



Including examiner comments



R3113

**UNDERSTANDING THE SETTING OUT & CONSTRUCTION OF LANDSCAPING
ELEMENTS IN THE GARDEN**

Level 3

Thursday 8 February 2024

13:30 – 14:55

Written Examination

Candidate Number:

Candidate Name:

Centre Name:

IMPORTANT – Please read carefully before commencing:

- i) The duration of this paper is **85** minutes;
- ii) **ALL** questions should be attempted;
- iii) **EACH** question carries **10 marks**;
- iv) Write your answers legibly in the spaces provided. It is **NOT** necessary that all lined space is used in answering the questions;
- v) Use **METRIC** measurements only;
- vi) Use black or blue ink only. Pencil can be used for drawing purposes only. Ensure that all diagrams are labelled accurately with the line touching the named object;
- vii) Where plant names are required, they should include genus, species and where appropriate, cultivar;
- viii) Where a question requires a specific number of answers; only the first answers given that meet the question requirement will be accepted, regardless of the number of answers offered;
- ix) Please note, when the word '**distinct**' is used within a question, it means that the items have different characteristics or features.

ANSWER ALL QUESTIONS

MARKS

Q1 a) Describe what information is shown on **EACH** of the following scale drawings:

- i) sections
- ii) contour plans
- iii) elevations

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b) State **ONE** limitation when using **EACH** of the scale drawings named in a).

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Q2 a) State **THREE** safety measures to be put in place on a new construction site to minimise risk of injury.

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b) State **FOUR** considerations which should be taken into account at the construction planning stage to minimise potential environmental damage.

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MARKS

Q3 a) For a 4m x 4m concrete slab patio against the back of a house:

- i) state a suitable fall to disperse rainwater
- ii) outline the method of calculating the required fall for the patio

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b) Describe how to set out the fall for the patio in a) using wooden pegs.

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Q4

Describe the installation of a permeable domestic driveway under **EACH** of the following headings:

- i) appropriate foundations
- ii) specification and installation of **ONE NAMED** edging material
- iii) specification and installation of **ONE NAMED** surface material

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MARKS

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MARKS

Q5 a) Describe what is meant by reconstituted stone.

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b) State **FOUR** advantages of using reconstituted stone blocks rather than natural stone when constructing a garden wall.

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MARKS

c) Describe **TWO** methods of providing drainage from behind a 1 metre high retaining wall.

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MARKS

- Q8** a) Describe the procedure for constructing a timber sleeper suitable raised bed including the tools and equipment used.

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MARKS

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Q1	a	Question Describe what information is shown on EACH of the following scale drawings: i) Sections ii) Contour plans iii) Elevations	4 2 1
	b	State ONE limitation when using EACH of the scale drawings named in a)	3

a) In general, this question was poorly answered by candidates. Questions in previous exam papers and examiners' comments had asked for a description of the use of the drawing, not the information each should contain. Unfortunately, the majority of candidates described the use and not what information is shown, while many did not show the distinction between sections and elevations.

Examples of good answers included

i) Sections

"Section plans show details along a line cut through the plan. They are usually vertical but can also be horizontal or oblique. The foundations are usually shown if required so this means the section plan will extend underground. The section plan is a scale drawing most likely in the scale of 1:50, 1:20, 1:10 depending on the size of the feature and the level of detail required. The method of construction of the feature will be shown including the depth of foundation, size of holes to be dug for posts etc. The materials used to construct the feature along with their dimensions and the method of construction will be detailed. The height of the finished feature will be shown. As this is a scale drawing it will also include a title box, scale bar, north point. "

ii) Contour plans

Answers gaining marks included the inclusion of points of known height located on the plan joined by contour lines. Heights above Ordnance Benchmark or datum are recorded along with scale.

iii) Elevations

A single face of a structure or view of the garden in the vertical plane. Should include: The scale used, pictorial representation of the face of a structure along with clear labelling, symbols and a key.

b) Limitations accepted for the award of marks could have included:

Sections - not all dimensions necessary are shown, limited to line of section only, or drawing has been produced to an odd scale during copying process

Contour lines - contours too far apart to show accurate values between them can be difficult to calculate/estimate/interpret leading to inaccuracies

Elevations – only pictorial – limited information only in one plane

Most candidates stated the limitation of sections and elevations as only showing a small section of the overall construction or garden or that they only show one plane.

Q2		Question	MARKS
	a	State THREE safety measures to be put in place on a new construction site to minimise risk of injury	3
	b	State FOUR considerations which should be taken into account at the construction planning stage to minimise potential environmental damage.	4
	c	State THREE distinct excavation tasks that could be included in the groundwork stages of a construction project	3

a) Safety measures could include; lockable fencing along with signage indicating potential hazards (eg deep excavations, vehicle movement etc), lockable storage for hazardous materials and equipment, risk assessments and regulation in place and enforced (e.g. the requirement to wear PPE, identification and designation of areas for waste, movements etc).

Answers awarded marks included;

1. The site must be made secure to prevent people coming onto site and getting injured. Rigid mesh security fence panels that can be locked at night and signage indicating dangers and restricted access should be erected.

2. Designated routes for vehicular and pedestrian traffic should be established so that workers and visitors can walk safely. Designated pedestrian walkways outside the site may be also advisable.

3. Safe storage for fuel and chemicals should be established along with appropriate signage warning of possible hazards and risks. Fuel will require fireproof storage. The area should be well ventilated and well-lit.

b) Environmental considerations could be those related to the planned for construction practices on site, or the materials used.

An example of an answer gaining full marks

- Wood being used on site should be FSC certified to ensure felling is regulated and trees are re-planted.
- Waste: waste generated should be kept to a minimum. Where possible any materials on site with the potential to be recycled should be identified e.g. reusing an old patio in a utility area. Reusing demolition waste as hardcore to avoid landfill.
- Carbon footprint: Stone used should preferably be local rather than imported from long distances away. Transporting items to be used on site long distances will have a large carbon footprint.

Other correct answers included;

- Soil storage and movement to avoid contamination
- The protection of existing vegetation/trees (e.g. fencing)
- Protection of wildlife, (e.g. newts, badgers, bats, nesting birds)
- The avoidance of or responsible control of chemical applications to avoid cross contamination around site or to other sites

c) Correct answers specifically stated three different tasks involved in any work below ground. Correct answers could be:

- digging out for sub-base or foundations and dealing with sub/topsoil
- re-contouring/terracing etc and removal of waste – vegetation/hard landscape,
- installation of drainage or other underground services,

Candidates most often gave answers covering foundations, re-contouring and clearance of sites.

Q3	a	Question	
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		For a 4mX4m concrete slab patio against the back of a house:	1
		i) State a suitable fall to disperse rainwater;	2
		ii) Outline the method of calculating the required fall for the patio.	
	b	Describe how to set out the fall for the patio in a) using wooden pegs	7

a)

- i) Most candidates correctly gave a fall between 1:50 and 1:100
- iii) A poorly answered section by the majority of candidates, showing lack of understanding of ratio or the calculation.
A correct answer could have been;
Divide length (4m) by denominator, $400\text{cm} \div 50$ to 100 .
e.g. $400 \div 100 = 4\text{cm}$ for a patio with a fall of $1/100$.
Or $400 \div 50 = 8\text{cm}$ for a patio with a fall of $1/50$

b)

Very few candidates gained the full 7 marks, many did not include vital stages, such as working from a known level/datum, the need to set out the higher level first

1. Identify and establish the datum point from a plan, 150mm below DPC or a known door threshold
2. using wooden pegs starting at the line of the house, with an initial peg at the datum height
3. extending the pegs alongside the house at the same level using a spirit level,
4. the pegs extending away from the horizontal can be added next, measuring out at a right angle, hammer in a peg at each furthest corner with string line between first and last peg. Along this line insert a peg at 2 metres along the fall line
5. For a fall of $1/100$ place a measured piece of wood 2cm on top of the middle peg, place a straight edge and spirit level between the top and second peg.
6. Adjust peg 2 until both are level with the 2cm block on top of peg 2. Now continue from peg 2 to the lower corner peg,
7. Repeat the process from the other corner of the patio

Q4	a)	Describe the installation of a permeable domestic driveway under EACH of the following headings:	
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		i) appropriate foundations	3
		ii) specification and installation of ONE NAMED edging material	4
		iii) specification and installation of ONE NAMED surface material	3
NOT TO INCLUDE SETTING OUT			

i) Those describing the process and materials gained marks.

Good answers included;

- Compact the subgrade soil, lay a permeable construction grade geotextile membrane
- Spread an even 150mm layer of type 3 DTp or MOT (DTp and MOT are interchangeable, either is correct for a type 3 aggregate)
- Consolidate using a plate vibrator, in two layers.

ii) Specified edgings were most often “Brick” occasionally concrete kerb or timber.

Examples included

- standard clay brick kerb edging with each brick being 215mm x 102.5mm x 65mm can be laid on 100mm concrete foundations on the 150mm sub-base and with haunching up the sides. They can be laid in a stretcher bond style with mortar between each brick.
- Preserved softwood timber boards of 25mm thickness x 150mm depth in lengths of 4.8m. Stabilized by wooden pegs of 50 x 50mm at 1m intervals, with a pointed bottom, screwed together before the infill of the subbase with galvanized timber screws of 4.5mm by 65mm,
- Concrete edging kerb, 150mm x 50mm x 915mm, round top. Install over 100mm compacted Type 1 aggregate DTp1 or MOT1 with a 100mm layer of concrete. Haunch the concrete up to at least half the height of the kerb at the rear. Butt joint kerbs.

iii) Candidates who described the specification and appropriate installation method for a permeable material suitable for use as a driveway gained marks. Examples of credited answers were:

- Concrete block paving suitable for permeable paving. 100mm x 200mm x 60mm with a 6mm spacer nib. Install onto the foundations described above. Pavers should be butted close together when installing but because of the 6mm nib this will leave a gap of 6mm for drainage
- angular washed gravel of varying sizes 6-14mm. Tipped in piles across the site and levelled out to 50mm depth and consolidated. As an alternative, gravel mats/grids can be installed and gravel raked evenly across the site.

Q5		Question	MARKS
	a	Describe what is meant by reconstituted stone.	2
	b	State FOUR advantages of using reconstituted stone blocks	4

		rather than natural stone when constructing a garden wall.	
	c	Describe TWO methods of providing drainage from behind a 1 metre high retaining wall	4

a) Reconstituted stone is a precast concrete block used in masonry intended to mimic natural-cut stone; it can utilise crushed rocks and be coloured to mimic a range of natural stones.

Candidates whose answers included the above gained marks in this section.

b) The majority of candidates gave up to four relevant advantages, often using a comparison with natural stone.

Reconstituted stone has several advantages of natural stone;

- comes in fixed and standardised sizes and so can make construction easier than using natural stones,
- reconstituted stone is generally less expensive than natural stone comparatives,
- they do not require sealing such is the case with many natural stones and can be more resistant to damage from weathering and frost.
- options offered by reconstituted stones in terms of design, colour and style of the material are much more varied than that of natural stone without incurring additional costs.

c) Answers most often described methods to move water along drainage pipe behind the wall or into soakaway at the base of the wall. A few described the use of weep holes.

Correct answers could include;

- **Weep holes or pipes through wall** at appropriate positions (at base of wall, 1800mm spacings)
- **Perforated pipe** running along back of wall at base using aggregate and clay or plastic pipe, water can be diverted to an attenuation cell or mains drainage to prevent it building up behind the wall.
- **Hardcore or porous backfill** behind wall as type of soakaway allowing water to drain away into the ground.

Q6		Question	
		An area of hard-standing is to be constructed in a front garden:	
		i) Describe TWO methods of collecting surface water	4

	ii) into a pipe leading to a soakaway. Describe the construction of a soakaway suitable for disposal of the run-off. NOT TO INCLUDE HARD SURFACE CONSTRUCTION DETAILS	6
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i) Several candidates did not notice the words “**hard-standing**” in the question and instead describe drainage through a permeable surface to collection across the area. Candidates who correctly described **TWO** methods of collection for water running across and from an area of hard standing, to be collected and moved away, gained marks. Suitable answers included the use of gulleys, channels, ditches or traps.

- A pipe or tile drain could be installed along the lowest edge of the hard standing, where water runs to. A trench could be dug, a layer of aggregate laid at the bottom and a permeable clay pipe placed atop it (perforations up). The pipe would be carefully surrounded and covered with more aggregate, then topped with a membrane, gravel and topsoil. The fall of the pipe would lead water to the site of the soakaway.
- Alternatively, a gutter could be built along the lowest edge of the drive. Covered with metal grille to prevent it getting blocked or damaged by traffic, it would lead into a pipe that terminated at the site of the soakaway.

ii) The two methods most often described were: hole filled with aggregate and the use of attenuation crates.

Correct answers included:

Traditional method

Dig a hole approximately 900mm deep x 600mm wide. Fill the bottom 600mm with rubble, broken bricks or aggregate with the inlet pipe 100mm above this layer. Lay a membrane on top of this layer, especially if the soil is clay, to prevent small particles from filling the voids between the aggregate masses. Lay at least 100mm of gravel on top of the membrane, then add topsoil and turf or grass seed, if appropriate. Water will flow from the inlet pipe into the soakaway, where it will be stored until it gently soaks back into the surrounding ground.

Crate method

This is a box shaped crate with lots of space for the water to enter. The crate is usually 1m x 1m in size and crates can be attached to each other depending on how much run off you need to cater for. Dig a hole depending on how many crates you are using, with the top of the crate at least 60cm away from the surface. Place in a permeable membrane that covers all of the bottom of the hole and allowing for overlap. Fill the base with 10cm of gravel, place in the crates and lock together. Fill all the sides with 10cm of gravel, fold over the membrane and top with another 10cm of gravel. The top of the hole can now be back filled with topsoil and re seeded. Ensure the pipe from a french drain enters above the layer of crates.

Q7	Question A rock garden is to be installed in a new garden. i) State SIX factors to be considered when carrying out the site assessment prior to construction	6
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	ii)	ii) State FOUR hazards to be noted in the risk assessment for its construction	4
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i) Candidates stating factors affecting construction, and not factors affecting the design and planting, of a rock garden gained marks. Site factors could include, delivery, storage and movement of heavy materials, topography and re-grading, existing vegetation, site services and obstructions along with general construction site factors: security, welfare, health and safety, waste handling.

Examples of answers awarded marks include;

- The ground and overhead cables will need to be assessed for any electrical cables, water pipes, crossing the route near or en route to where the rock garden is to be placed. Machinery workers will need to be notified of location of cables beforehand.
- Is any machinery able to access the site location of the rock garden or will it need to be done by hand? Is the ground suitable for heavy machinery carrying heavy rocks into the garden, does a temporary alternative surface need to be laid or an additional route determined?
- Storage of rocks and machinery: if work not completed within 1 day will need to be safely stored in a fenced area safely away from public access
- Is there space for the rocks / machinery to be delivered onto site via a front driveway or will it need to be accessed via a neighbour's land? Can the garden be easily accessed from the road? Can materials such as rocks be driven in using machinery or will a small crane be needed to crane the rocks in over a wall or fence?
- Welfare - Are there toilet facilities available for the workers on site, can they access the house or will Portaloos need to be included on site?
- Waste, is there room for a skip for any waste, is this on site or on the road side? If on the roadside a licence, signs and lights will be required

ii) Possible hazards for construction of a rock garden could include: heavy lifting · use of appropriate machinery, working on slope, working on slippery ground.

Examples included;

- Carrying heaving materials by hand could cause injury -will need to consider safe methods of manual handling
- Slips, trips and falls on sloping ground while moving materials around the site
- Dust inhalation from rock particles - PPE ensure masks are worn
- Rocks could fall onto somebody during construction, consider the use of machinery to lift rocks as an alternative to a wheel barrow
- Somebody could get injured by the machinery whilst installing -nobody to go near machinery when operating
- Dust or rock fragments when being moved could get into somebody's eye -goggles to be worn
- If concrete is used to lay stone/hard landscape PPE must be used, gloves, mask, eye protection.

Q8		Question	
	a)	Describe the procedure for constructing a timber sleeper suitable raised bed including the tools and equipment used.	6
	b)		4

		Describe TWO distinct methods of securing the sleepers together	
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a) Generally well answered by candidates. Most candidates described the process to include;

- Site preparation
- Laying the first/bottom layer
- Laying subsequent levels
- Filling the bed.

Examples of answers awarded marks include:

“Timber sleepers – 200 x 200mm x 1.2m tanalised, pressure treated, *Pinus* softwood. or standard size landscaping sleepers 100 x 200mm x 2.4m

Tools and equipment - saw, spade, screwdriver, galvanised bolts, spirit level, builders square, pvc plastic sheet.

Dig a trench 300 mm deep, add a layer of MOT1 aggregate, consolidate, install the first layer of timber sleepers. Check that everything is level. Connect the two adjacent sleepers with the stainless-steel galvanised brackets and 100mm long SS bolts. The next layer of sleepers to be added in a way as in laying bricks. Once all the sleepers are laid, and connected securely, add a layer of pvc plastic sheet behind the timber to avoid water damaging them. Fill in with top-soil or compost.”

Candidates who described in detail one appropriate method of securing sleepers together in a) gained marks in b) for this.

b) Methods of securing the sleepers together include

- using galvanised 90-degree corner brackets at each corner, screwed into place using zinc or galvanised 50mm screws
- secured to each other using wooden dowels or metal rods. Drill a hole into the bottom and top sleepers in matching positions. Tap the dowel or rod into the bottom one half way, and then line up the holes and place the upper sleeper on top, tapping down until they are flush.
- using a square post 300mm into the ground on the inside of each corner of the bed and secure using deck screws or coach bolts.

Candidates describing the materials and methods of securing gained marks.
