2	Identify the section indicated by number 1.	1	
4.1.3	Calculate the perimeter of the dwelling. Give the answer in metres.	2	
4.1.4	Identify number 2.	1	
4.1.5	Identify number 3.	1	
4.1.6	Determine the distance from the boundary line to the dwelling on the left-hand side of the building.	1	
4.1.7	Identify number 4.	1	
4.1.8	Identify number 5.	1	
4.1.9	Identify number 6.	1	
4.1.10	What is the plot number of the proposed dwelling?	1	
4.1.11	What does the abbreviation IE represent?	1	
4.1.12	What does the abbreviation WC represent?	1	
4.1.13	What is the distance from the building line to the dwelling on the right-hand side of the building?	1	
4.1.14	What is the number of the plot on the west side of the proposed dwelling?	1	
	Total	15	

[15]

ANSWER SHEET 5.2

NAME:.....

QUESTION 5.2 QUANTITIES – GENERIC

A	B	C	D
			<u>TRUE LENGTH OF THE CONCRETE FLOOR:</u> $\dots \text{mm} - 2 / \dots \text{mm} = 5\ 760 \text{ mm}$ (2)
			<u>TRUE WIDTH OF THE CONCRETE FLOOR:</u> $\dots \text{mm} - 2 / \dots \text{mm} = 3\ 860 \text{ mm}$ (2)
1/ .....m.....m.....m	.....m ³		<u>VOLUME CONCRETE FOR THE FLOOR:</u> True length of the floor True width of the floor Thickness of the floor (2)
			<u>TOTAL LENGTH OF THE SKIRTING:</u> $2/ \dots \text{mm} + 2/ \dots \text{mm} - \dots \text{mm} = 18\ 340 \text{ mm}$ (2)

[15]

ANSWER SHEET 4.1

NAME:.....

QUESTION 4.1 CONSTRUCTION – SPECIFIC

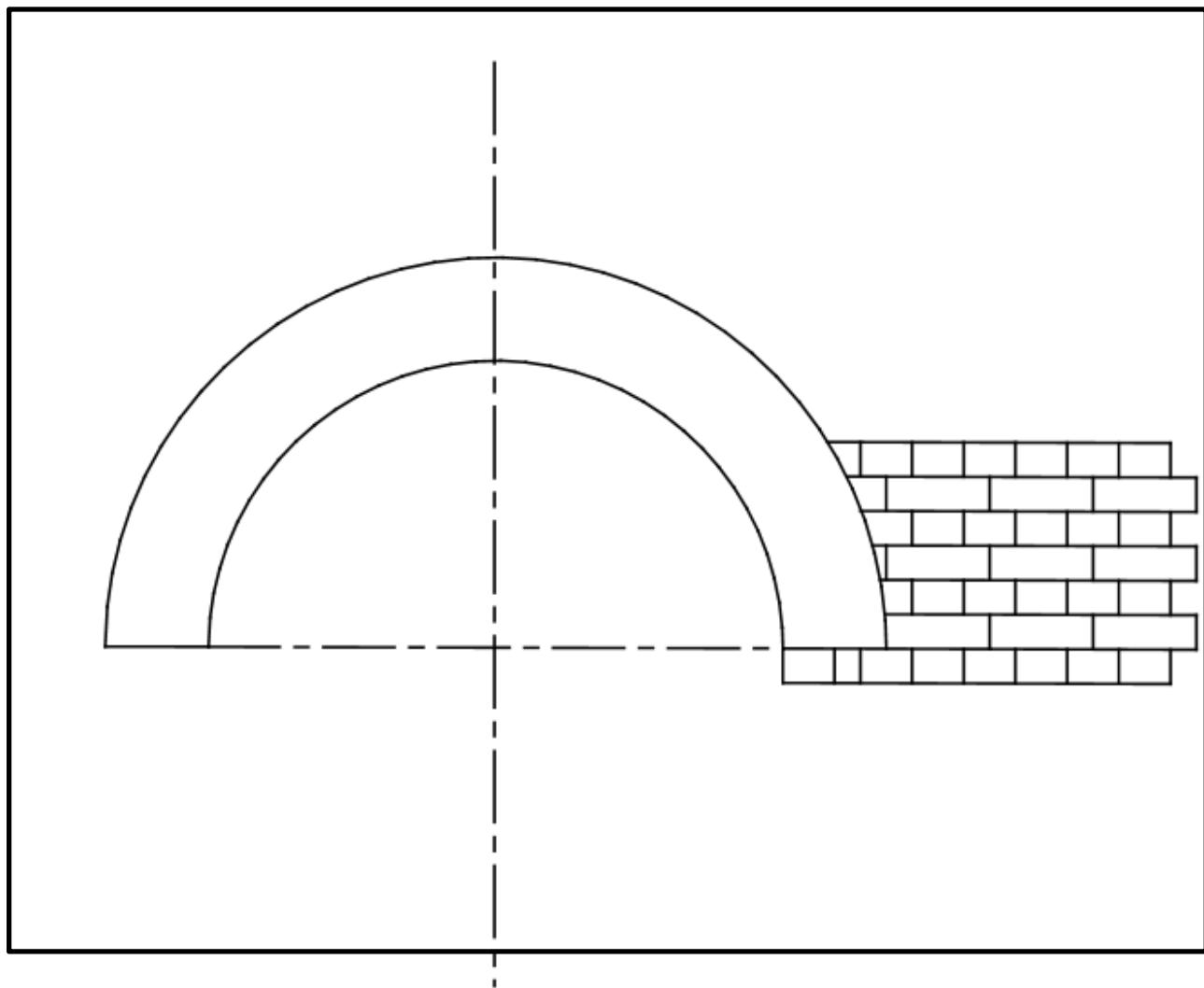


FIGURE 4

	DESCRIPTION	MARKS	LEARNER'S MARKS
1	Draw the voussoirs.	3	
2	Label the rise.	1	
3	Label the span.	1	
4	Label the striking point.	1	
5	Draw and label the intrados.	2	
6	Draw and label the extrados.	2	
7	Draw and label the key voussoir.	2	
8	Label the bond used in the surrounding brickwork.	1	
9	Label the abutment.	1	
10	Label the springer.	1	
	Total	15	

ANSWER SHEET 5.1

NAME:.....

QUESTION 5.1 CONSTRUCTION – SPECIFIC

A	B	C	D
			<u>CENTRE LINE OF THE SUPERSTRUCTURE:</u> / mm = m / mm = m - / mm = m Centre line of the substructure = m (4)
1/	..... .....	..... m ²	<u>AREA OF THE SUPERSTRUCTURE:</u> Centre line of the substructure = m Height of the superstructure = m (3)
1/	..... .....	..... m ²	<u>AREA OF THE DOOR:</u> Width of the door = 900 mm Height of the door = 2 000 mm (2)
1/	..... .....	..... m ²	<u>AREA OF THE WINDOW:</u> Width of the window = 800 mm Height of the window = 1 500 mm (2)
			<u>AREA OF THE WALL WITHOUT THE DOOR AND WINDOW:</u> Area of the wall – area of the door – area of the window = - - = 83,724 m ² (1)
.... /	50	.... bricks	<u>NUMBER OF BRICKS NEEDED FOR THE SUPERSTRUCTURE</u> Area of the wall without the door and window = 83,724 m ² 50 bricks per m ² for a half-brick wall (3)

[15]

7. Grade 11 Term 3 Task

GRADE 11

CIVIL SERVICES

TIME: 1 HOUR

MARKS: 50

QUESTION 1 Specific

1.1 **FIGURE 1.1** shows the first layer of a **T-junction** of a one-brick wall built in stretcher bond. Use **ANSWER SHEET 1.1** and project and draw the second layer (consecutive layer). (5)

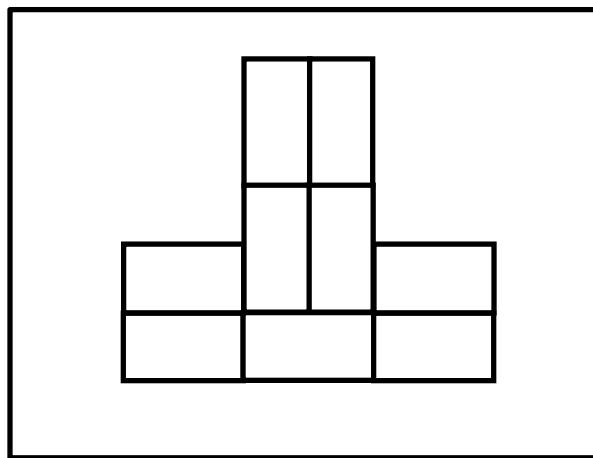


FIGURE 1.1

1.2 Name **FOUR** methods when curing concrete. (4)

1.3 Give the **THREE** methods that is used to level concrete. (3)

1.4 Name **THREE** different types of joints that can be used to join different types of pipe. (3)

1.5 **FIGURE 1.5** shows a type of pipe used for cold and hot water supply.

Answer the questions that follow.



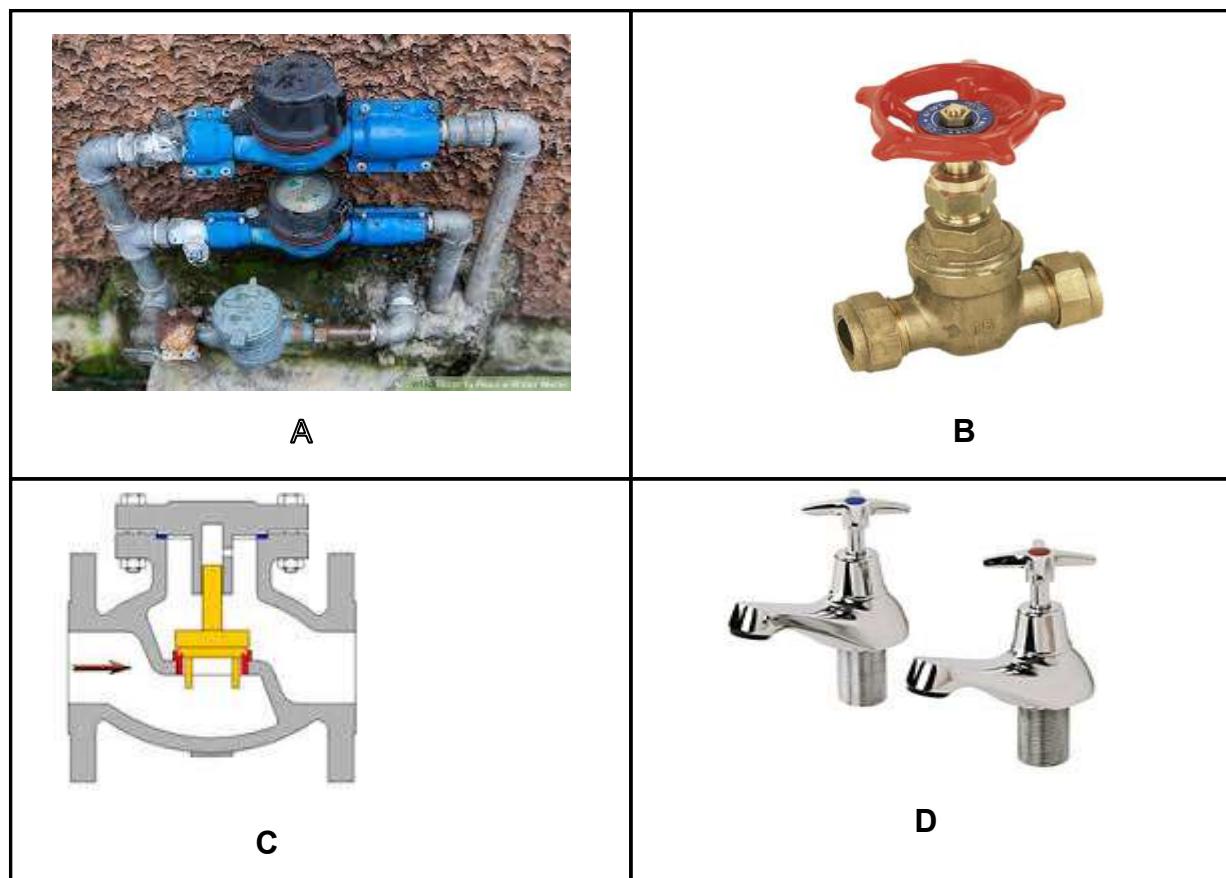
FIGURE1.5

1.5.1 Identify the type of pipe. (1)

1.5.2 Name **TWO** types of joints that you will use to join these pipes. (2)

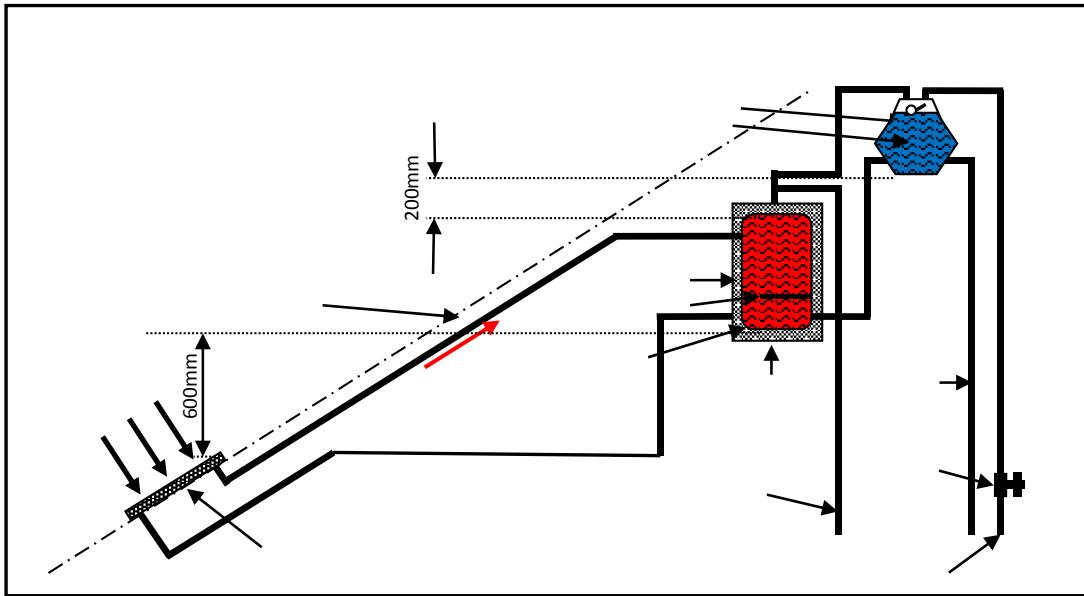
1.5.3 Name **TWO** other types of pipe that are also used for water supply. (2)

1.6 Identify the following valves (A-D). (8)



1.7 Explain the working principles of an electrical hot-water supply system. (4)

1.8 **FIGURE 1.8** shows a type of hot-water system. Answer the questions that follow:



1.8.1 Name the type of system. (1)

1.8.2 Give a reason for your answer in 1.8.1 (1)

1.8.2 Give four working principles of this system. (4)

1.9 Develop and draw a stop-end with open top for a square gutter.

Specifications:

Length = 125 mm

Height = 80 mm

Width = 40 mm

(8)

1.10 Define storm water. (4)

Memo Grade 10

QUESTION 1 (SAFETY)

1.1 Define safety: To protect people from physical injuries. ✓ (1)

1.2

- Sharing needles can cause HIV or hepatitis ✓
- Injected drugs can cause veins to collapse and infections of the blood vessel
- High blood pressure
- Lung diseases, including asthma and lung cancer
- Behavioural problems
- Anxiety
- Addiction
- Aggressiveness
- Impulsiveness

(1)

ANY OTHER ACCEPTABLE ANSWER

1.3

- It may fall and get damaged ✓
- It may fall and cause injuries ✓

(2)

1.4

- A fire that is started by electric faults ✓

(1)

1.5

1.5.1

- A: smocking is prohibited ✓
- B: no entry ✓
- C: first aid kit location✓

(3)

1.5.2

- Red sign; black symbol ✓

(1)

1.5.3

- positive action sign ✓

(1)

1.6

- Gum boots ✓
- PVC gloves ✓
- Overalls ✓
- Dust mask

(3)

ANY THREE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

1.7

- Use the right equipment for the right job ✓
- Machinery must be in a good working order ✓
- Machine operators must be trained
- Controls must be easy to reach and properly installed
- Fire extinguishers must be on hand in the event of fire

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER (2)

QUESTION 2 (MATERIALS)

2.1

COLUMN A	COLUMN B
2.1.1 Mortar	L ✓
2.1.2 Cement hollow blocks	C ✓
2.1.3 Saligna	B ✓
2.1.4 Grey cast iron	K ✓
2.1.5 PVC adhesive	I ✓
2.1.6 Concrete	A ✓
2.1.7 SA pine	D ✓
2.1.8 Clay bricks	E ✓
2.1.9 Aluminium	F ✓
2.1.10 Screed	J ✓

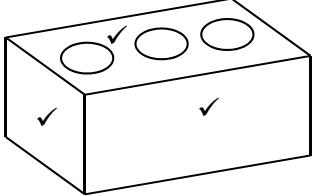
(10)

2.2 COARSE AGGREGATE: consists of gravel, fragments of broken stone, slag and other coarse substances. Used for more massive members. ✓✓

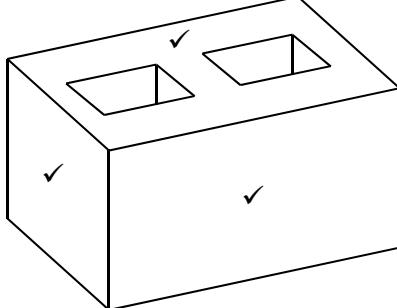
FINE AGGREGATE: consists of sand or crushed stone. Used in making thin concrete slab or where a smooth surface is required. ✓✓

(4)

2.3



CLAY BRICK



CEMENT HOLLOW BLOCK

(6)

2.4

- Joins PVC pipes ✓
- Clear/transparent ✓
- Dries quickly when in contact with PVC pipes ✓

(3)

2.5 Mastic sealant ✓, because it is waterproof. ✓

(2)

2.6

Type	Cellular	Keyed
Material	Plasticised clay ✓	Fine clay ✓
Use	Cavity walls ✓	Inserted in the centre of an arch ✓

(4)

2.7 Cement ✓

(1)
[30]

QUESTION 3 (Tools and Equipment)

3.1 3.1.1 D ✓ (1)
3.1.2 D ✓ (1)
3.1.3 B ✓ (1)
3.1.4 C ✓ (1)
3.1.5 A ✓ (1)
3.1.6 A and D ✓ (1)
3.1.7 C ✓ (1)
3.1.8 A ✓ (1)
3.1.9 D ✓ (1)
3.1.10 C ✓ (1)

3.2

3.2.1 • Steel square ✓ (1)
3.2.2 • Testing squareness of cupboards. ✓
• Setting out of brickwork/ walls✓
• Setting of foundations, brickwork, staircase, roof trusses.
• Check straightness of large objects (2)

ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

3.2.3 • Lines and pins ✓
• Spirit level ✓
• Steel tape ✓
• Wooden and steel pegs
• Straight edge (3)

ANY THREE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER

3.2.4

Jointing tools	Bricklaying tools
Mastic trowel✓	Pipe level✓
Pointing trowel✓	Line block✓

3.3 Dumpy level ✓ (1)

3.4

- Cold chisel: for cutting concrete and brickwork or chasing walls or cutting metal. ✓
- Bolster: used with a brick or club hammer to cut bricks or blocks accurately. ✓ (2)

3.5

- Sledge hammer ✓ (1)

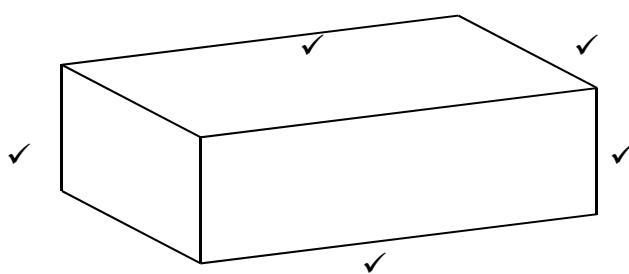
3.6

- A** Plumb bob ✓
- B** Concrete mixer ✓
- C** Poker ✓
- D** Club hammer ✓
- E** Brick trowel ✓
- F** Scoop shovel ✓ (6)

[30]

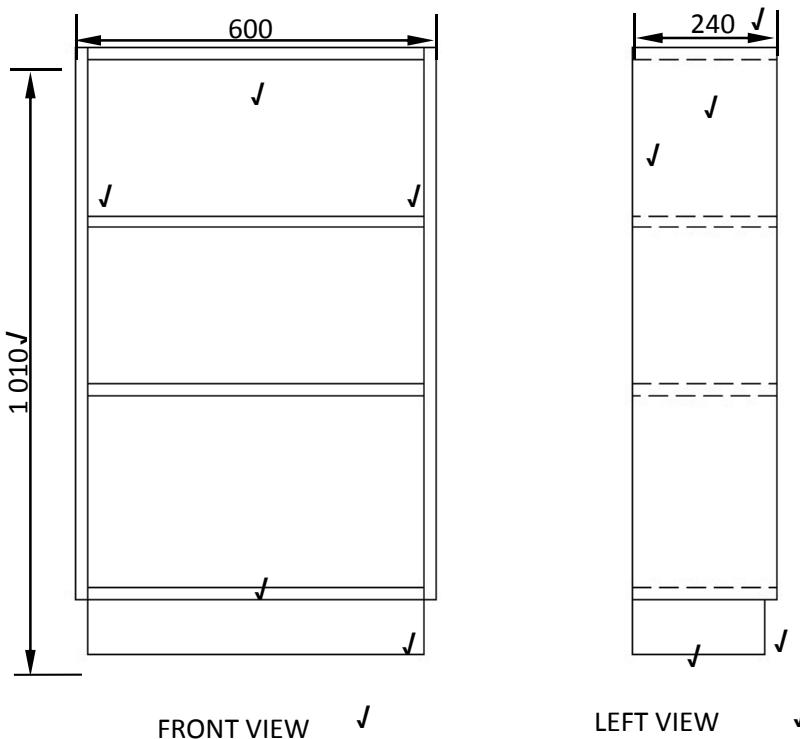
Question 4 (Graphics and Communication)

4.1



(5)

4.2



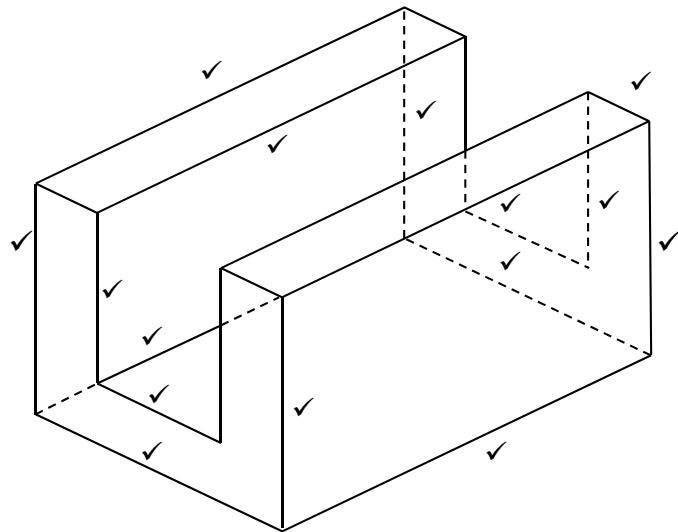
FRONT VIEW ✓

LEFT VIEW ✓

Marking criteria	
Front view & title	6
Left view & title	5
Dimensions	2
Line work	2
TOTAL	15

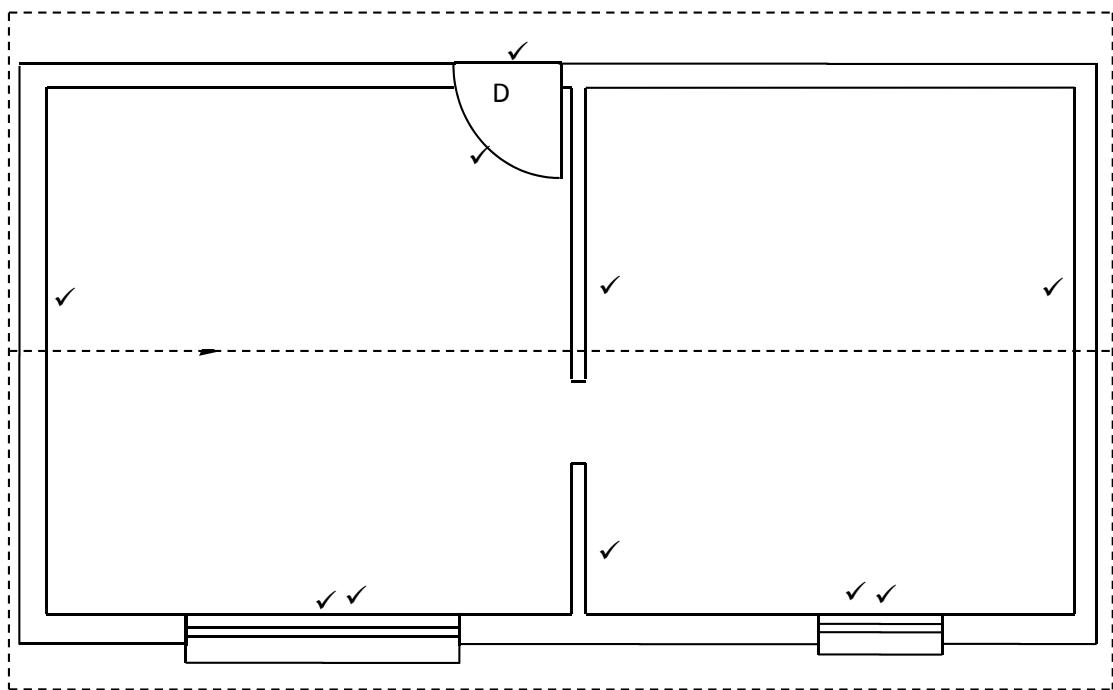
65

4.3



(15)

4.4.



FLOOR PLAN ✓

SCALE 1:50 ✓

(15)

Application of scale ✓✓✓

Question 5 (Quantities)

5.1 FIGURE 5.4 below shows the front and left views of a straight foundation.

5.1.1 5 metres ✓ (1)

5.1.2 0,6 metres ✓ (1)

5.1.3 0,150 metres ✓ (1)

5.1.4 Volume = Length x breadth x depth
= 5m ✓ x 0,6m✓ x 0,150 m ✓
= 0,4 m³ ✓ (4)

5.2

5.2.1 Internal length of building:

$$= 11\ 440 - 2(220) = 11\ 000 \checkmark \checkmark$$

Internal width of building:

$$= 7\ 440 - 2(220) = 7\ 000 \checkmark \checkmark$$

Length of skirting required for building

$$= 11\ 000 \text{ mm (2)} \checkmark + 7000 \text{ mm (2)} \checkmark$$

$$= 22\ 000 \checkmark + 14\ 000 \checkmark$$

$$= 36\ 000 \text{ mm} - 900 \text{ mm} \checkmark \text{ (width of door opening)}$$

$$= 35\ 100 \text{ mm or } 35,1 \text{ m} \checkmark$$

(10)

5.2.2 Area of tiles for the building:

Use inside measurements as calculated above.

$$11,0 \checkmark \times 7,0 \checkmark = 77 \text{ m}^2 \checkmark$$

$$\text{Area is } 77 \text{ m}^2 \checkmark$$

(4)

5.2.3 5% for breakage

$$= 3,85 \text{ m}^2 \checkmark \checkmark$$

Total area of tiles

$$77 \text{ m}^2 + 3,85 \text{ m}^2 \checkmark$$

$$= 80,85 \text{ m}^2 \checkmark$$

(4)

[25]

TOTAL [150]

REQUIREMENTS:

1. Drawing instruments
2. A non-programmable calculator
3. ANSWER BOOK

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR sections: SECTIONS A, B, C and D.
2. SECTION A (QUESTIONS 1, 2, 3, and 4) is COMPULSORY for all learners.
3. Choose ONE of the following SECTIONS according to the area of specialisation that you have registered for:

SECTION B: Construction

SECTION C: Civil Services

SECTION D: Woodworking

NOTE: If you answer the questions in SECTIONS B, C and D that you have NOT registered for, they will NOT be marked.

4. Number the answers correctly according to the numbering system used in this question paper.
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10. Make drawings and sketches in pencil, fully dimensioned and neatly finished off with descriptive titles and notes to conform to the *SANS/SABS Code of Practice for Building Drawings*.
11. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
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14. Answer QUESTIONS on the attached ANSWER SHEETS, as prescribed in each question where applicable.
15. Drawings in the question paper are NOT to scale due to electronic transfer.

QUESTION 1: EXCAVATIONS, FOUNDATIONS, CONCRETE

1.1. Many accidents happen during excavations.

1.1.1. State THREE causes of accidents that may occur during excavations.

(3)

- Excavated earth on the edge of the trench. ✓
- Poor soil. ✓
- Buildings, utilities or heavy traffic routes nearby and any source of vibration. ✓
- Whether the ground has been disturbed before.
- Nearness to streams, old sewers and underground cables.
- The availability of adequate equipment, protective gear, shoring materials and warning lights and signs.

ANY TWO OR ANY OTHER ACCEPTABLE ANSWER

1.1.2. Explain how these accidents may be prevented. Name THREE.

(3)

- Excavated material to be kept more than 600 mm from the edges of trenches. ✓
- Placing of heavy equipment and material. ✓
- Changing ground conditions, especially after rainfalls. ✓
- The way in and out of the excavations.
- Oxygen levels in or gaseous conditions of trenches.
- Trucks to be kept away from trench walls.

ANY TWO OR ANY OTHER ACCEPTABLE ANSWER

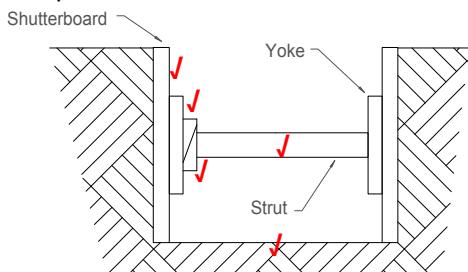
1.2. Describe the purpose of the datum peg.

(1)

- It determines the source height on the building site. ✓

1.3. Make a neat, freehand sketch of a suitable formwork method that can be used in loose, damp soil.

(5)



1.4. What does "dewatering" mean?

(1)

- The action of removing ground water or surface water from a construction site. ✓

1.5. Describe strip foundation.

(2)

- It is a continuous foundation of which the length considerably exceeds the breadth. ✓
- It is used where the soil is of good bearing capacity. ✓

1.6. Pile foundations are used where the soil cannot support ordinary foundations. Describe steel tube caisson piles.

(3)

- Is the method where a steel tube caisson is driven through water or unstable soil until a stable formation of soil is reached ✓
- The tube is partly filled with low water content and dry concrete to form a plug. ✓
- The tube is percussion-driven into the ground with an internal drop hammer ✓
- Concrete is now poured into the tube and tamped with a drop hammer to form a solid hardened pile until it is full.
- No reinforcement is required because the steel tube acts as reinforcement.

- The steel tube caisson will form part of the construction and it is not removed afterwards.

1.7. Figure 1.7 below shows the front elevation of the reinforcement for a concrete beam. Name the reinforcement steel parts labelled A – D. (4)

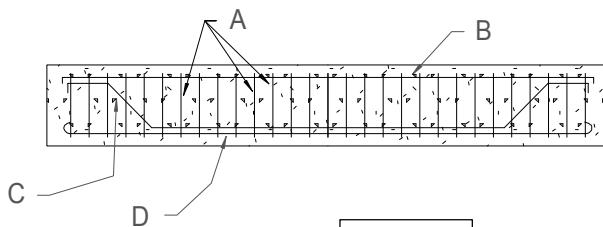


Fig. 1.7.

- A – Stirrups ✓
- B – Anchor bar ✓
- C – Shear Bar ✓
- D – Main bar ✓

1.8. Explain the properties of steel reinforcement. (3)

- Should be free of salt spray, mud, rust, splinters and any oiliness before it is placed in position. ✓
- Resistant to tensile stress ✓
- Easy to bend into shape ✓
- Able to bind firmly with concrete
- Readily available and affordable

ANY THREE OR ANY OTHER ACCEPTABLE ANSWER

1.9. Identify the following steel reinforcement bars: (3)

1.9.1.



- Twisted ribbed bar ✓

1.9.2.



- Ribbed bar ✓

1.9.3.



- Square twisted bar ✓

1.10. Name two wire joints that are used to join steel reinforcement bars. (2)

- Hair knot ✓
- Crown ✓
- Crosswire

1.11. Define formwork. (2)

- It is a mould or structure into which in-situ (prepared on site) concrete is poured ✓

1.12. Mention THREE advantages of pre-stressed, prefabricated lintels. (3)

- Readily available on the market because of large-scale manufacturing ✓

- Saving the time and labour that would have been necessary to construct formwork ✓
- The strongest lintels
- Suitable for spanning widths of 900 mm and more.

ANY TWO OR ANY OTHER ACCEPTABLE ANSWER

1.13. Mention two disadvantages of pre-stressed, prefabricated lintels. (2)

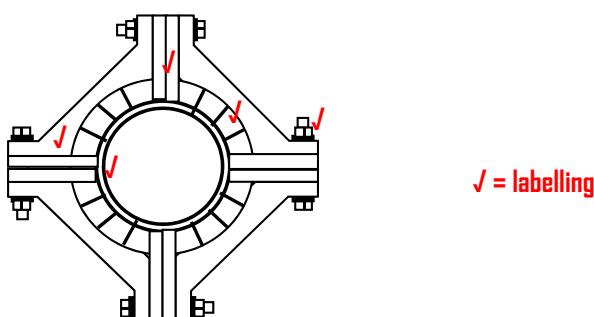
- Lintels are only available 28 days after casting to accommodate curing ✓
- Trained workers are needed to make the lintels ✓
- Shapes have to be strengthened by every available means ,e.g. cramps
- Must be designed by capable designer

1.14. Use ANSWER SHEET 1.14 and complete a drawing, to scale 1 : 10, of a horizontal sectional view of the metal/timber collar used for a round column.

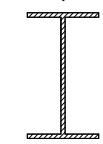
Show the following in your drawing:

- 1.14.1. Hardboard lining –3 mm (1)
- 1.14.2. Vertical boards (1)
- 1.14.3. Bolt and nut (1 of 4) – M16 (1)
- 1.14.4. Laggings – 50 x 25 mm (1)
- 1.14.5. Meta/timber collar – 35 mm thick (1)

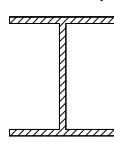
Label ONE part of the drawing. (1)



1.15. Differentiate, with the aid of sketches, between an I-Beam and H-Beam. (4)



I-Beam ✓

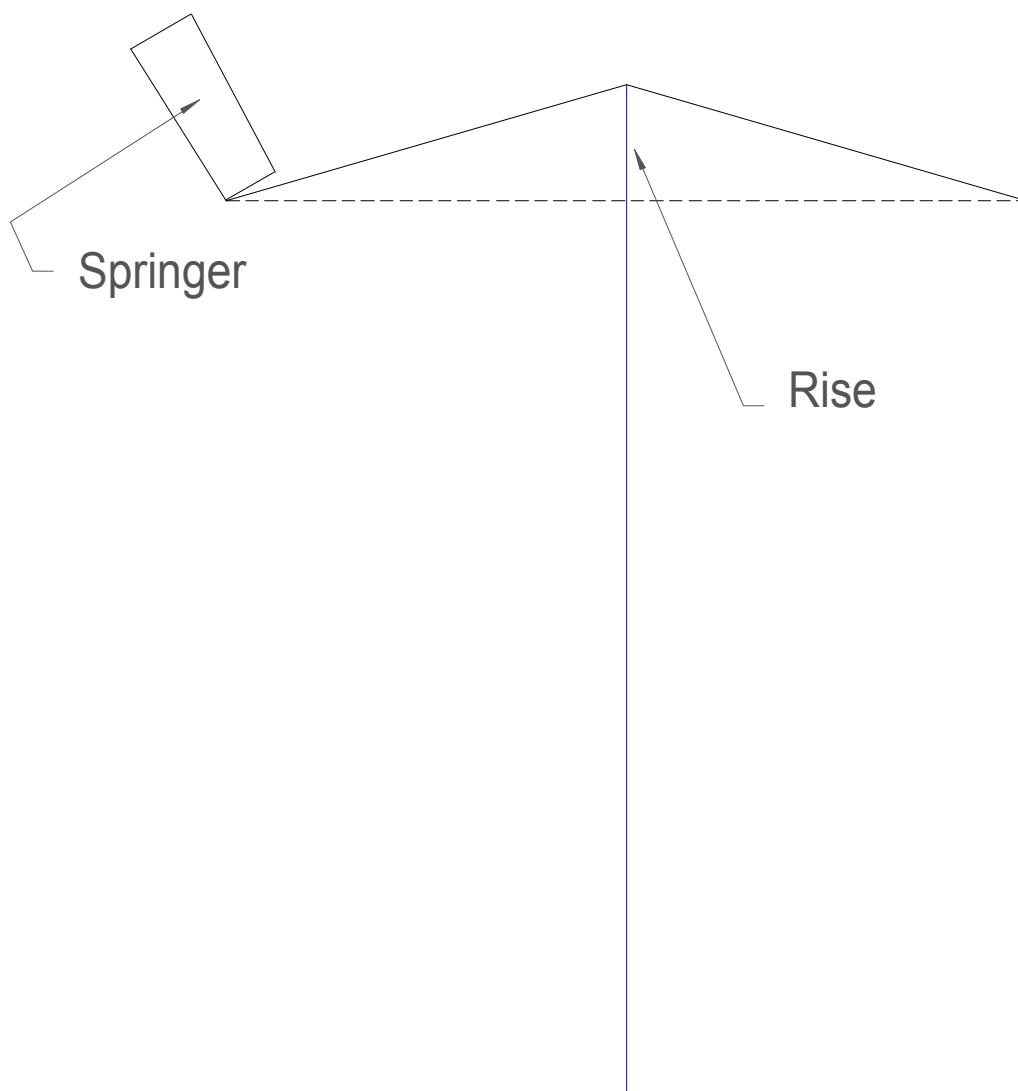


H-Beam ✓

1.16. Name TWO purposes of a cavity wall. (2)

- To prevent rainwater from penetrating the building from the outside ✓
- Sound insulation ✓
- Thermal insulation
- Diverting the mass of the building to the foundation

ANSWER SHEET 1.12



REQUIREMENTS:

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QUESTION 1:

- 1.1. Many accidents happen during excavations.
 - 1.1.1. State THREE causes of accidents that may occur during excavations. (3)
 - 1.1.2. Explain how these accidents may be prevented. Name THREE. (3)
- 1.2. Describe the purpose of the datum peg. (1)
- 1.3. Make a neat, freehand sketch of a suitable formwork method that can be used in loose, damp soil.
- 1.4. (What does “dewatering” mean? (1)
- 1.5. Describe strip foundation. (2)
- 1.6. Pile foundations are used where the soil cannot support ordinary foundations. Describe steel tube caisson piles. (3)
- 1.7. Figure 1.7 below shows the front elevation of the reinforcement for a concrete beam. Name the reinforcement steel parts labelled A – D. (4)

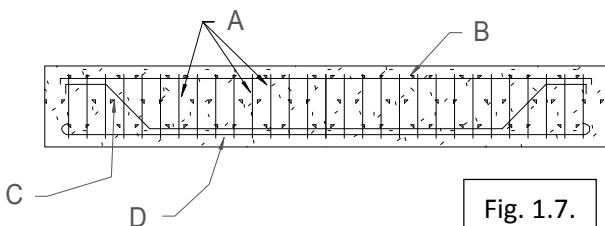


Fig. 1.7.

- 1.8. Explain the properties of steel reinforcement. (3)
- 1.9. Identify the following steel reinforcement bars:
 - 1.9.1.
 - 1.9.2.
 - 1.9.3.
- 1.10. Name two wire joints that are used to join steel reinforcement bars. (2)
- 1.11. Define formwork. (2)
- 1.12. Mention THREE advantages of pre-stressed, prefabricated lintels. (3)
- 1.13. Mention two disadvantages of pre-stressed, prefabricated lintels. (2)
- 1.14. Use ANSWER SHEET 1.14 and complete a drawing, to scale 1 : 10, of a horizontal sectional view of the metal/timber collar used for a round column.
Show the following in your drawing:
 - 1.14.1. Hardboard lining – 3 mm (1)
 - 1.14.2. Vertical boards (1)
 - 1.14.3. Bolt and nut (1 of 4) – M16 (1)

1.14.4. Laggings – 50 x 25 mm (1)

1.14.5 Meta/timber collar – 35 mm thick (1)

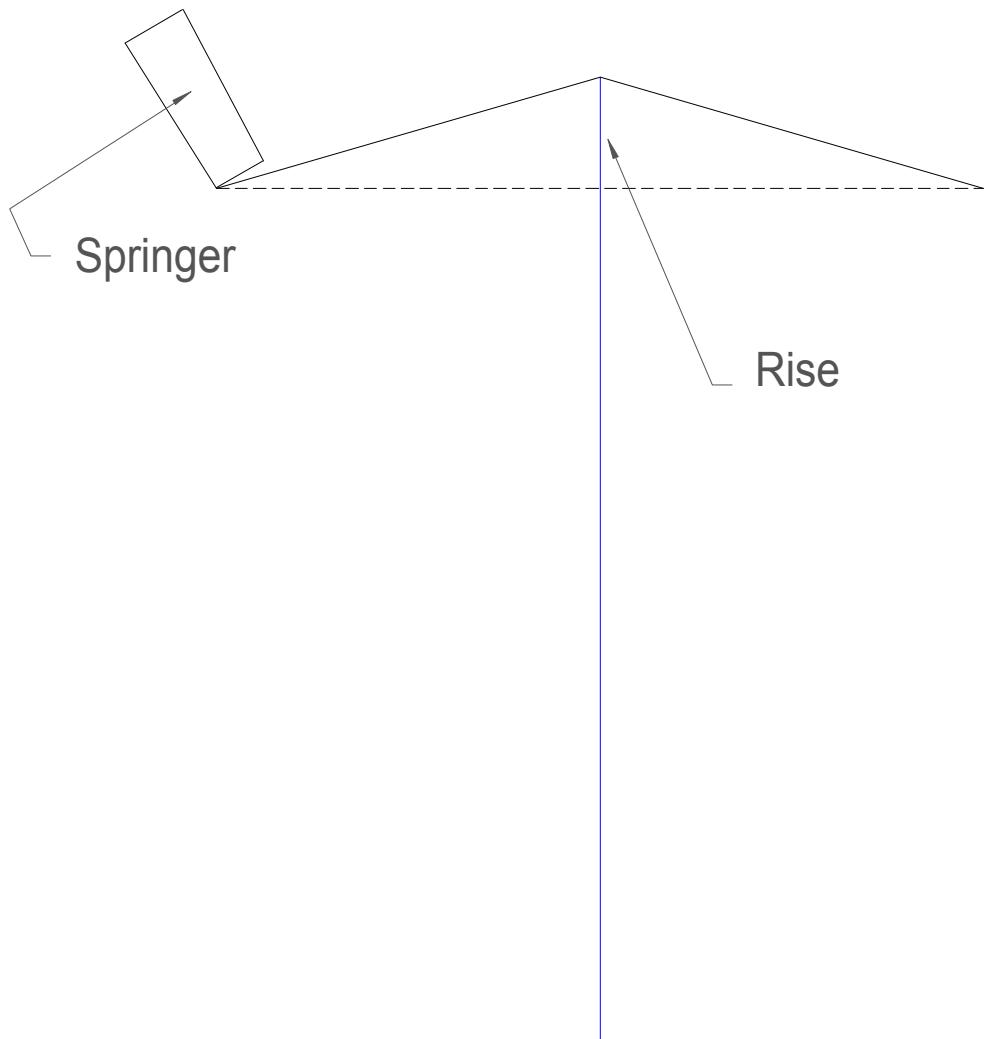
Label ONE part of the drawing. (1)

1.15. Differentiate, with the aid of sketches, between an I-Beam and H-Beam. (4)



1.16. Name TWO purposes of a cavity wall. (2)

ANSWER SHEET 1.12



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1.1.1. State THREE causes of accidents that may occur during excavations. (3)

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- Poor soil. ✓
- Buildings, utilities or heavy traffic routes nearby and any source of vibration. ✓
- Whether the ground has been disturbed before.
- Nearness to streams, old sewers and underground cables.
- The availability of adequate equipment, protective gear, shoring materials and warning lights and signs.

ANY TWO OR ANY OTHER ACCEPTABLE ANSWER

1.1.2. Explain how these accidents may be prevented. Name THREE (3)

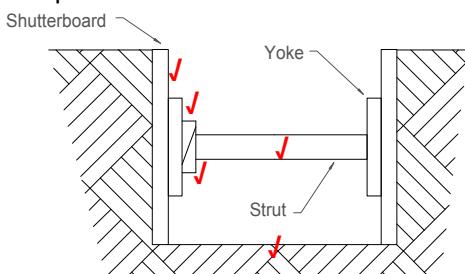
- Excavated material to be kept more than 600 mm from the edges of trenches. ✓
- Placing of heavy equipment and material. ✓
- Changing ground conditions, especially after rainfalls. ✓
- The way in and out of the excavations.
- Oxygen levels in or gaseous conditions of trenches.
- Trucks to be kept away from trench walls.

ANY TWO OR ANY OTHER ACCEPTABLE ANSWER

1.18. Describe the purpose of the datum peg. (1)

- It determines the source height on the building site. ✓

1.19. Make a neat, freehand sketch of a suitable formwork method that can be used in loose, damp soil. (5)



1.20. What does "dewatering" mean? (1)

- The act of removing ground water or surface water from a construction site. ✓

1.21. Describe strip foundation. (2)

- Is a continuous foundation of which the length considerably exceeds the breadth. ✓
- It is used where the soil is of good bearing capacity. ✓

1.22. Pile foundations are used where the soil cannot support ordinary foundations. Describe steel tube caisson piles. (3)

- Is the method where a steel tube caisson is driven through water or unstable soil until a stable formation of soil is reached ✓
- The tube is partly filled with low water content and dry concrete to form a plug. ✓
- The tube is percussion driven into the ground with an internal drop hammer ✓
- Concrete is now poured into the tube and tamped with a drop hammer to form a solid hardened pile until it is full
- No reinforcement is required because the steel tube acts as reinforcement.

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1.23. Figure 1.7 below shows the front elevation of the reinforcement for a concrete beam.

Name the reinforcement steel parts labelled A – D.

(4)

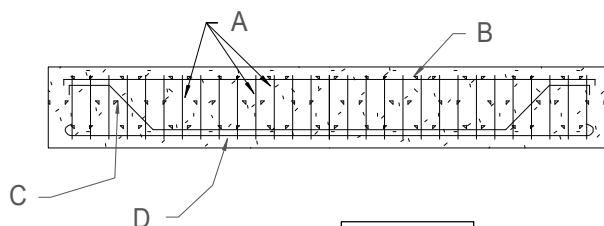


Fig. 1.7.

- A – Stirrups ✓
- B – Anchor bar ✓
- C – Shear Bar ✓
- D – Main bar ✓

1.24. Explain the properties of steel reinforcement.

(3)

- Should be free of salt spray, mud, rust, splinters and any oiliness before they are placed in position. ✓
- Resistant to tensile stress ✓
- Easy to bend into shape ✓
- Able to bind firmly with concrete
- Readily available and affordable

ANY THREE OR ANY OTHER ACCEPTABLE ANSWER

1.25. Identify the following steel reinforcement bars:

(3)

1.25.1.



- Twisted ribbed bar ✓

1.25.2.



- Ribbed bar ✓

1.25.3.



- Square twisted bar ✓

1.26. Name two wire joints that are used to join steel reinforcement bars.

(2)

- Hair knot ✓
- Crown ✓
- Crosswire

1.27. Define formwork.

(2)

- Is mould or structure into which in-situ(prepared on site) concrete is poured ✓

1.28. Mention THREE advantages of pre-stressed, prefabricated lintels.

(3)

- Readily available on the market because of large-scale manufacturing ✓
- Saving the time and labour that would have been necessary to construct formwork ✓

- The strongest lintels
- Suitable for spanning widths of 900 mm and more.

ANY TWO OR ANY OTHER ACCEPTABLE ANSWER

1.29. Mention two disadvantages of pre-stressed, prefabricated lintels. (2)

- Lintels are only available 28 days after casting to accommodate curing ✓
- Trained workers are needed to make the lintels ✓
- Shapes have to be strengthened by every available means e.g. cramps
- Must be designed by capable designer

1.30. Use ANSWER SHEET 1.14 and complete a drawing, to scale 1 : 10, of a horizontal sectional view of the metal/timber collar used for a round column.

Show the following in your drawing:

1.14.1. Hardboard lining - 3 mm (1)

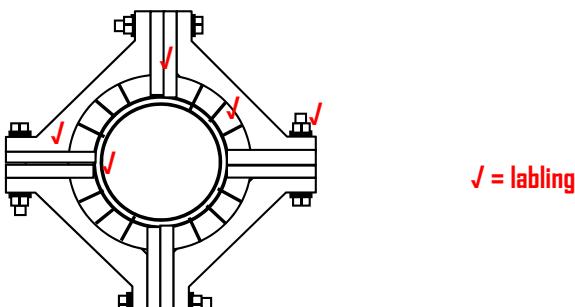
1.14.2. Vertical boards (1)

1.14.3. Bolt and nut(1 of 4) - M16 (1)

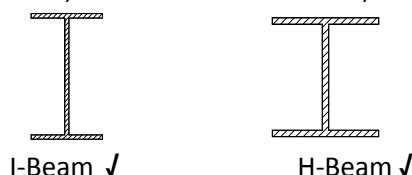
1.14.4. Laggings – 50 x 25 mm (1)

1.14.5. Meta/timber collar – 35 mm thick (1)

Label ONE part of the drawing. (1)



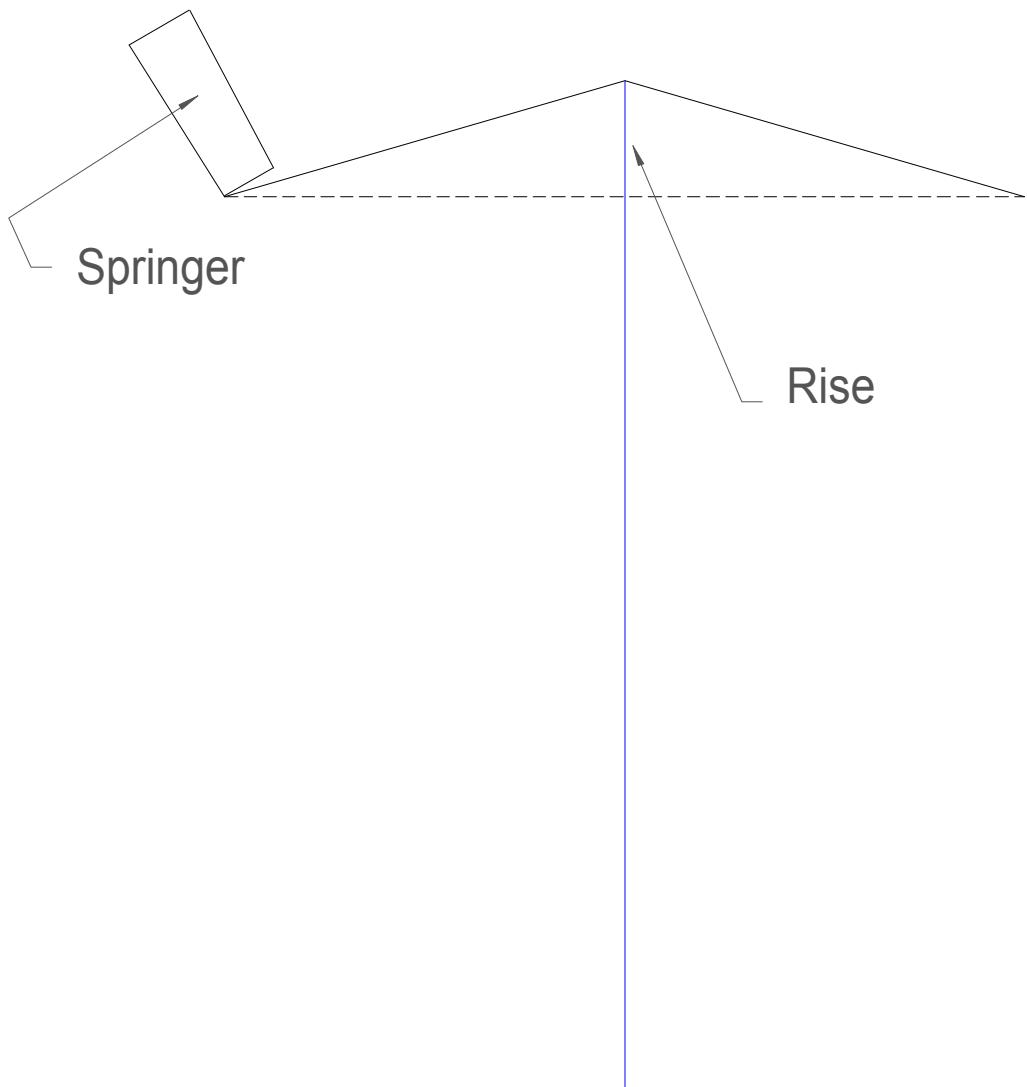
1.31. Differentiate, with the aid of sketches, between I-Beam and H-Beam. (4)



1.32. Name TWO purposes of cavity wall. (2)

- To prevent rainwater from penetrating the building from the outside ✓
- Sound insulation ✓
- Thermal insulation
- Diverting the mass of the building to the foundation

ANSWER SHEET 1.12





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