BOARD OF STUDIES
NEW SOUTH WALES

2001

HIGHER SCHOOL CERTIFICATE EXAMINATION

Construction

General Instructions

- Reading time – 5 minutes
- Working time – 2 hours
- Write using black or blue pen
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of pages 9, 11, 15 and 25

Total marks – 80

Section I Pages 2–7

15 marks

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

Section II Pages 9–16

35 marks

- Attempt Questions 16–25
- Allow about 45 minutes for this section

Section III Pages 17–26

30 marks

- Attempt TWO questions from Questions 26–28
- Allow about 1 hour for this section

Section I

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

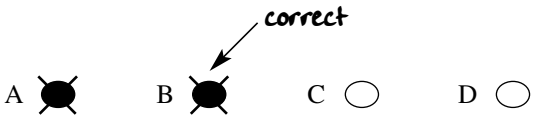
Use the multiple-choice answer sheet.

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

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

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



1 Which of the following is NOT usual practice on a construction site at the completion of a day's activities?

(A) Lock up sheds and site, clear site of debris.

(B) Roll up all power leads, turn off power and water.

(C) Return unwanted material to supplier, clean all power tools.

(D) Clean tools and equipment, put barricades in place where necessary.

2 What does the abbreviation AS that appears on plans, specifications and products stand for?

(A) Australian Systems

(B) Australian Standard

(C) Australian Services

(D) Australian Specifications

3 What would be an appropriate scale for a site plan of a cottage on a suburban block?

(A) 1 : 50

(B) 1 : 500

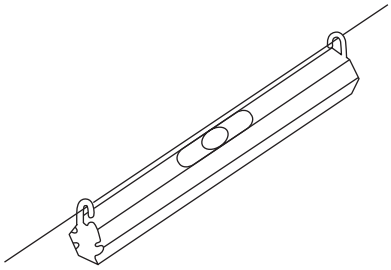
(C) 1 : 1000

(D) 1 : 2000

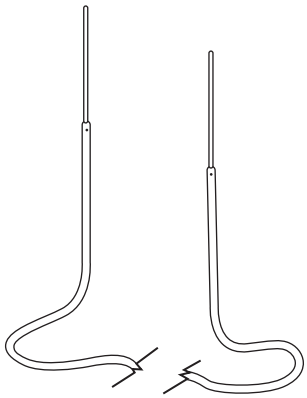
4 Which of the levelling devices is the most accurate for the transfer of level over 15 metres?

(A)

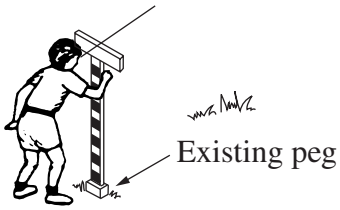
(B)



(C)



(D)



Diagrams not to scale

5 A slump test may be required on a concrete mix. Which of the following does a slump test measure?

(A) Concrete strength

(B) Water–cement ratio

(C) Weight of wet concrete

(D) Workability of the mix

6 What is the most appropriate method of determining whether a power tool is safe for use?

(A) Check the tagging.

(B) Check with the foreman.

(C) Check the power tool logbook.

(D) Check the manufacturer's compliance plate.

7 Which would be the correct order if 5 lengths of $75 \times 50 \times 3100$ general construction pine are needed?

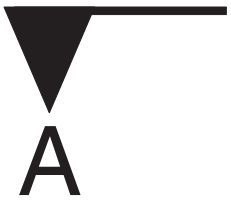
(A) 75×50 F5 PINE 5/3.3

(B) 75×50 F8 PINE 5/3.1

(C) 50×75 F5 PINE 5/3.3

(D) 50×75 F8 PINE 5/3.1

8 What would the following symbol on a drawing indicate?



(A) North

(B) Reduced level

(C) Sectional plane

(D) Water flow direction

9 Which tool is best suited for squaring a trench in undisturbed ground?

(A) Bar

(B) Mattock

(C) Pick

(D) Square-mouth shovel

10 At a building site, excavation is in progress. Jackhammers, rock breakers and dump trucks are in constant use.

Which of the following site signage would be used?

(1)

(2)

(3)

(4)

(5)

(6)

(A) 1, 2, 4, 5

(B) 1, 3, 4, 6

(C) 2, 3, 5, 6

(D) 2, 4, 5, 6

11 Which of the following would NOT usually be found in a switchboard box on a builder's temporary power pole?

(A) Earth leakage device

(B) GPO

(C) Main switch

(D) Surge protector

12 When a work area on a concrete surface is being cleaned, which of the following is the most suitable way of suppressing dust?

(A) Air the area thoroughly.

(B) Apply a light spray of water.

(C) Hose the surface thoroughly.

(D) Use an industrial vacuum cleaner.

13 On large construction sites, who is responsible for providing the tradesperson with personal protective equipment (PPE)?

(A) Employer

(B) Supervisor

(C) Union representative

(D) WorkCover representative

14 What units are used to measure the capacity of portable electric generators?

(A) Amps (A)

(B) Kilonewtons (kN)

(C) Kilovolt-amps (kVA)

(D) Volts (V)

15 How much concrete would need to be ordered for a concrete path 41 metres long with a width of 900 millimetres and thickness of 100 millimetres, allowing an extra 7.5% for wastage?

(A) 3.4 m^3

(B) 3.7 m^3

(C) 3.8 m^3

(D) 4.0 m^3

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Construction

Centre Number

Section II

Student Number

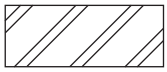
35 marks
Attempt Questions 16–25
Allow about 45 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 16 (2 marks)

Symbols and abbreviations appear on plan and elevation drawings. Complete the table by writing the meaning of each symbol. **2**

Symbol	*Meaning*
	
	

Question 17 (3 marks)

Give ONE major advantage for each of the following methods of communication used on a building site. **3**

Signage .....

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Site Meeting .....

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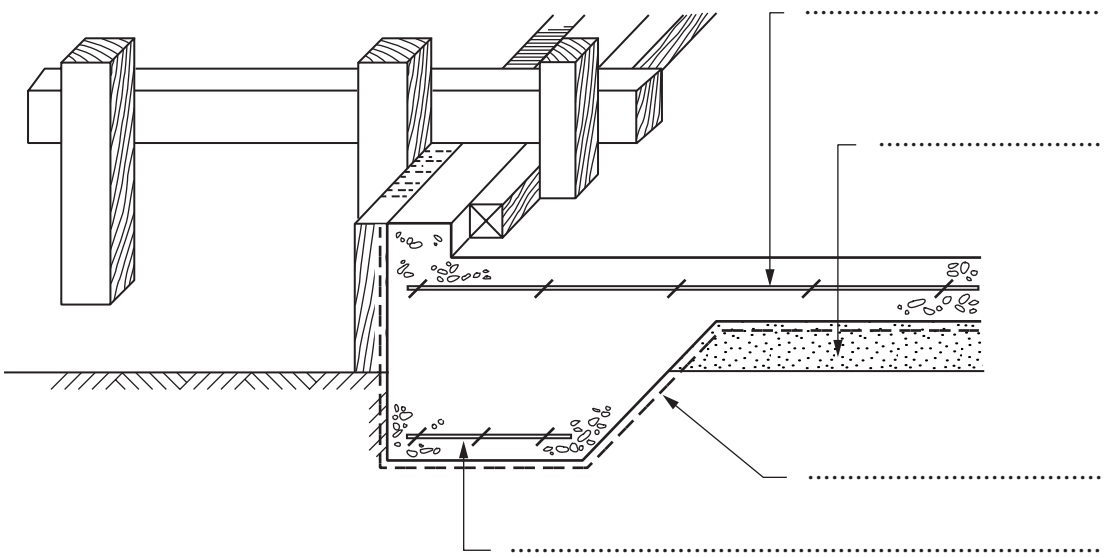
Drawing .....

.....

Marks

Question 18 (2 marks)

Complete the diagram by labelling the parts shown by the arrows. **2**



Question 19 (3 marks)

List THREE factors that can affect the accuracy of a water level. **3**

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Centre Number

Section II (continued)

Student Number

Marks

Question 20 (2 marks)

List TWO types of portable fire extinguisher and the type of fire each is used to extinguish. **2**

Extinguisher	*Type of fire*

Question 21 (2 marks)

Describe how to manually lift a load safely. **2**

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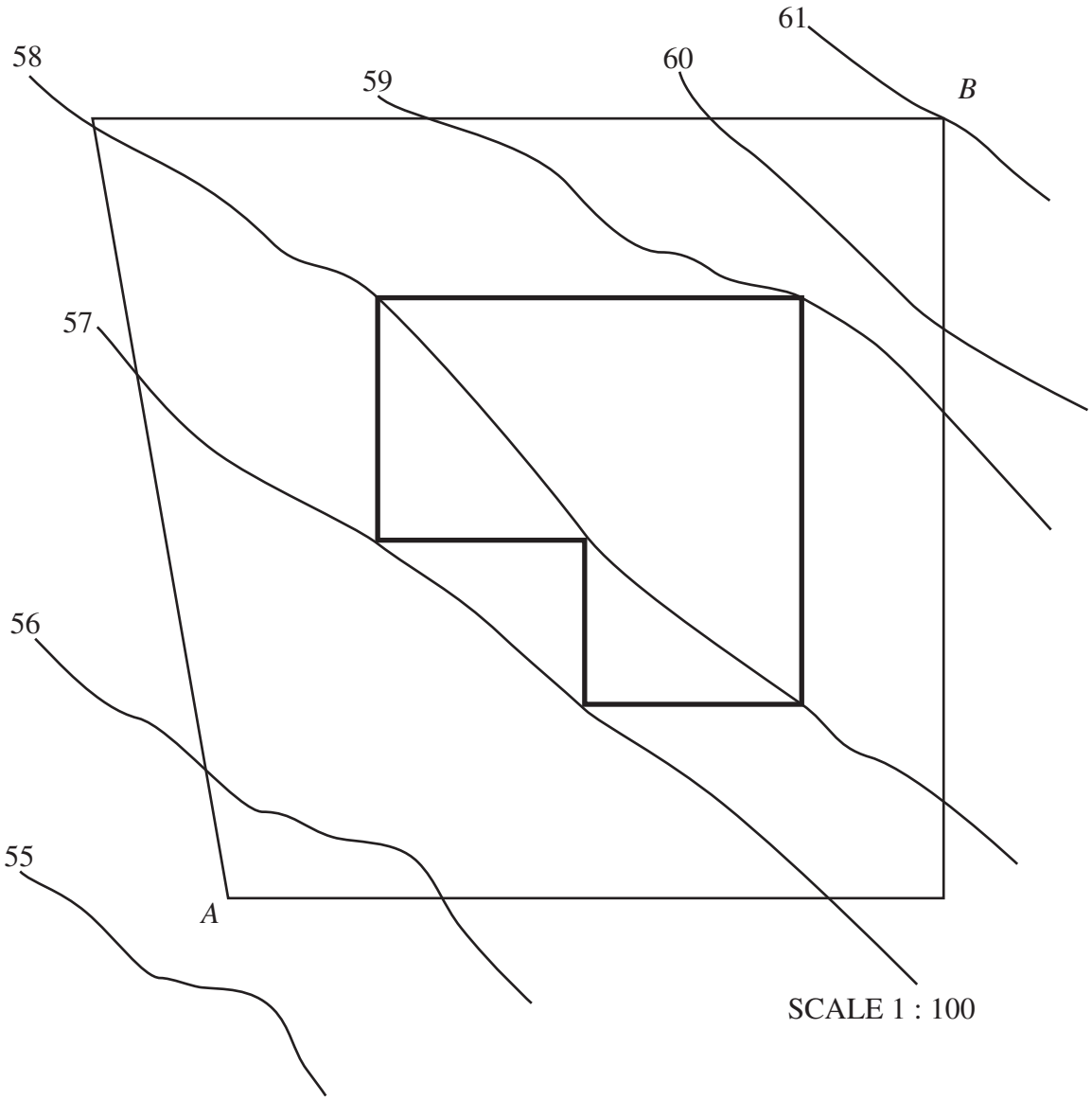
Marks

Question 22 (7 marks)

The diagram indicates contours and an excavation for a concrete slab on a building site.



(a) Estimate the fall between *B* and *A*. **1**

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(b) Calculate the area of the slab shown. **2**

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Question 22 continues on page 13

Marks

Question 22 (continued)

(c) If the excavation is from contour 57, calculate the approximate volume of the excavated material. Show all working. **4**

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End of Question 22

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Centre Number

Section II (continued)

Student Number

Marks

Question 23 (4 marks)

A builder is to remove an amount of less than 200 m^2 of existing asbestos cement (A/C) sheeting.

(a) What items of personal protective equipment (PPE) would be required? **2**

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(b) How should the demolished A/C sheeting be prepared for removal from site? **2**

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Question 24 (4 marks)

The offsite sector of the construction industry has an increasingly important role within the industry. Using TWO examples, explain why this is the case. **4**

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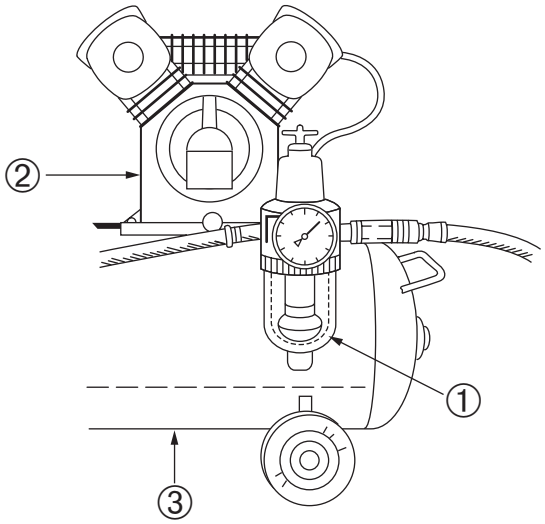
Marks

Question 25 (6 marks)



(a) Name the parts of the air-compressor shown in the diagram. **3**

① .....

② .....

③ .....

(b) How is the capacity of an air-compressor expressed? **1**

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(c) Explain why there has been a recent increase in the use of air-compressors on building sites. **2**

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Construction

Section III

30 marks
Attempt TWO questions from Questions 26–28
Allow about 1 hour for this section

Answer each question in a SEPARATE writing booklet. Extra writing booklets are available.

In your answers 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

Question 26 (15 marks)

An electric brick-masonry saw (with water dust suppression) is to be used on a large construction site. The operator should have received three levels of occupational health and safety (OH&S) training:

- General OH&S induction training;
- Site induction OH&S training; and
- Work activity OH&S training.

Explain OH&S aspects within each level of training that should have prepared the construction worker to safely operate this potentially dangerous machine.

Please turn over

In your answers 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

Question 27 (15 marks)

Scenario:
You are presented with a situation where a co-worker has collapsed while working with hydrochloric acid, resulting in spillage of acid concentrate.

Use the MSDS for hydrochloric acid (on page 19) and the scenario provided, to answer the following question:

Propose and justify an appropriate response, indicating the correct sequence for the procedures.

Your answer should include both immediate and long-term actions.

Question 27 continues on page 19

Question 27 (continued)

HYDROCHLORIC ACID
HAZARDOUS ACCORDING TO WORKSAFE CRITERIA

ChemWatch 1789 **Company contact No. (1800) 093 333**

INGREDIENTS (CHEMICAL ENTITY)	CAS No	%	TWA
hydrochloric acid	7647-01-0	100	1 ppm

UN Number: 1789 Hazchem Code: 2R
D. Goods Class: 8 Subsidiary Risk: None
Poisons Schedule No: S6 (S3NZ)

PROPERTIES

Liquid
Mixes with water
Corrosive
Acid
Toxic or noxious vapours/gas

HEALTH HAZARD INFORMATION

Acute Health Effects:
Harmful if swallowed.
Toxic by inhalation.
Causes severe burns.
Skin contact may produce health damage.
Eye contact may produce serious damage.

Chronic Health Effects:
Exposure may produce irreversible effects.

FIRST AID

Swallowed:
Contact doctor or Poisons Centre.
Give glass of water.
Rinse mouth with plenty of water.

Eye:
Wash with running water (15 mins)
Medical attention.

Skin:
Flood body with water. Remove contaminated clothing. Wash with water & soap. MEDICAL ATTENTION.

Inhaled:
Fresh air. Rest, keep warm. If breathing shallow, give oxygen. Medical attention.

ADVICE TO DOCTOR

Airway problems – 100% O_2. Treat burns as thermal. Retract eyelids – irrigate 30 mins.

PRECAUTIONS FOR USE

Glasses:
Safety glasses.
Chemical goggles.
Full face-shield.

Gloves:
1.BUTYL 2.BUTYL/NEOPRENE 3.PVC

Respirator:
Type B-P Filter of sufficient capacity

Flammability:
Does not burn.

SAFE HANDLING INFORMATION

Storage & Transport:
Keep locked up.
Keep container tightly closed.
Keep container in a well-ventilated place.
Keep away from food, drink and animal feeding stuffs.
Store in cool, dry, protected area.
Restrictions on Storage apply. Refer to Full Report.

Spills & Disposal:
Spilled liquid has low temperature and evaporates quickly.
Control vapour with water spray/fog.
Absorb with dry agent.
Dilute with water.
Neutralise with soda ash/lime.
Stop leak if safe to do so.
Take off all contaminated clothing immediately.
This material and its container must be disposed of in a safe way.
To clean the floor and all objects contaminated by this material, use water.

Fire/Explosion Hazard:
Vapours/gas heavier than air.
Toxic smoke/fumes in a fire.
Attacks metals to liberate hydrogen.

Fire fighting:
Keep surrounding area cool.
Water spray/fog.

End of Question 27

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In your answers 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

Question 28 (15 marks)

Accurate costing of materials and projects is an important process within the construction industry. Construction workers need to obtain information from many sources to perform this task.

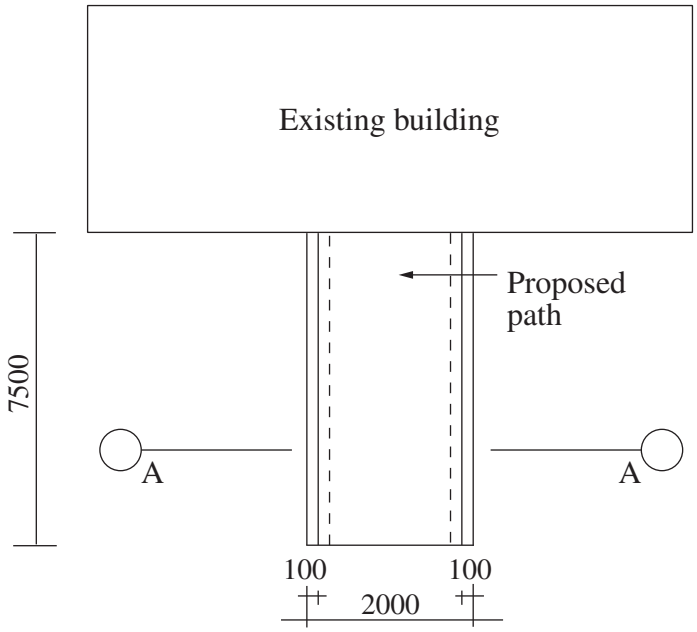
Detach pages 25 and 26. Complete the table on page 26 using the drawing specifications on page 22 and the data sheet on page 23. The top row of the table has been completed as an example.

After completing the table, answer the following in your writing booklet for Question 28:

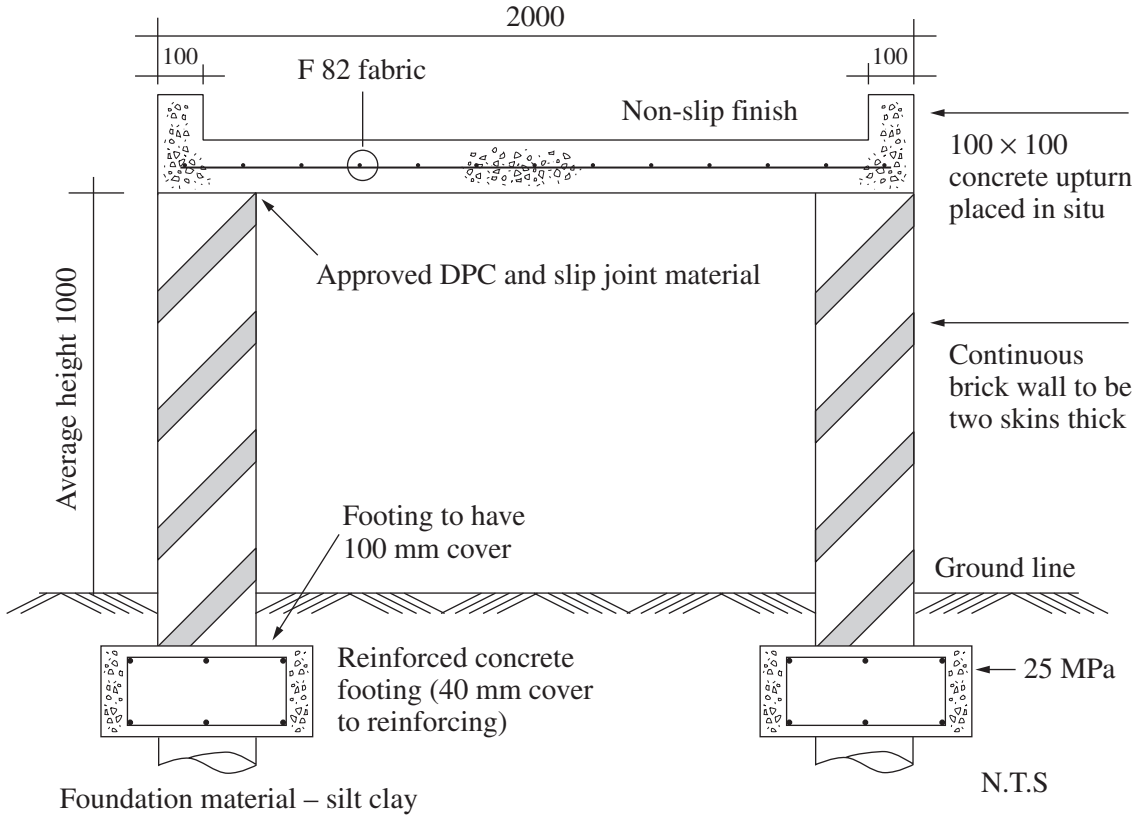
For each material on which you have provided information, explain why the material's physical characteristics make it suitable for its intended application in the suspended concrete path.

Question 28 continues on page 22

Question 28 (continued)



TOP VIEW



SECTIONAL VIEW A–A

Question 28 continues on page 23

Question 28 (continued)

SQUARE RIBMESH: Sheets 6.0 × 2.4 m Nominal							
	PRICE ($)				Long wire (mm)	Cross wire (mm)	Approx. mass (kg)
	Metro		Regional				
REF NO.	Per unit	Per m^2	Per unit	Per m^2			
RF 81	201.95	14.02	207.90	14.44	7.60 @ 100	7.60 @ 100	105
RF 102	158.50	11.01	163.30	11.34	9.50 @ 200	9.50 @ 200	80
RF 92	123.90	8.60	127.65	8.86	8.55 @ 200	8.55 @ 200	65
RF 82	96.95	6.73	99.90	6.94	7.60 @ 200	7.60 @ 200	52
RF 72	76.35	5.30	78.75	5.47	6.75 @ 200	6.75 @ 200	40
RF 62	61.20	4.25	63.05	4.38	6.00 @ 200	6.00 @ 200	33
RF 52	42.85	2.98	44.20	3.07	4.75 @ 200	4.75 @ 200	21
RF 42	33.95	2.36	35.80	2.43	4.00 @ 200	4.00 @ 200	15
RF 41	69.35	4.82	71.40	4.96	4.00 @ 100	4.00 @ 100	29

• Full strength fabric laps 400 mm
• Cut and bent Ribmesh will incur an additional surcharge.

SITE CLASSIFICATION		
Foundation	*Class*	*Description*
Most sand and rock sites	A	Stable
Most silt and some clay	S	Stable
Moderately reactive clay	M	Reactive
Highly reactive clay	H	Reactive
Extremely reactive clay	E	Reactive

FOOTING SCHEDULE						
Wall type	*Site class*	*Strip footing*		*Pad footing*		*Reinforcement*
		Depth	*Width*	*Depth*	*Width*	
110 brick wall	A	150	300	175	300	3 – 8 TM
	S	200	300	225	300	3 – 8 TM
	M	230	350	275	400	3 – 11 TM
	H	270	375	270	420	3 – 11 TM
	E	300	400	350	420	3 – 11 TM
230 brick wall	A	200	300	225	325	3 – 8 TM
	S	250	350	275	375	3 – 8 TM
	M	275	375	300	400	3 – 11 TM
	H	400	400	425	425	3 – 11 TM
	E	425	400	450	450	3 – 12 TM
350 brick wall	A	200	375	225	400	3 – 8 TM
	S	250	400	275	425	3 – 8 TM
	M	275	425	300	450	3 – 11 TM
	H	300	450	350	475	3 – 12 TM
	E	300	500	400	550	3 – 12 TM
Note: Concrete cost allowance $136/$m^3$.						

For 110 wall allow 50 bricks per square metre. For 230 wall allow 100 bricks per square metre. For 350 wall allow 150 bricks per square metre.	Brick cost allowance $550/1000

End of paper

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This page is to be detached, completed and attached to the inside front cover of your writing booklet for Question 28.

Please turn over

Question 28

PROJECT: Suspended Concrete Path			CLIENT: Mr P J Smith			
LOCATION: Pitt St, Sydney NSW						
Material	*Description*	*Functional characteristic in the structure*	*Working*	*Required (indicate units)*	*Cost per unit*	*Cost*
Concrete in piers	∅ 0.3 m × 9 m 25 MPa	Key footing to common foundation material	$\pi \times 0.152 \times 9$	0.636 m^3	\$136/m^3	\$86.52
Concrete in footings						
Brickwork						
Reinforcing in suspended concrete slab						