Royal Horticultural Society

R3113

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

Level 3

Thursday 30 June 2011

11:15 – 12:30

Written Examination

Candidate Number:.....

Candidate Name:.....

Centre Number/Name:.....

IMPORTANT – Please read carefully before commencing.

i) The duration of this paper is **75 minutes**.

ii) **ALL** questions should be attempted.

iii) **EACH** question carries **10 marks**.

iv) Write your answers legibly in the spaces provided.

v) Use **METRIC** measurements only.

vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

vii) Please note, sufficient lined space is provided. It is not necessary that all lined space is used in answering the questions.

Ofqual Unit Code D/601/3836

ANSWER ALL QUESTIONS

MARKS

Q1 a) State **THREE** materials suitable for the construction of a single-skin garden wall. **3**

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b) Describe the procedure for constructing a low wall made of **ONE** of the materials stated in a), to include a suitable foundation. **7**

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MARKS

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MARKS

Q2 Review the criteria for selecting a suitable type of stone for a rock garden. **10**

MARKS

Total Mark

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MARKS

Q3 Discuss the problems of maintaining the quality of stored soil. **10**

MARKS

Total Mark

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MARKS

Q4 Discuss **EACH** of the following equipment items used for setting out a site to scale plans:

i)	string lines;	**2**
ii)	spray paint;	**2**
iii)	wooden pegs;	**2**
iv)	laser beacon;	**2**
v)	builders square.	**2**

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MARKS

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MARKS

Q5 Describe the procedure for installing an informal pond using a butyl liner. **10**

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MARKS

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MARKS

Q6 a) Evaluate **ONE** type of natural stone suitable for a patio. **2**

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b) Draw a cross-sectional diagram to show the construction details of a patio using the stone named in a), including the arrangements for the removal of water. **8**

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MARKS

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MARKS

Q7 a) Specify **FOUR** materials suitable for the uprights of a pergola. **2**

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b) Specify **THREE** methods of providing a foundation for the uprights of a pergola. **3**

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MARKS

c) Identify the hazards associated with the construction of a pergola. **5**

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MARKS

Q8 a) For the treads of a short flight of garden steps:

i) specify **TWO** materials suitable for the treads;
ii) state an advantage for **EACH**. **4**

MARKS

b) Describe the construction of a short flight of three steps using a **NAMED** material. **6**

Total Mark

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RHS LEVEL 3 CERTIFICATE IN THE PRINCIPLES OF GARDEN PLANNING, CONSTRUCTION AND PLANTING
WRITTEN EXAMINATION

11:15am Thursday 30 June 2011

R3113

UNDERSTANDING THE SETTING OUT AND CONSTRUCTION OF LANDSCAPING ELEMENTS IN THE GARDEN

Candidates Registered	**107**		**Total Candidates Passed**	**49**	**63.64%**
Candidates Entered	77	71.96%	Passed with Commendation	5	6.49%
Candidates Absent	14	13.08%	Passed	44	57.14%
Candidates Deferred	9	8.41%	Failed	28	36.36%
Candidates Withdrawn	7	6.54%			

Q1 a) State **THREE** materials suitable for the construction of a single-skin garden wall.

b) Describe the procedure for constructing a low wall made of **ONE** of the materials stated in a), to include a suitable foundation.

The aim of this question was to assess the candidate's knowledge of wall materials and specifications, and their construction, including the foundations.

Generally this was answered well with most candidates stating bricks, concrete blocks and natural stone as their chosen materials. Some answers were a little vague and weren't sufficiently detailed to differentiate between three distinctly different materials, for instance giving three different types of clay brick, or just "concrete", which could have included blocks or in situ concrete. There was also some confusion with the terms "breeze block", "reconstituted stone block" and "concrete block".

The majority of candidates used brick walls as their chosen example and explained the construction with the aid of a cross section drawing. Marks were awarded for:

- ground preparation, excavation depths and consolidation of the sub grade,
- the appropriate foundation method and dimensions, including materials and their specifications,
- mortar, bonds and laying techniques,
- inclusion (or not) and specification of an appropriate damp proof course,
- jointing/pointing methods,
- coping/capping specifications.

Some answers specified the inclusion of expansion joints and piers, but were often vague in their application. There was also confusion between paving and walling foundation construction specifications.

Q2 Review the criteria for selecting a suitable type of stone for a rock garden.

The aim of this question was to assess the candidate's knowledge of rock garden materials and construction.

Marks were awarded for explanations of variations of the following criteria:

- local area unity,
- unity with existing features,
- local availability and cost, including transport,
- style of proposed feature (i.e. Japanese, scree, outcrop, alpine meadow etc),
- weight and sizes (for access, machinery availability, manual handling),
- pH value for suitable planting/chemical reaction with water (i.e. limestone),
- shapes and sizes (i.e. proportion and scale in overall design, steepness of slope, suitability as waterfall etc),
- strata considerations,
- density and absorption properties (in contact with water, moss growth, erosion and frost resistance),
- suitability for proposed planting themes,
- environmental/sustainability issues including extraction and transport.

Most candidates were able to describe the majority of these issues and were awarded marks appropriately. Quite rightly, environmental issues were covered in most answers with sustainability being a major factor – however any kind of rock extraction, be it quarrying or lifting surface rocks, is **not** sustainable, unless we are prepared to wait millions of years. Also concerns about the exploitation of child labour in the extraction of imported rock was often quoted – very little, if any, stone for general rock garden construction is actually imported, except maybe from Ireland.

Q3 Discuss the problems of maintaining the quality of stored soil.

The aim of this question was to assess the candidate's knowledge the correct handling, storage and reinstatement of soil during construction works.

Marks were awarded for discussion around the following problems that may be encountered when storing soil on a construction site, how they might occur, and the potential effect on the soil's quality:

- compaction,
- excess water content (or lack of),
- drainage,
- mixing of subsoil/topsoil,
- weed invasion,
- wind erosion,
- leaching of nutrients,
- excess organic matter content,
- contamination,
- extreme or inappropriate pH levels,
- biosecurity.

This question was generally misinterpreted as to describing how to store top soil and most candidates were able to do this well. However this often failed to address the effect on quality adequately – quoting that soil should not be stacked too high or that the sides should have an appropriate angle of repose needed to have an explanation of the problems generated and potential effects on quality if not done correctly. Better answers described the problems and then discussed, with suitable examples, how these could be prevented or minimised.

Q4 Discuss **EACH** of the following equipment items used for setting out a site to scale plans:

i) string lines;
ii) spray paint;
iii) wooden pegs;
iv) laser beacon;
v) builders square.

The aim of this question was to assess the candidate's knowledge of basic equipment used for setting out lines, shapes and levels on a site.

Marks were awarded for discussion around the following points for each piece of equipment:

i) can be used for setting out straight lines and levels and also for scribing arcs,
cheap, precise straight and thin line, but not always easy to see, can sag, can break, trip hazard, ends need to be attached to something and need to be maintained taut.

ii) used for marking out lines, shapes (especially informal) and points on the ground,
quick and easy to use, different colours for different features,
relatively expensive, gives a thick imprecise line, goes when the ground is excavated, cannot be raised to mark line above ground level unless sprayed on to existing objects, possible environmental problems with aerosols.

iii) used to mark points and levels, often in combination with string lines, cheap, easily obtainable (often scrap wood), possibility of having several level marks on one peg,
disadvantages are that they split easily and tops are therefore often inaccurate, thickness makes it difficult to determine which side measurement is taken from, only good in soft ground (useless on hard surfaces), trip hazard.

iv) used for setting out levels,
advantages are that it only needs one person to operate, it can be set up and used over long period (i.e. all day without resetting) and no maths is involved, accurate over long distance if set up properly.
Disadvantages are that it is expensive, regular servicing/calibration required to maintain accuracy, needs batteries, needs sensor, needs unobstructed view, possible eye damage,
(Many candidates were not familiar with a laser beacon and stated that it is used for taking distance measurements).

v) used for marking out right angles,
cheap (could be “home made”) , quick and easy to use, saves setting 3,4,5 triangles continuously with tape measures, can fold up,
disadvantages it is cumbersome, easily damaged, inaccurate over greater distances, only really suitable at ground level.

Generally this question was not answered well. The answer required a discussion as to the use of the equipment and not, as most candidates did, just a statement of what it is used for, which in most cases was very brief anyway. A discussion should include some advantages and disadvantages of each piece of equipment as outlined in the examples above, possibly with comparisons to alternative methods. Many answers confused setting out, as asked for here, with surveying, or even the drawing up of scale plans.

Q5 Describe the procedure for installing an informal pond using a butyl liner.

The aim of this question was to assess the candidate's knowledge of pond construction materials and methods.

Marks were awarded for descriptions and explanations of the following procedures:

- setting out suitable shape,
- excavation to include shelves – appropriate depths,
- level top,
- batter/slope of sides,
- stone/root removal and installation of sand or underlay,
- installation of butyl (including calculation of size required),
- filling with water and easing in butyl to minimise folds,
- cutting excess,
- hiding/disguising edges with a coping or other method,
- overflow provision.

Most candidates were familiar with the above procedures and were awarded marks appropriately but many failed to include enough detail or missed out vital stages in the process or included information which was not required. Many answers unnecessarily went into some detail about the suitable siting of a pond. Several even missed out the need to fill with water, which is a vital part of the construction process of a liner pond. Several also advocated the use of rainwater which would not be practical in most cases. The disguising of the liner and addition of a coping was often very vague. Many candidates went on to describe the establishment of aquatic plants and the addition of fish which was not required.

Q6 a) Evaluate **ONE** type of natural stone suitable for a patio.

b) Draw a cross-sectional diagram to show the construction details of a patio using the stone named in a), including the arrangements for the removal of water.

The aim of this question was to assess the candidate's knowledge of paving materials and construction methods.

Suitable types of natural stone include – slate, granite setts, York sandstone, Indian sandstone, Purbeck limestone. Marks were then awarded for an evaluation to include the following: durability, frost resistance, slip resistance, aesthetics (colour, texture etc), weathering properties, resistance to algae/moss, maintenance requirements, cost of material and construction, ease of construction, environmental issues, unity, style possibilities, etc.
All candidates were able to name a type of natural stone but this was often too vague to be able to evaluate it accurately. For instance "limestone" can vary greatly in most of the criteria above. In some cases the criteria discussed were too subjective – it is not sufficient to say "expensive" or "looks nice" without further comparison or explanation.

Dependant on the format of materials selected in a), marks were awarded for clear cross-section drawings showing:

- details of excavation to foundation,
- details and dimensions of foundation (sub-base) installation,
- blinding/geotextile membrane as appropriate,
- specifications and dimensions of bedding layer,
- haunching/edging,
- details of jointing techniques,
- haunching/edging,
- falls (direction and ratio),
- drainage arrangements to outfall.

Most candidates were able to produce a clear cross section drawing, but specifications and dimensions were often vague or omitted completely. There was considerable confusion as to whether the construction should be rigid or flexible. This was often compounded by the perceived need for candidates to quote permeable paving planning regulations and SUDS.

Q7 a) Specify **FOUR** materials suitable for the uprights of a pergola.

b) Specify **THREE** methods of providing a foundation for the uprights of a pergola.

c) Identify the hazards associated with the construction of a pergola.

The aim of this question was to assess the candidate's knowledge of timber and timber structures and their understanding of a range of safe construction methods.

Suitable materials for the uprights of a pergola could include, for example, timber, brick, natural stone, concrete blocks, steel, cast concrete. All candidates were able to name four materials but often these were not distinctly different. For instance two or three different species of timber only counted as one material.

Methods of providing a foundation were well understood by most candidates who were easily able to identify three methods. Dependant on material, answers included pad foundation (brick or stone), steel socket (timber), concreted in an excavated hole (timber or steel), rammed earth (timber). Some candidates suggested that timber pergola posts could be pointed and driven in with a post rammer – because of the thickness of the timber and the height involved, this would be very unlikely.

Risks in pergola construction include potential injury caused by: use of hand tools/machinery for excavation, working near open excavations, use of machines/chemicals for mixing concrete, manual handling, abrasion from rough materials, use of power (electricity)/hand tools for carpentry, working at heights, falling objects.
There is some confusion between a hazard and the related risk, and then the precautions that should be in place to minimise these risks. Most candidates were able to identify some of the hazards and risks but few produced a suitably extensive list to gain higher marks. Some answers only listed the personal protective equipment that should be used.

Q8 a) For the treads of a short flight of garden steps:

i) specify **TWO** materials suitable for the treads;
ii) state an advantage for **EACH**.

b) Describe the construction of a short flight of three steps using a **NAMED** material.

The aim of this question was to assess the candidate's knowledge of step materials and specifications, and their understanding of appropriate construction methods.

In the first part of the question, two materials could include: PC concrete slabs, brick, natural stone (i.e. Indian sandstone), timber (softwood or hardwood, decking), in-situ concrete, suitably identified as being distinctly different.

One advantage for each material chosen could be non slip, hard wearing, cheap etc, but really needed to be compared with the other material selected above. Many candidates gave the same answer for each material.

In part b), dependant on material selected, marks were awarded for: appropriate excavation/foundation installation, appropriate labelling and dimensions of treads and risers (with proportions), pitch line, nosings, handrails, methods of fixing treads to risers, drainage (slight slope forward), etc. Most candidates answered this question with a diagram which usually explained the process better than words. All candidates had an appreciation of step construction but in many cases there was a lack of detail in the specifications, especially with the foundations and dimensions. Some candidates wrote down all they could think about steps without contextualising to the question – for instance a landing in the middle of a flight of three steps would be totally inappropriate. The proportions of risers to treads or the pitch angle was not well specified in most answers.