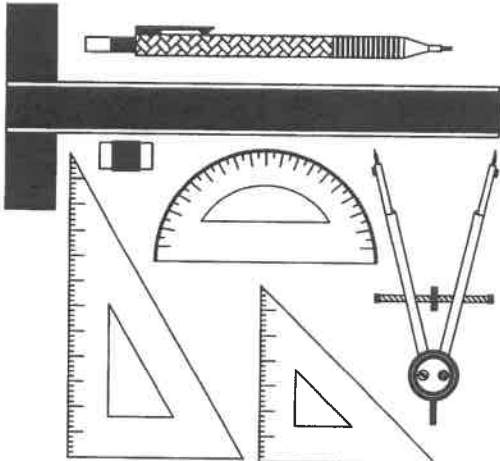




NATIONAL SENIOR CERTIFICATE EXAMINATION
2019

ENGINEERING GRAPHICS AND DESIGN
PAPER 1

MARKS: 200
TIME: 3 HOURS



FOR OFFICIAL USE ONLY					
QUESTION	SECTION	MARK	MODERATED	MAXIMUM	CODE
1	CIVIL ANALYTICAL			20	
2	INTERPENETRATION & DEVELOPMENT			40	
3	TWO-POINT PERSPECTIVE			40	
4	CIVIL DRAWING			100	
	TOTAL			200	

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of **6 pages** including the cover page and **4 questions**.
2. **All** questions must be answered.
3. Unless specified otherwise, all questions are in **First-angle Orthographic Projection**.
4. Unless specified otherwise, all questions are to be completed to a **scale of 1:1**.
5. **All** answer sheets must be re-stapled in numerical order, even questions that have not been answered.
6. **All construction work** must be shown.
7. Print your **examination number** neatly on each page.
8. Use only the **answer sheets** provided.
9. Your drawings should reflect **neatness** and **accuracy**.
10. All dimensions or detail not given may be **assumed** in **good proportion**.
11. Your drawings should comply with SANS 10143.

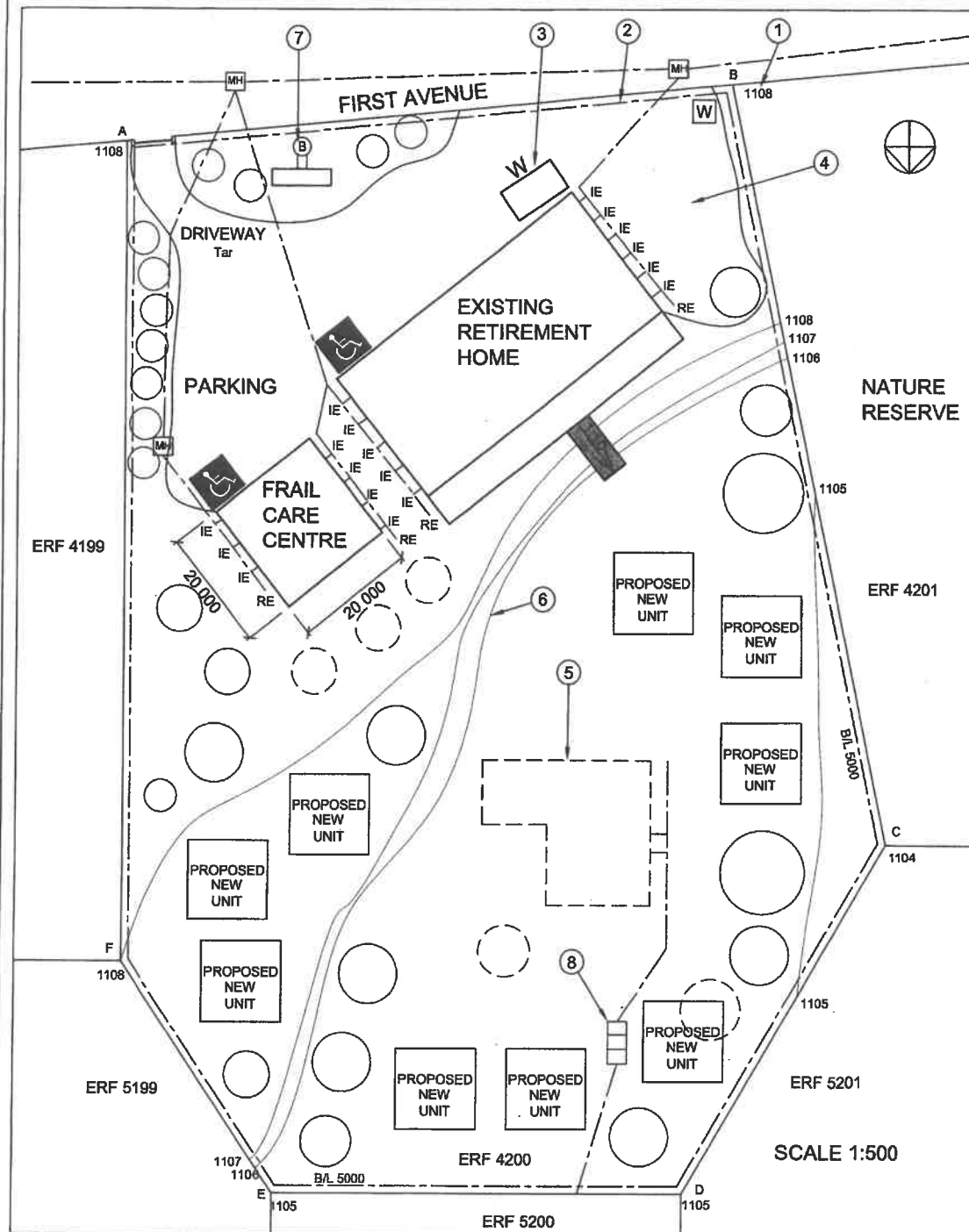
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QUESTION 1

CIVIL
ANALYTICAL



STUDY THE ADJACENT DRAWING AND ANSWER THE QUESTIONS THAT FOLLOW:

1.1 What type of civil drawing is shown?	1
1.2 Which ERF is to the NORTHEAST of the retirement complex?	1
1.3 How many manholes are there in this drawing?	1
1.4 Which corner has the lowest elevation? (either A,B,C,D,E or F)	1
1.5 How many trees need to be removed?	1
1.6 What is the feature at 1 called?	1
1.7 What is the feature at 2 called?	1
1.8 What is the feature at 3 called?	1
1.9 What is the feature at 4 called?	1
1.10 What is indicated at feature 5?	1
1.11 Has the ramp been drawn correctly?	1
1.12 What is the feature at 6 called?	1
1.13 What is the feature at 7 called?	1
1.14 What is the feature at 8 called?	1
1.15 In what colour would a proposed new unit be drawn on this plan?	1
1.16 Is this drawing drawn to the scale indicated?	1
1.17 What does the abbreviation IE stand for?	1
1.18 What is the closest that a new unit can be placed to ERF 5200?	1

1.19 In the space below, determine the area of the Frail Care Centre in m²:

Answer: _____

20 MARKS

EXAMINATION NUMBER

ANSWER SHEET 1

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QUESTION 2

INTERPENETRATION & DEVELOPMENT

The drawings below show the COMPLETE Top and Right View as well as the INCOMPLETE Front View of a **CYLINDRICAL PIPE** which has been joined together with a **SQUARE DUCT** and drawn in First-angle Orthographic Projection. An Auxiliary View of the square duct is also shown in the Top and Front Views.

Draw the following:

- 2.1 the complete Front View clearly showing the curve of interpenetration. Show all hidden detail.
- 2.2 the development of only half of the cylindrical pipe which joins with the duct, clearly showing the curve of interpenetration.

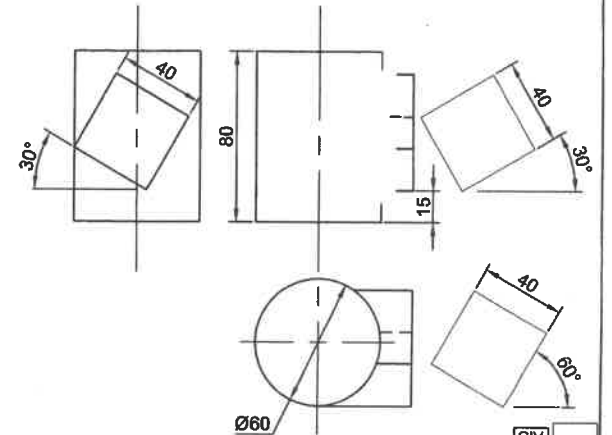
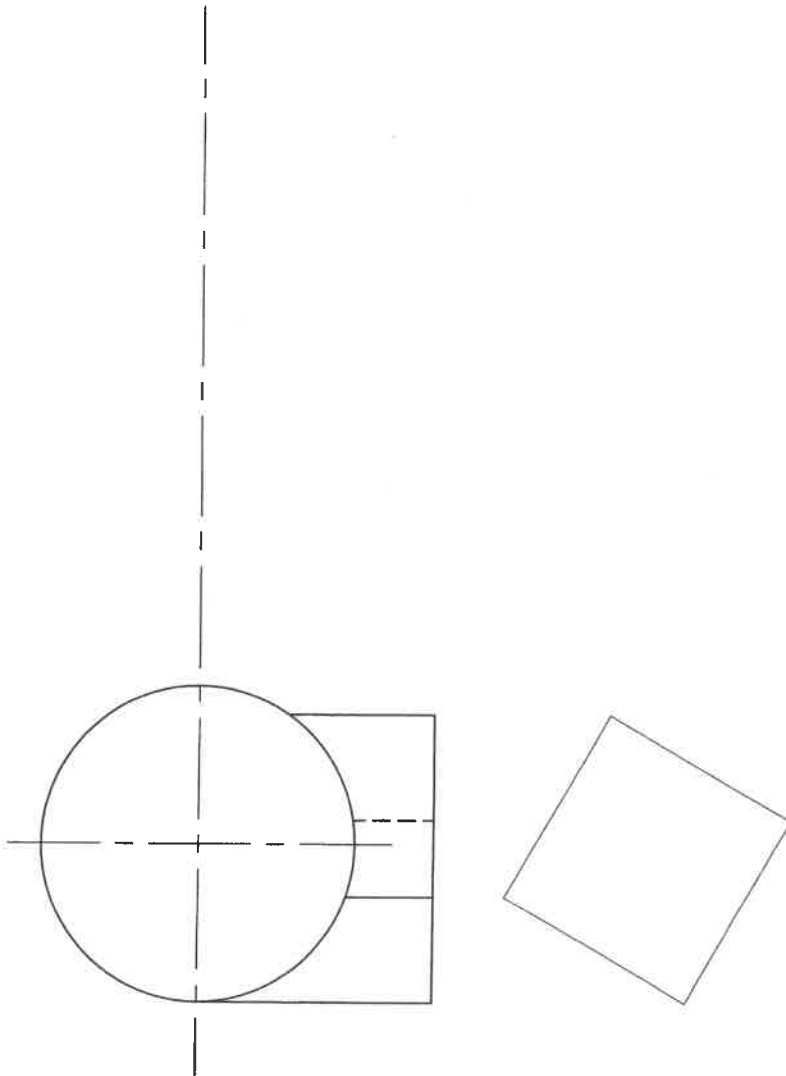
Show all construction and calculations.
Do not draw the right view.

The complete Top View and an Auxiliary View have already been drawn in position.

ASSESSMENT CRITERIA

You will be assessed on your ability to do the following:

- draw and complete the Front View 24
- show necessary construction 2
- develop and draw the cylindrical pipe 14



GIV	4
FV	20
CON	2
DEV	14

40 MARKS

EXAMINATION NUMBER

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ANSWER SHEET 2

QUESTION 3

TWO-POINT PERSPECTIVE

The figures show the three views of the inside of a tuck shop with built-in cupboards and a semi-circular serving hatch. Some walls have been removed to see inside the room.

Draw a neat two-point perspective view of the tuck shop.

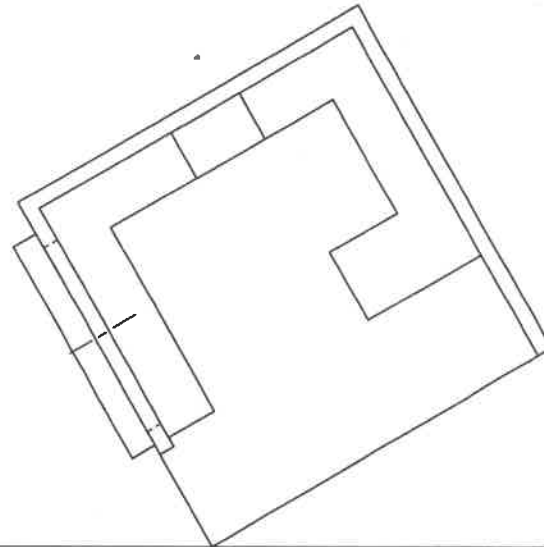
- PP - Picture Plane
- HL - Horizon Line
- GL - Ground Line
- SP - Station Point

Neatly label the vanishing points RVP and LVP. NO HIDDEN DETAIL IS REQUIRED.

ASSESSMENT CRITERIA

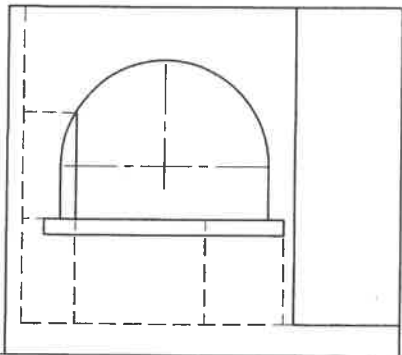
You will be assessed on your ability to do the following:

- determine and label the vanishing points 1
- draw the two-point perspective view 39



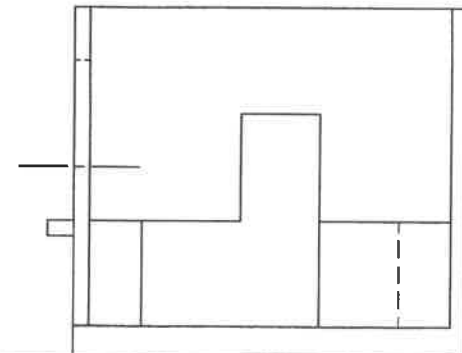
PP HL

HL PP



GL

+ SP



GL

PTS

30

Con

2

Arc

7

VPS

1

40 MARKS

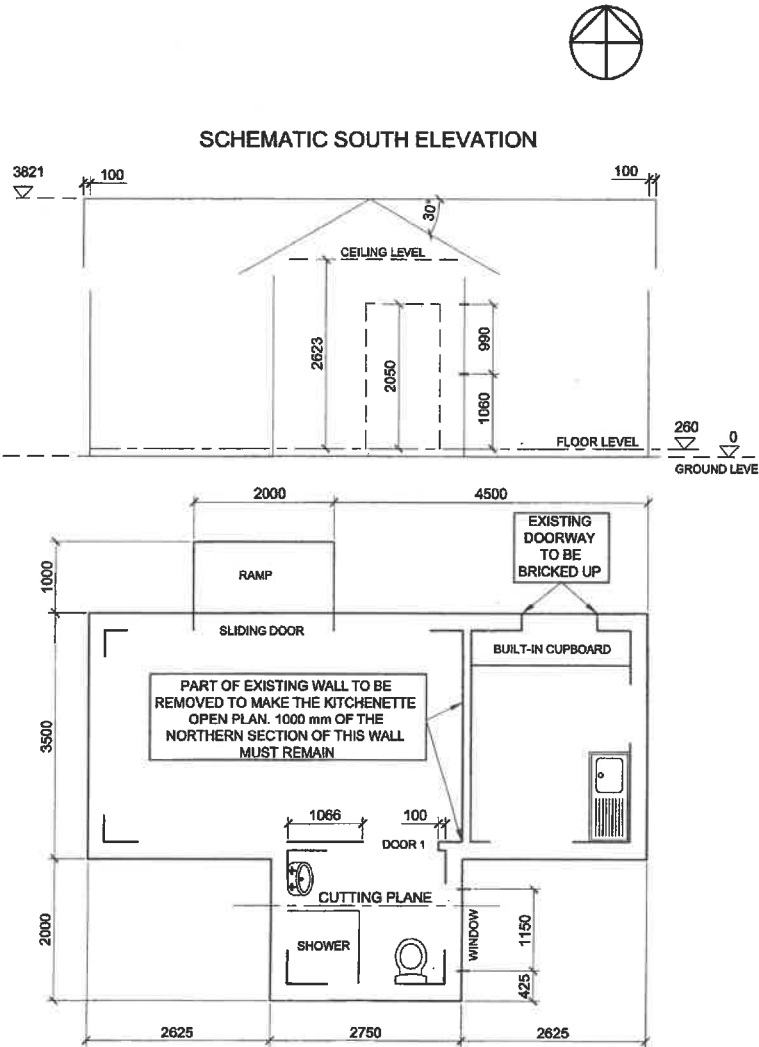
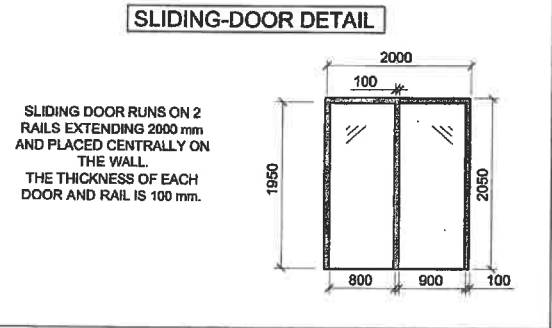
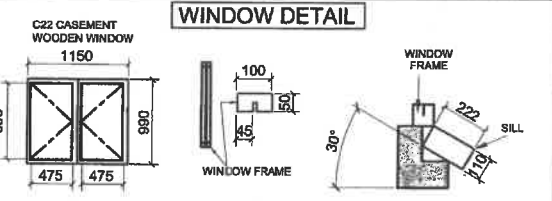
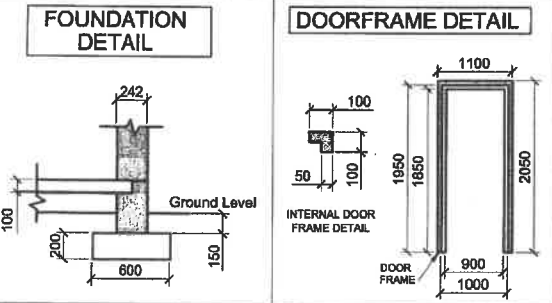
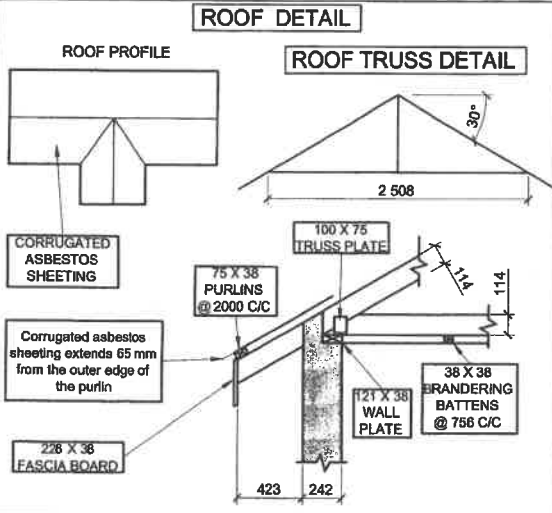
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ANSWER SHEET 3

QUESTION 4

CIVIL DRAWING



NOTES:

DOOR 1 opens internally into the bathroom.

The ramp has an inclination of 1 to 5

Floor tiles should be used for the entire floor area.

Brickwork must be carried out as indicated on the schematic drawing.

The built-in cupboard has a depth of 500 mm.

The basin top is 900 mm from the floor level.

The shower is 1000 mm x 1000 mm in size

The water closet must be placed 200 mm from the eastern bathroom wall.

The basin must be placed 200 mm from the northern bathroom wall.

Answer this question on ANSWER SHEET 4 (page 6).
All drawings must comply with SANS 10143.

The following is given:

- An incomplete schematic floor plan of a tiled **BUILDING** to be converted to have an open-plan living area with
 - ▶ window and door positions
 - ▶ perimeter dimensions
- An incomplete schematic elevation with
 - ▶ door and window positions, ground and floor levels
- Doorframe and sliding-door detail
- Incomplete foundation detail
- Roof detail
- Window, window frame and windowsill detail

Draw the following on Answer Sheet 4 using a scale of 1:50 :

- The **complete FLOOR PLAN**
- The **SECTIONAL SOUTH ELEVATION** on cutting plane A-A.

FLOOR PLAN INSTRUCTIONS

- The following alterations must be made:
 - ▶ Brick up the existing external door on the northern wall
 - ▶ Remove part of the existing internal wall as indicated leaving the northern portion of 1000 mm intact
- Draw and hatch all walls
- Insert all window details
- Insert the door detail of Door 1 and the Sliding Door
- Draw the ramp and indicate the direction and inclination
- Insert all the plumbing fixtures using the correct SANS conventions
- Draw the Built-in cupboard
- Label the floor plan and the scale
- Draw and label the cutting plane

SECTIONAL SOUTH ELEVATION INSTRUCTIONS

- Draw the complete **SOUTH ELEVATION** showing the section as per the indicated cutting plane and the remaining outside elevation
- Complete the foundation details
 - ▶ insert all floor slab details
 - ▶ use 150 mm compacted hardcore filling and 10 mm screed
- Label the ground level and damp-proof course
- Draw and label the finished floor level
- Draw in the sectional window using the C22 frame detail
 - ▶ use ONE 242 x 75 mm concrete lintel above the window
 - ▶ use a 222 x 110 mm quarry tile windowsill
 - ▶ show the window frame detail
- Roof details
 - ▶ draw the roof truss using 114 x 38 rafters and 100 x 75 truss plates
 - ▶ use FOUR 75 x 38 purlins spaced at 2 000 mm centres
 - ▶ use TWO 121 x 38 wall plates
 - ▶ use TWO 38 x 38 ceiling battens spaced at 756 mm centres
 - ▶ use corrugated asbestos sheeting for the roof and a 30° pitch
 - ▶ use 228 x 38 fascia boards
 - ▶ use 9 mm gypsum ceiling boards
- Draw the bathroom doorframe
- Draw the basin
- Show all hatching detail
- Label the sectional **SOUTH ELEVATION**

QUESTION 4

**CIVIL
DRAWING**

Assessment Criteria

Sectional Elevation

1	Ceiling Battens	2	
2	Wall Plates	2	
3	Ceiling Board	1	
4	Truss Plates	4	
5	Roof Truss	5	
6	Purlins	4	
7	Roof	1	
8	Sectioned Walls	4	
9	Sectioned Window	5	
10	Floor & Foundation	6	
11	DPC	2	
12	Hatching	10	
13	Internal Door	3	
14	Basin	1	
15	External Walls	4	
16	Fascia Boards	4	
17	Roof Detail	4	
18	Finished Floor Level	2	
19	Labels	2	

Subtotal 66

Floor Plan

20	Walls	8	
21	Hatching	5	
22	Window	2	
23	Doors	6	
24	Cupboard	1	
25	Plumbing Fixtures	4	
26	Labels	2	
27	Ramp	4	
28	Cutting Plane	2	

Subtotal 34

TOTAL 100

100 MARKS

EXAMINATION NUMBER

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ANSWER SHEET 4