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GRADE 12

ENGINEERING GRAPHICS AND DESIGN P1

SEPTEMBER 2024

PREPARATORY EXAMINATION

MARKS: 200

TIME: 3 hours

This question paper consists of 6 pages.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. All drawings must be drawn to scale 1 : 1, unless otherwise stated.
4. ALL drawings are in first angle orthographic projection, unless stated otherwise.
5. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
6. All answers must be drawn accurately and neatly.
7. The questions must be answered on the question paper, as instructed.
8. All the answer sheets must be re-stapled in numerical sequence and handed in irrespective of whether the question was attempted or not.
9. Time management is essential in order to complete all the questions.
10. Print your name in the block provided on every ANSWER SHEET.
11. Any details or dimensions not given, must be assumed in good proportion.

FOR OFFICIAL USE ONLY			
			MODERATED MARK
1			
2			
3			
4			
TOTAL			
	2	0	0
		2	0
			0

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
EXAMINATION CENTRE

SYMBOL LEGEND		
1		BRICK PAVING
2		HOUSING CONTAINER FOR 4 PEOPLE
3		2 100 mm HIGH SECURITY FENCING
4		1 250 KVA DIESEL GENERATOR
5		INDIGENOUS TREE
6		STREETLIGHT
7		ZEBRA-CROSSING

LAND SURVEYOR'S CERTIFICATE OF THE BORDER LINE LENGTHS AND CORNER HEIGHTS OF STAND 6358 SURVEYED ON 2024-02-27	
LENGTHS IN MILLIMETRES	CORNER HEIGHTS IN METRES
AB = 87 000	A = 83
BC = 41 250	B = 81,5
CD = 8 250	C = 81
DE = 63 750	D = 81
EF = 93 000	E = 82
FA = 93 750	F = 80

NOTE:
Contractors must verify all dimensions and levels on the site before commencing work. Architects to be notified immediately of any discrepancies.

ARCHITECT'S SIGNATURE
CLIENT'S SIGNATURE

ANSWER 17

In the space below, draw in neat freehand, the front view and top view of the SANS 10143 graphical symbol for a SLAB URINAL.



REVISION	DATE	DESCRIPTION
3		
2	2024-04-16	Show the position of the shaded parking
1	2024-03-28	Indicate the KVA of the generator

KOTZE AND FOX ARCHITECTS
133 PIET RETIEF ROAD
DURBANVILLE, CAPE TOWN
083 789 555
kotze.fox@gmail.com

PRINTED BY: **FLOW SIGNS** DATE OF PRINT: **2024-03-20**

DRAWING TITLE: **SITE PLAN**

PROJECT: **NEW DINING HALL PROPOSAL ON STAND 6358 FOR MR P. KOK Cnr. PORTER ROAD, GOUDA**

PROJECT NUMBER: 01-2024	DRAWING NUMBER: KJ-20/03-24
DATE: 2024-03-03	DRAWN: JACQUES
CHECKED: WILLEM	SCALE: 1 : 750
REFERENCE CODE: SITE- 6358-24	DRAWING NO.: 1 of 5

QUESTION 1: ANALYTICAL (CIVIL)

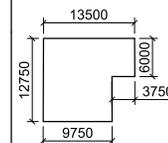
Given:

The site plan of an existing fruit packhouse with alterations of a new dining hall on stand 6358, a title block and a table of questions. The drawing has not been prepared to the indicated scale.

Instructions:

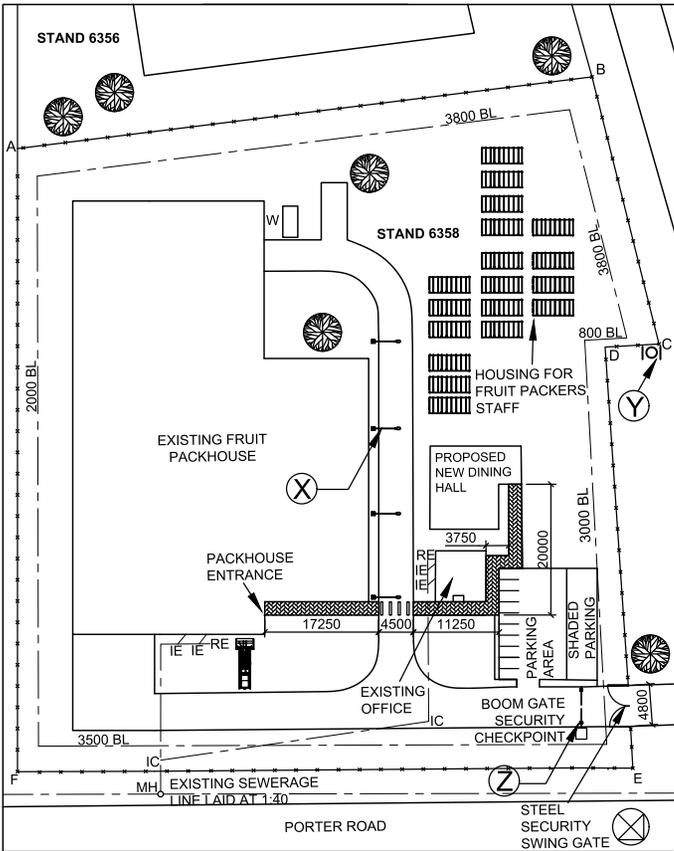
Complete the table below by neatly answering the questions which refer to the accompanying drawing and title block. [28]

QUESTIONS		ANSWERS	
1	In which town is the fruit packhouse situated?	1	
2	On what date was the borderline lengths and corner heights of stand 6358 surveyed?	1	
3	What is the reference code of this drawing?	1	
4	What is the indicated KVA of the diesel generator?	1	
5	How many open parkings are indicated on stand 6358?	1	
6	In what colour should a new steel security gate be presented on the siteplan?	1	
7	Name the feature at X.	1	
8	Name the feature at Y.	1	
9	What is the purpose of the boom gate, indicated at Z, on the site plan?	1	
10	What does the abbreviation IC stands for?	1	
11	What is the height of the security fencing on stand 6358, in meter?	1	
12	How many packing staff can be accommodated in the housing containers?	2	
13	In relation to the north point, which elevation of the existing office faces Porter road?	2	
14	Determine the total length that is paved, from the dining hall to the entrance of the packhouse, in meters.	3	
15	Determine, in the space provided below (ANSWER 15) the total length of the security fence around stand 6358 in meters. Show ALL calculations and formulas.	3	
16	Determine, in the space provided below (ANSWER 16), the total area of the new dining hall on stand 6358 , in square meters. Show ALL calculations and formulas.	3	
17	In the space at the title panel (ANSWER 17), draw in neat freehand, the top view and front view of the SANS 10143 graphical symbol for a slab urinal .	4	
ANSWER 15 Show ALL calculations.		ANSWER 16 Show ALL calculations.	TOTAL 28



NAME	
NAME	
2	

Please turn over



QUESTION 2: SOLID GEOMETRY

Given:

- The complete front view and top view of a hexagonal prism with a half circular hole and a triangular pyramid. One of the pyramid sides, rests against the prism.
- A cutting line A-A.
- Starting Point O.

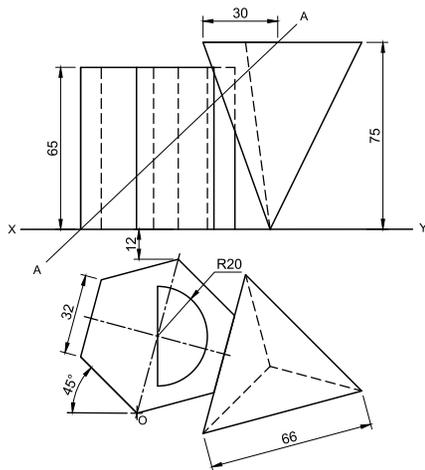
Instructions:

Draw to scale 1 : 1, the following views of the solids:

- 2.1 The given front view.
- 2.2 The sectional top view.
- 2.3 The sectional left view.

- ALL hidden detail is required.
- Show ALL necessary constructions.

[38]



+

ASSESSMENT CRITERIA			
1	FRONT VIEW	7½	
2	SECTIONAL TOP VIEW	11	
3	SECTIONAL LEFT VIEW	14½	
4	HATCHING	5	
PENALTIES (-)			
TOTAL		38	

NAME	
NAME	3

QUESTION 3: PERSPECTIVE

Given:

- Three views of a house with a porch and the information needed to draw a two-point perspective drawing.

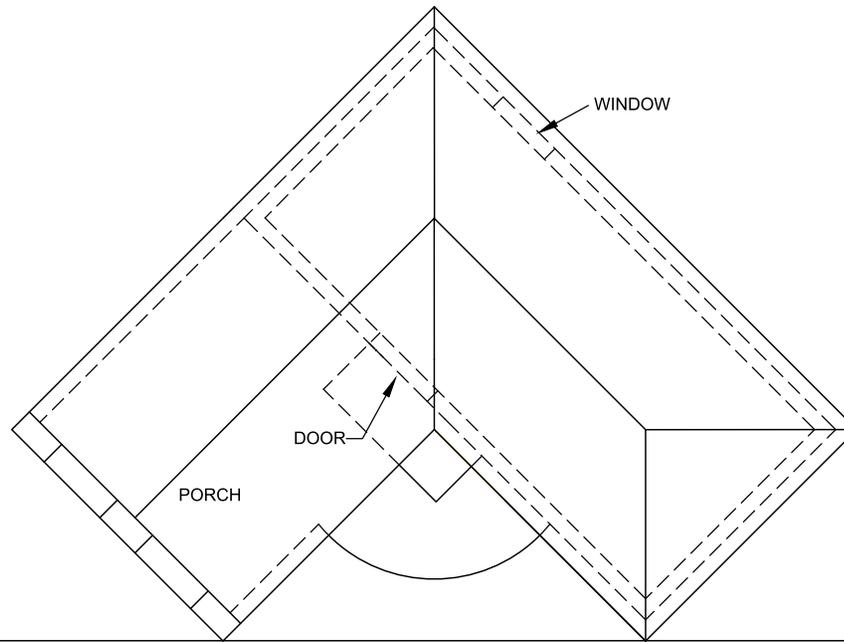
PP – Picture plane
 HL – Horizon line
 GL – Ground line
 SP – Station point

Instructions:

Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL necessary construction.
- NO hidden detail is required.

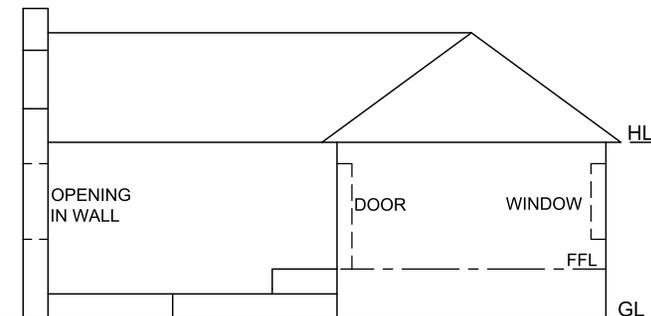
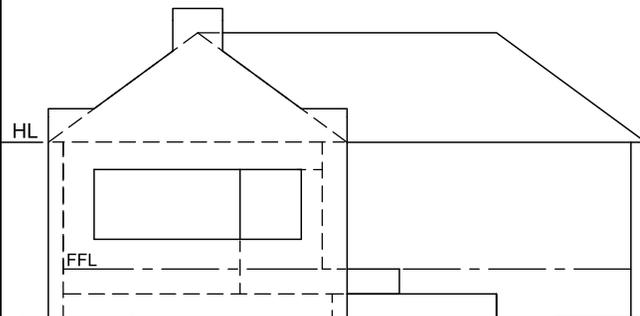
[38]



ASSESSMENT CRITERIA				
1	CONSTRUCTION + VP's	6		
2	WALLS + PORCH + STEP	18½		
3	ROOF	4		
4	WINDOWS + DOOR	5½		
5	ARCH + CONSTRUCTION	4		
PENALTIES (-)				
TOTAL		38		

PP

PP



SP +

NAME	
NAME	
4	

DOOR AND WINDOW SCHEDULE

DOOR (D1)
TO FIT
2100

WINDOW (NE1)
600

WINDOW (NC2)
1200

WINDOW (NC2F)
1200

WINDOW NOTES
A = OPENING SIDE
B = FIXED PANEL
THICKNESS OF ALL FRAMES: 50 mm

WINDOW SILL:
180 x 20 mm
FIBRE CEMENT
WINDOW SILL UNDER ALL WINDOWS

ROOF COMPONENTS

RIDGE COVER	300
200 x 20 mm ROOF BARGE BOARD	
200 x 20 mm FASCIA BOARD	
150 x 100 GUTTER	

INCOMPLETE EAST ELEVATION

FEATURES
D1 DOORS
NE1 + NC2F + NC2 WINDOWS

FIXTURES
S SINK
B BATH
WC TOILET
WB WASH BASIN

ELECTRICAL FITTINGS

- ONE-WAY SWITCH - SINGLE-POLE
- ONE-WAY SWITCH - DOUBLE-POLE
- SWITCHED SOCKET OUTLET
- FLUORESCENT LIGHT 2 x 40 W
- CEILING LIGHT
- WALL-MOUNTED LIGHT

NOTE:
THE ARROWS ON THE FLOOR PLAN SHOW THE LIGHT CONNECTION TO THE SWITCH.

FLOOR FINISHES

1. OPEN PLAN:	TILES
2. BEDROOM 1:	CARPET
3. BATHROOM:	TILES
4. OFFICE:	WOOD

ELECTRICAL SYMBOLS

STEPS AND RAMP SCHEDULE

SANITARY FIXTURES

WASH BASIN (WB)
500, 650, 200

TOILET (WC)
400, 750, 400

BATH (B)
1700, 700

SINK (S)
1200, 350, 500

FLOOR PLAN SCALE 1 : 50

ROOF NOTES:
20° ROOF PITCH
114 x 38 mm ROOF TRUSSES ON 114 x 38 mm WALL PLATES
300 mm ROOF OVERHANG TO THE END OF THE ROOF TRUSS
ROOF COVER: 20 mm FIBRE CEMENT ROOF SHEETING ON 75 x 50 mm PURLINS @ 900 mm c/c
200 x 20 mm FASCIA BOARD WITH 150 X 100 mm GUTTERS ON ALL SIDES AND A Ø100 mm RAINWATER DOWN-PIPE
200 x 20 mm ROOF BARGE BOARD
10 mm CEILING BOARD ON 38 x 38 mm BRANDING @ 400 mm c/c

ROOF TRUSS DETAIL:
1 X 250 x 100 mm LINTEL ABOVE ALL DOOR AND WINDOW OPENINGS

DIMENSION GUIDE: INCOMPLETE FOUNDATION AND EXTERNAL WALL DETAIL

SCHEMATIC DIAGRAM OF ROOF TRUSS FOR ROOF

QUESTION 4: CIVIL DRAWING

Given:

- The incomplete east elevation of a **new house**, showing the walls, windows and door openings, the steps and ramp, the roof and labels.
- The incomplete floor plan showing the walls, steps, ramp, position of the doors, windows, fixtures and the electrical layout.
- A schematic diagram of a single roof truss and roof notes.
- The incomplete foundation and external wall with dimensions.
- A door and window schedule
- A steps and ramp schedule
- A table of electrical symbols
- A table of roof components
- Floor finishes
- A table of sanitary fixtures
- The incomplete floor plan, of a **new house**, drawn to scale 1 : 50, and the incomplete foundation and break lines for the detailed section, drawn to scale 1 : 20, on page 6.

Instructions:

Answer this question on page 6.

4.1 Use the given incomplete floor plan, to draw, in first-angle orthographic projection to **scale 1 : 50**, the following views of the **new house**:

4.1.1 THE COMPLETE FLOOR PLAN

Add the following features to the drawing:

- ALL doors and windows
- ALL sanitary fixtures as indicated by the abbreviations
- ALL electrical fittings as indicated by the numbers
- ALL hatching detail

4.1.2 THE COMPLETE EAST ELEVATION

Show the following features on the drawing:

- The outside walls, door, steps, ramp and the detailed windows.
- The roof detail, including the fascia boards, ridge covers, roof barge board, gutters.
- The finished floor level.

4.2 Using the given foundation and break line on page 6, draw, to scale 1 : 20 a **DETAILED SECTION** on cutting plane **A-A** of the area in the ellipse shown on the incomplete floor plan.

Show the following features on the drawing:

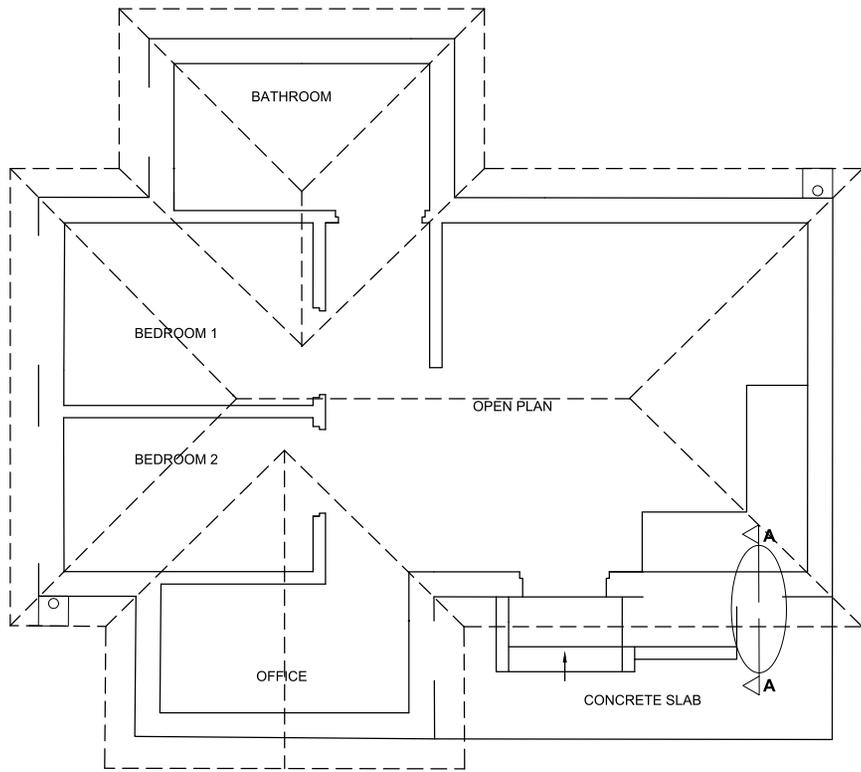
- The complete foundation-, concrete slab-, external wall-, and window detail.
- The steps, with the ramp, to the south of the cutting plane **A-A**
- The roof detail, including the fascia board and gutter.
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:

- The east elevation.
- The floor finishes.
- Ground level, finished floor level and damp proof course (use the correct abbreviations and show it on ALL the relevant views)

NOTE:
ALL drawings must comply with the **guidelines** and **graphical symbols** as contained in the **SANS 10143**. [96]

NGL



FLOOR PLAN
SCALE 1 : 50



DETAILED SECTION A-A
SCALE 1 : 20

ROOF DETAIL: MARK ALLOCATION			
A	ROOF ANGLE	$\frac{1}{2}$	
B	ROOF SHEET (SHOW THICKNESS)	2	
C	ROOF TRUSS OVERHANG	$2\frac{1}{2}$	
D	PURLIN + SPACING	$1\frac{1}{2}$	
E	BRANDING + SPACING	$1\frac{1}{2}$	
F	CEILING BOARD	$\frac{3}{4}$	
G	WALL PLATE	1	
H	FACIA BOARD	$1\frac{1}{2}$	
I	GUTTER	$1\frac{1}{2}$	
TOTAL		$12\frac{1}{2}$	

PENALTIES			
1	INCORRECT SCALE		
2	NON-ALIGNMENT OF VIEWS		
3	INCORRECT LETTERING		
TOTAL PENALTIES (-)			

ASSESSMENT CRITERIA			
FLOOR PLAN			
1	DOORS + WINDOWS	14	
2	ELECTRICAL	9	
3	FIXTURES	7	
4	HATCHING	3	
5	LABELS	2	
SUBTOTAL		35	

EAST ELEVATION			
1	ROOF + FACIA + GUTTER + COVERS + BARGE BOARD	$12\frac{1}{2}$	
2	WALLS + PORCH + STEPS + RAMP + FFL	8	
3	DOOR + WINDOW	$5\frac{1}{2}$	
4	LABELS	1	
SUBTOTAL		27	

DETAILED SECTION			
1	ROOF DETAIL	$12\frac{1}{2}$	
2	FOUNDATIONS + WALLS + FLOOR + SLAB	6	
3	WINDOW + STEPS + RAMP	$8\frac{1}{2}$	
4	HATCHING	$5\frac{1}{2}$	
5	LABELS	$1\frac{1}{2}$	
SUBTOTAL		34	
TOTAL		96	
PENALTIES (-)			
GRAND TOTAL			

NAME	
NAME	
	6