

BOARD OF STUDIES
NEW SOUTH WALES

2001 HSC Specimen Paper

Construction

ACKNOWLEDGEMENTS

Question 17 (a) Figure 1 – Bosch Power Tool Manual

Question 17 (a) Figure 2 – Bosch Power Tool Manual

Question 17 (a) Figure 3 – Craftsman 7 1/4" Circular Saw: [www.sears.com/jsp/scripts/tools/item - 27542](http://www.sears.com/jsp/scripts/tools/item-27542)

Question 17 (a) Figure 4 – Makita Trade Catalogue

Question 17 (a) Figure 5 – Craftsman 3" Belt Sander: [www.sears.com/jsp/scripts/tools item - 11715](http://www.sears.com/jsp/scripts/tools/item-11715)

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Construction **(240 indicative hours)**

(Construction Curriculum Framework)

This booklet contains the specimen examination paper for the 2001 Higher School Certificate examination in the 240-hour VET course in Construction.

The specimen paper shows the format of the New HSC examination. It has been printed on A4 paper and side-stapled, to make it convenient for use in schools. Actual examination papers will be produced as A4 booklets. All New HSC papers will be printed on white paper.

The 2001 HSC specimen papers have been produced in accordance with the Board's *Principles for Setting HSC Examinations in a Standards-Referenced Framework*, published in Board Bulletin Volume 8 Number 9 (Nov/Dec 99).

The specimen paper as a whole is structured to allow for appropriate differentiation of student performance. The format of the paper allows students to gain a clear understanding of what they are required to do in each question, and in working through the paper. Instructions have been standardised and the demands of the questions have been made explicit. Key words in questions, such as 'discuss', 'analyse', and 'explain', have been used consistently in accordance with the glossary published in the Board's *Assessment Support Document*.

The examinations in the 240-hour VET courses are optional, but required of students who wish this subject to contribute towards a University Admission Index. Students who sit for the examination will receive a statement of HSC outcomes in the same form as for other Board determined HSC courses.

This specimen paper is an example of the type of examination that could be prepared within the examination specifications for the 240-hour VET course in Construction. The range and balance of outcomes tested in the HSC examinations in 2001 and subsequent years may differ from those addressed in this specimen paper. Questions are based on:

- the units of competency identified for examination;
- the minimum prescribed learning contained in the Higher School Certificate requirements for each specified unit of competency;
- the associated key competencies.

There are a number of points to note in considering the Construction specimen examination paper:

- All VET examination papers conform to a common examination framework:
 - Section I – multiple-choice items (15 marks)
 - Section II – short response items (35 marks)

➤ Section III – extended response items (30 marks)

The examination is a 2-hour written paper. A total of 80 marks is shown on the examination paper. The total marks gained by a student on the paper are then converted to a mark out of 100.

- The number of questions in Section II may vary from year to year, however marks in this section will always total 35.
- A rubric indicating general criteria for judging performance has been placed at the beginning of Section III to clearly indicate the factors that will be used to assess responses to the question(s). These criteria are in addition to criteria specific to each question.
- For the purposes of the specimen papers only, there are some questions that appear in more than one of the VET specimen examinations. For the 2001 and subsequent HSC examinations, the papers will have no questions in common.



Sample marking guidelines for Construction

The following marking guidelines have been developed for selected questions from the 2001 HSC Specimen Examination in Construction. These guidelines indicate the approach that would be taken to marking questions.

For each question, the following are typically included:

1. The units of competency that are targeted by the question.
2. The assessment rubric from the specimen paper, where there is one, listing the set of general criteria that are used to assess responses.
3. The marking guidelines, which show the criteria to be applied to responses along with the marks to be awarded in line with the quality of the responses. For extended-response questions, performance is described at a number of levels of performance, each covering a range of marks.
4. A sample answer or some points that answers might include. Sample answers indicate the scope and depth of treatment expected, and are not intended to be prescriptive. Similarly, the points that could be included in answers are not intended to be an exhaustive list, but rather an indication of the considerations that students could include in their responses.

Marking guidelines will generally require some refinement at the Marking Centre to take account of unanticipated responses that students present. For essay-type questions, the standard described at each mark range will be made clear during pilot-marking by the selection of sample scripts.

In a standards-referenced framework, examination questions are closely linked to syllabus content and outcomes. Expectations of the question are to be clear in the wording of the question. Marking guidelines will be developed at the same time as the examination questions, by examination committees. The development of marking guidelines will be guided by the Board's *Principles for Developing Marking Guidelines Examinations in a Standards-Referenced Framework*, published in Board Bulletin Volume 9 Number 3 (May 2000).

Sample Marking Guidelines – Construction

Marks

Question 18 (4 marks)

Figure 6 shows a construction site with a uniform slope of 1 metre in 100 metres. An excavation is to be performed on the site. This excavation is to form a level area that is 56 metres long and 33 metres wide.

Refer to Figure 6 on page 14 of the Specimen Paper

- (a) Calculate the volume of material to be excavated. Show all working. 2

Related units of competency: BCG 1004A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Correctly calculates the volume $\text{Volume} = \frac{1}{2} \times b \times h \times l$ $= \frac{1}{2} \times 33 \times 0.33 \times 56$ $= 304.92 \text{ m}^3$ Rounding to 305 m^3 is acceptable	2
<ul style="list-style-type: none"> Recalls $\text{Volume} = \frac{1}{2} \times b \times h \times l$ OR <ul style="list-style-type: none"> Substitutes 0.33 m as the height in a volume calculation 	1

- (b) The excavated material will be removed in waste dump bins that have a fill-capacity of 39 m^3 . How many bins need to be ordered? Show all working. 1

Related units of competency: BCG 1004A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Correctly calculates 8 bins required ($304.92/39$ (rounded up)) OR <ul style="list-style-type: none"> Correctly calculates the number of bins required for the answer given in part (a) 	1

- (c) The bins require covering before they are transported. Each bin is 1.6 metres high, 2.4 metres wide and 10.5 metres long. The cover must overlap the sides by 300 mm. What size cover is required for each bin? Show all working. 1

Related units of competency: BCG 1004A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Dimensions of cover = 3.0×11.1 (units, if given, must be correct) 	1

Question 22 (15 marks)

The construction industry relies on the ability of construction workers to transfer levels and use lining devices.

Explain why the concept of ‘level’ is important in the construction process, and discuss the advantages and disadvantages of THREE different levelling devices.

In your answer you will be assessed on how well you:

- demonstrate relevant knowledge and understanding
 - communicate ideas and information, using precise industry terminology and appropriate workplace examples
 - organise information in a well-reasoned and cohesive response
 - solve proposed issues and problems
-

Related units of competency: BCG 1008A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Provides an explanation of the concept of ‘level’ and explains the importance of ‘level’ to the construction process. The explanation is supported by a range of relevant examples • Demonstrates a precise and extensive knowledge of levelling and lining • Correctly identifies 3 levelling or lining devices and discusses the advantages and disadvantages of each type of device • Communicates ideas and information by integrating correct industry terminology with construction concepts in a cohesive response 	13 – 15
<ul style="list-style-type: none"> • Provides an explanation of the concept of ‘level’ and explains its importance to the construction process through the use of some examples • Demonstrates knowledge of levelling and lining • Correctly identifies 3 levelling or lining devices and discusses the advantages and disadvantages of at least two devices • Communicates ideas and information by using correct industry terminology in context and produces a well-structured response 	10 – 12
<ul style="list-style-type: none"> • Provides an explanation of the concept of ‘level’ and attempts to explain its importance to the construction process through the use of examples • Demonstrates a working knowledge of levelling and lining devices • Correctly identifies 3 levelling or lining devices and describes some advantages and disadvantages of at least two devices • Communicates ideas and information using a range of industry terminology in context 	7 – 9

Criteria	Marks
<ul style="list-style-type: none"> • Provides an explanation of the concept of ‘level’ and attempts to describe its importance to the construction process • Correctly identifies 2 or 3 levelling or lining devices and lists some advantages and disadvantages of each identified device • Communicates ideas and information using some industry terminology and construction concepts 	4 – 6
<ul style="list-style-type: none"> • Demonstrates some understanding of the concept of ‘level’ • Presents a superficial knowledge of levelling and lining devices • Uses some basic industry terminology and/or construction concepts 	1 – 3

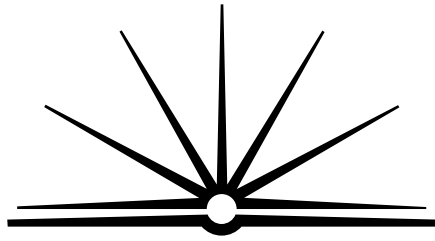
Answers could include:

The importance of the concept of level in the construction industry includes:

- level provides a ‘natural’ datum to which all measures and alignments can be referred
- level is not reliant on line-of-sight to the datum
- as a natural datum it can be used anywhere, eg at varying heights above sea level, different locations on the same building site
- it can be used to define any angle on the site

Types of levelling devices, and some of their advantages and disadvantages, include:

Type	Advantage	Disadvantage
Spirit level	<ul style="list-style-type: none"> - ease of use - plumb and level 	<ul style="list-style-type: none"> - limited to short distance - must be handled with care
Water level	<ul style="list-style-type: none"> - inexpensive - accurate over distance - line of sight unnecessary 	<ul style="list-style-type: none"> - may require two people - set up time
Boning rod	<ul style="list-style-type: none"> - can be used over very long distances - very useful for lining 	<ul style="list-style-type: none"> - difficult to use for levelling - dependent on skilled operator
Telescopic level	<ul style="list-style-type: none"> - high level of accuracy - can be used over distance - can be used for lining/setting-out and levelling 	<ul style="list-style-type: none"> - expensive - requires two people to operate
Laser level	<ul style="list-style-type: none"> - high level of accuracy - can be operated by one person 	<ul style="list-style-type: none"> - expensive - safety precautions necessary



B O A R D O F S T U D I E S
NEW SOUTH WALES

2001
HIGHER SCHOOL CERTIFICATE
SPECIMEN EXAMINATION

Construction

General Instructions

- Reading time – 5 minutes
- Working time – 2 hours
- Board-approved calculators may be used
- Write using blue or black pen
- Write your Centre Number and Student Number at the top of page 9 and page 19

Section I Pages 2 – 7

Total marks **(15)**

- Attempt Questions 1 – 15
- Allow about 15 minutes for this section

Section II Pages 9 – 16

Total marks **(35)**

- Attempt Questions 16 – 20
- Allow about 45 minutes for this section

Section III Pages 17 – 19

Total marks **(30)**

- Attempt TWO questions from Questions 21 – 23
- Allow about 1 hour for this section

Section I

Total marks (15)

Attempt Questions 1 – 15

Allow about 15 minutes for this section

Use the multiple-choice answer sheet.

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9
 A B C D

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D

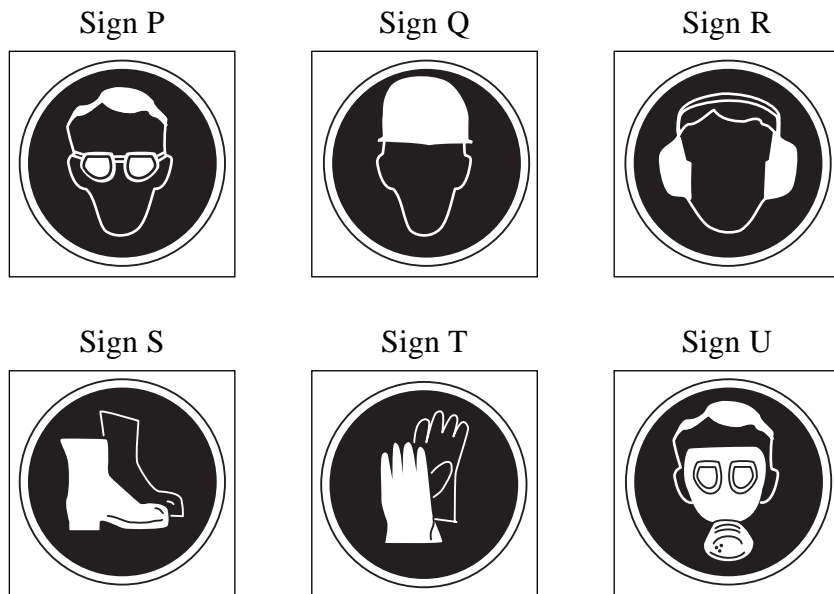
If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:

A B ^{*correct*} ← C D

- 1** It is the employer's responsibility to provide all workers with which of the following?
- (A) A safe workplace and a site-specific induction
 - (B) Union representation and a safe workplace
 - (C) A first-aid certificate and union representation
 - (D) A first-aid certificate and a site-specific induction
- 2** An employer's 'duty of care' most accurately applies to which of the following groups of people?
- (A) Employers and contractors only
 - (B) Employees and visitors only
 - (C) Employees, visitors and contractors
 - (D) Employees, visitors and manufacturers
- 3** Which of the following best describes a memorandum?
- (A) A flowchart outlining operational procedures within the organisation
 - (B) A document used for internal communication within the organisation
 - (C) A graphical representation of the departments within the organisation
 - (D) An official written response mailed to a client of the organisation
- 4** Which of the following best describes workers compensation?
- (A) A reimbursement of wages or salary paid to a worker injured at work
 - (B) A reimbursement of sick leave and superannuation paid to an injured worker
 - (C) A fixed amount paid to an injured worker while performing light duties
 - (D) A fixed amount paid to an injured worker as a compulsory saving
- 5** Which of the following does NOT comply with the correct procedures for establishing power supply to a work area?
- (A) Electrical extension leads supported overhead, clear of traffic
 - (B) Electrical extension leads connected to double adaptors for multi-tool use
 - (C) Electrical extension leads visually checked for serviceability
 - (D) Electrical extension leads covered when on the ground in high traffic areas

- 6 Which of the following procedures are used in dust suppression?
- (A) Spraying with water, use of compressed air, sweeping
 - (B) Spraying with water, covering, use of vacuum cleaner
 - (C) Spraying with water, covering, use of compressed air
 - (D) Sweeping, covering, use of vacuum cleaner
- 7 Which of the following statements describe correct procedures at a construction site?
- I Worksite left clean, safe and secure on completion
 - II Debris and waste material left for future use
 - III Tools maintained and stored
 - IV Unused materials returned to the manufacturer
 - V Equipment cleaned
- (A) II, III and IV
 - (B) I, III and V
 - (C) III, IV and V
 - (D) I, IV and V

- 8 The team assembling the formwork for a concrete slab will use a portable circular saw. Other work activities are being carried out overhead. Which of the following signs should be displayed adjacent to the work area?



- (A) P, S, T and R
(B) P, R, T and Q
(C) P, Q, S and U
(D) P, Q, R and S
- 9 A mortar mix specifies a ratio of six parts of sand to one part of cement. How many cubic metres of cement is used per cubic metre of sand in this mix?
- (A) 0.16 cubic metres
(B) 1.0 cubic metre
(C) 1.6 cubic metres
(D) 6.0 cubic metres

Use the following information to answer Questions 10 to 14.

A reinforced concrete slab is to be constructed on a level site. The dimensions of the slab are:

- 2750 mm long
- 1800 mm wide
- 150 mm thick.

10 Which of the following tools is best suited to determining that the site is level?

- (A) A spirit level
- (B) A water level
- (C) A survey peg
- (D) A string line

11 What would be the minimum length of formwork required for the slab?

- (A) 4550 mm
- (B) 4625 mm
- (C) 9100 mm
- (D) 9250 mm

12 What is the volume of concrete needed for this slab?

- (A) 0.7425 m³
- (B) 4.625 m³
- (C) 7.425 m³
- (D) 9.1 m³

13 A non-slip finish will be applied to the surface of the slab. What is the required coverage of the non-slip finish?

- (A) 4.625 m²
- (B) 4.95 m²
- (C) 7.425 m²
- (D) 9.1 m²

- 14** Which of the following tools is most appropriate for cutting the reinforcing mesh?
- (A) Circular saw
 - (B) Hacksaw
 - (C) Angle grinder
 - (D) Bolt cutters
- 15** The process of triangulation is most commonly used in which of the following jobs?
- (A) Drawing floor plans
 - (B) Constructing formwork
 - (C) Surveying sites
 - (D) Erecting frames

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Centre Number

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Student Number

Section II

Total marks (35)

Attempt Questions 16 – 20

Allow about 45 minutes for this section

Answer the questions in the spaces provided.

Question 16 (6 marks)

Marks

Propose an appropriate course of action to address each situation.

<i>Situation</i>	<i>Course of Action</i>	
Electric extension lead on ground presents a hazard		1
Installation of pipes requires excavation of a 1-metre deep trench. This presents a potential hazard to pedestrians		1
Moving heavy building materials to different locations on site		1

Question 16 continues on page 10

Marks

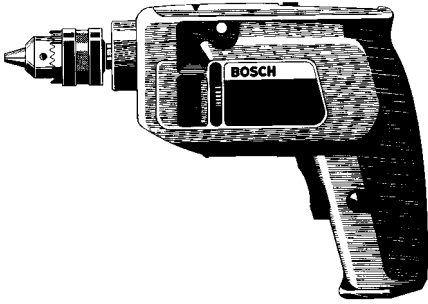
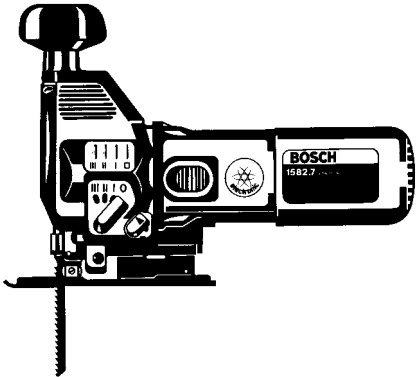

Question 16 (continued)

<i>Situation</i>	<i>Course of Action</i>	
Working on a ladder situated on unstable ground		1
Excavation of a site where power, sewer, and gas lines are present		1
A circular saw used by an operator generates excessive noise and dust		1

End of Question 16

Question 17 (12 marks)

- (a) Complete the table below by naming the portable power tools, listing ONE application for EACH power tool, and stating ONE safety precaution that must be observed when using the specific tool.

<i>Portable power tool</i>	<i>Name, application and safety precaution</i>
 <p data-bbox="694 969 762 1003">Fig. 1</p>	<p data-bbox="1380 546 1401 577">1</p>
 <p data-bbox="694 1462 762 1496">Fig. 2</p>	<p data-bbox="1380 1025 1401 1057">1</p>
 <p data-bbox="694 1939 762 1973">Fig. 3</p>	<p data-bbox="1380 1518 1401 1550">1</p>

Question 17 continues on page 12

Question 17 (continued)

<i>Portable power tool</i>	<i>Name, application and safety precaution</i>
 <p data-bbox="694 817 766 851">Fig. 4</p>	<p data-bbox="1380 398 1401 430">1</p>
 <p data-bbox="694 1288 766 1321">Fig. 5</p>	<p data-bbox="1380 880 1401 911">1</p>

(b) For each of the following tools, state a possible cause of danger that may result from poor maintenance, and a method for correctly maintaining the tool.

(i) Chisel: 1

(ii) Hammer: 1

Question 17 continues on page 13

Marks

Question 17 (continued)

(iii) Hand saw: **1**

.....
.....

(iv) Drill bit: **1**

.....
.....

(c) Name the most appropriate tool/gauge for measuring the features listed below, and briefly explain why the tool/gauge is appropriate.

<i>Feature</i>	<i>Tool/gauge and explanation of appropriateness</i>	
Length of a boundary on a construction site		1
A 45° angle		1
The vertical fall between boundaries on a work site		1

End of Question 17

Question 18 (4 marks)

Figure 6 shows a construction site with a uniform slope of 1 metre in 100 metres. An excavation is to be performed on the site. This excavation is to form a level area that is 56 metres long and 33 metres wide.

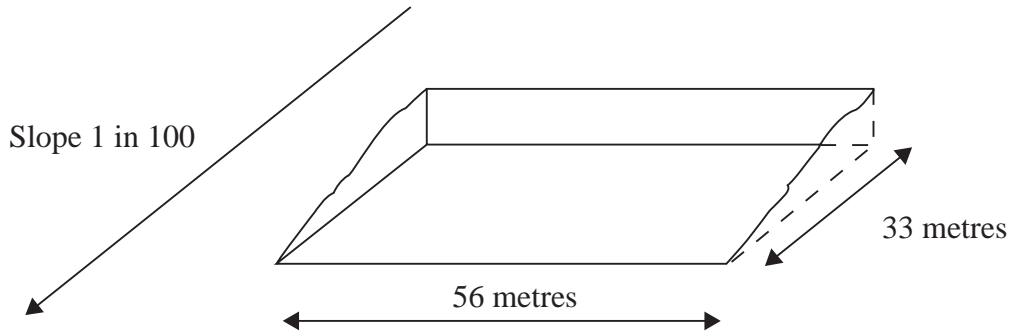


Fig. 6

- (a) Calculate the volume of material to be excavated. Show all working. 2

.....
.....
.....
.....
.....

Volume =

- (b) The excavated material will be removed in waste dump bins that have a fill-capacity of 39 m^3 . How many bins need to be ordered? Show all working. 1

.....
.....
.....

Number of waste dump bins =

Question 18 continues on page 15

Question 18 (continued)

- (c) The bins require covering before they are transported. Each bin is 1.6 metres high, 2.4 metres wide and 10.5 metres long. The cover must overlap the sides by 300 mm. What size cover is required for each bin? Show all working. 1

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.....
.....

Cover size =

Question 19 (3 marks)

Figures 7 and 8 show two views of a shed.

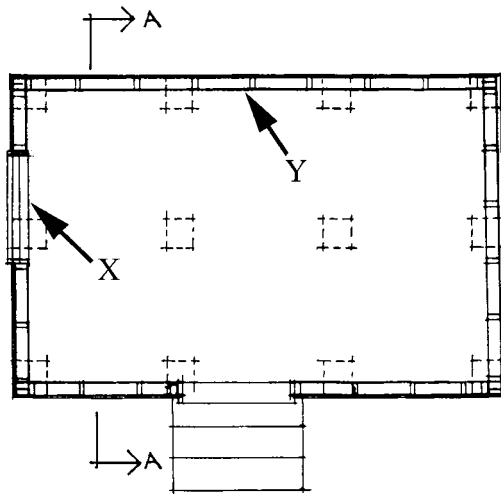


Fig. 7

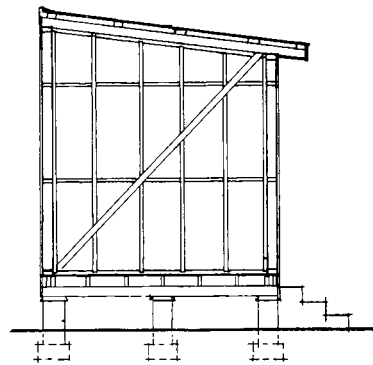


Fig. 8

Scale 1:100

- (a) Correctly dimension the sides of the shed labelled X and Y on Figure 7. Include any building features. 2
- (b) State the views represented by Figure 7 and Figure 8. 1

Figure 7

Figure 8

Question 20 (10 marks)

You are required to use an electric concrete mixer on a cottage construction site. Complete the table by identifying important checks or procedures for each of the major steps shown.

<i>Step</i>	<i>Important checks or procedures</i>	
(a) Pre-use and set-up	(i) (ii) (iii)	3
(b) During use	(i) (ii) (iii) (iv)	4
(c) Post-use	(i) (ii) (iii)	3

Section III

Total marks (30)

Attempt TWO questions from Questions 21 – 23

Allow about 1 hour for this section

In this section you will be assessed on how well you:

- demonstrate relevant knowledge and understanding
 - communicate ideas and information, using precise industry terminology and appropriate workplace examples
 - organise information in a well-reasoned and cohesive response
 - solve proposed issues or problems
-

Answer Question 21 and/or Question 22 in a writing booklet. Extra writing booklets are available.

Question 21 (15 marks) Use a SEPARATE writing booklet.

Discuss a range of strategies that could be used by employers in the construction industry to raise employee awareness of issues relating to occupational health and safety.

Question 22 (15 marks) Use a SEPARATE writing booklet.

The construction industry relies on the ability of construction workers to transfer levels and use lining devices.

Explain why the concept of ‘level’ is important in the construction process, and discuss the advantages and disadvantages of THREE different levelling devices.

Answer Question 23 in the space provided on page 19. Write your Centre Number and Student Number at the top of page 19.

Question 23 (15 marks)

Accurately sketch and correctly dimension a site plan for a rectangular site, applying a scale of 1:500.

The following specifications are given:

- Eastern boundary of the site is 5 metres from the road.
- Northern boundary of the site is 21 metres from the road.
- Site dimensions are 27 metres width and 56.5 metres depth.

Indicate the position of a 6 metre by 3 metre site shed located in the south-eastern corner of the site. Its length is parallel to Main Road, 2 metres from each boundary.

Question 23 continues on page 19

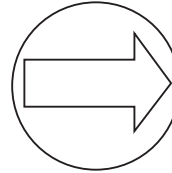
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Centre Number

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Student Number

Question 23 (continued)



Cross Road

Main Road

End of paper

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