



Candidate Number:

Candidate Name:

Centre Number/Name:

**RHS (LEVEL 3) ADVANCED CERTIFICATE IN HORTICULTURE
WRITTEN EXAMINATION**

Wednesday 6th July 2005

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **E** is **2 hours**.
- ii) Answer **ALL** questions in Section **A**.
- iii) **ALL** questions in Section **A** carry equal marks.
- iv) Write your answers legibly in the spaces provided.
- v) Use **EITHER** metric **OR** imperial measurements but **NOT** both.
- vi) Where plant names are required, they should include genus, species and where appropriate, cultivar.

Module E

**Design of Ornamental Gardens,
Plant Selection, Establishment & Maintenance,
Ornamental Landscape Construction**

Section A – Short Answer

Please turn over/.....

ANSWER ALL QUESTIONS

MARKS

Q1 Explain the term 'TBM' as used in land surveying.

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Q2 Explain why it is necessary to transplant woody plants with their roots at the correct depth.

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Q3 State the historical period associated with **EACH** of the following features:

- i) parterres;
- ii) wild gardens.

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Q4 Explain the purpose of a 'focal point' in garden design and give **TWO** examples.

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Please see over/.....

ANSWER ALL QUESTIONS

Q5 State the species used and proportion of **EACH** in a suitable, hard-wearing grass seed mixture for an all-year-round shaded area. **2**

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Q6 Explain how existing vegetation and services may influence the design proposals of a new garden. **2**

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Q7 List **FOUR** plants of different genera suitable for use in a dry, sunny, gravel garden. **2**

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Q8 State **FOUR** factors that influence soil stability in the construction of soil embankments and slopes. **2**

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Please turn over/.....

ANSWER ALL QUESTIONS

Q9 Describe **ONE** method of improving:

- i) surface drainage;
- ii) sub-surface drainage.

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Q10 State the relative proportions of **NAMED** ingredients suitable for mortar mixes for:

- i) spot mortar below concrete slabs;
- ii) a free standing full brick wall of buff coloured soft stock bricks.

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WRITTEN EXAMINATION**

Wednesday 6th July 2005

IMPORTANT – Please read carefully before commencing.

- i) The duration of the papers in Module **E** is **2 hours**.
- ii) Answer **ONE** question only from **EACH** of the sections **B**, **C** and **D**.
- iii) **ALL** questions carry equal marks.
- iv) Write your answers legibly in the answer booklets provided.
- v) Use **EITHER** metric **OR** imperial measurements but **NOT** both.
- vi) Where plant names are required, they should include genus, species and
where appropriate, cultivar.

Module E

**Design of Ornamental Gardens
Plant Selection, Establishment and Maintenance
Ornamental Landscape Construction**

Section B, C & D

Structured Questions

Please turn over/.....

Section B – Design of Ornamental Gardens

Answer ONE question only from this section

MARKS

Q1 Describe how the apparent size of a small garden may be increased by using the following devices:

- | | | |
|------|---------------------------------------|----------|
| i) | composition and shape of space; | 5 |
| ii) | arrangement of colour; | 5 |
| iii) | scale and texture of surfaces; | 5 |
| iv) | size and height of ornamental plants. | 5 |

Q2 Evaluate the factors which dictate to both:

- | | | |
|-----|--|-----------|
| i) | the selection and arrangement of plants; | 8 |
| ii) | for a planting scheme. | 12 |

Please see over/.....

Section C – Plant Selection, Establishment & Maintenance

Answer **ONE** question only from this section

	MARKS
Q3 a) State FOUR benefits of using climbing plants in a garden.	4
b) Name FOUR different climbing mechanisms used by plants and for EACH , give a NAMED plant example suitable for a south-westerly aspect.	6
c) Using ONE NAMED example from b), write an account of the planting process, plant establishment and future management when planting against a brick wall.	10
 Q4 In relation to the use of a pedestrian cylinder petrol driven mower, explain the following:	
i) P.U.W.E.R 1998;	6
ii) risk assessment;	6
iii) manual handling.	8

Please turn over/.....

Section D – Ornamental Landscape Construction

Answer ONE question only from this section

	MARKS
Q5 a) Explain how a level terrace, 20m x 10m, can be created from an existing sloping area of lawn.	10
b) Describe how the terrace in a) should be prepared for re-establishing a lawn.	4
c) Describe THREE methods for securing the banks with planting.	6
Q6 a) Evaluate the following path surfaces for use in ornamental landscapes with public access:	
i) 20mm scalping;	4
ii) in situ concrete;	4
iii) reclaimed bricks;	4
iv) pea shingle.	4
b) Describe the factors that will influence the depth of foundation for a paver surface.	4



RHS (LEVEL 3) ADVANCED CERTIFICATE IN HORTICULTURE

Wednesday 6th July 2005

MODULE E

Design of Ornamental Gardens Plant Establishment and Maintenance Ornamental Landscape Construction

Examiners Comments

Candidates Registered	394		Total Candidates Passed		
Candidates Entered	321	81.48%	Passed with Commendation	49	15.26%
Candidates Absent	50	12.69%	Passed	232	72.28%
Candidates Deferred	15	3.80%	Failed	40	12.46%
Candidates Withdrawn	8	2.03%			

Senior Examiners Comments

Structured questions do not require candidates to write in essay form. It is important that candidates answer questions in a style that is appropriate to the question asked. This requires an understanding of the phraseology used.

It is of vital importance that candidates understand the meaning of the key words used in examination questions and respond accordingly. In many instances full marks could not be awarded because candidates had not understood what was required and as a result did not provide an answer that met the question in full, and thus failed to gain the available marks.

Below is provided a definition of the key words used in questions, which may help to clarify the requirement of questions.

State means - *to write down the facts briefly*

Describe means – *to give an account of*

Explain means – *to make the meaning clear – (answers will normally need to include details of how, when, why and to relate horticultural practice to underlying scientific principles).*

Evaluate means - *to judge the worth of (state the benefits and limitations of..)*

List means – *to itemise*

Diagrams must be annotated if they are to be of any value. It is advisable (but not essential) to draw them in pencil as mistakes can easily be rectified. The use of colour is a luxury and should only be carried out when clear differentiation is required.

In some instances handwriting again proved to be difficult to decipher. Candidates should remember that if the examiner cannot read what has been written it will not be possible to award any marks.

Wherever possible, named examples should be given in answers as these indicate to the examiner that the candidate has a comprehensive understanding of the subject concerned.

Where a question is set in different sections, eg a,b,c or i,ii,iii candidates are advised to set out their answers to follow the structure of the question, section by section.

Section A. Short Answer Questions

Short answer questions seek short answers. Candidates could save much time by writing less and yet still manage to cover all the necessary points in the question as set.

Some questions were broad in their approach and attracted a wide range of answers. The Examiner took this into consideration and credit was given wherever the correct information was evident.

Q1. Explain the term 'TBM' as used in land surveying.

It was interesting to note the ingenuity of many candidates as they tried to make T.B.M (Temporary Bench Mark) fit the words they conjured up. The question was not well answered. Candidates either knew the answer and scored well as a result or struggled to achieve any marks at all. The answer, required candidates to explain the term, which is a temporary datum point selected for a specific site from which a survey may be carried out. It may be a door step, manhole cover, top of a wall or some alternate height or level that will remain unaltered/static during and after site investigation.

Q2. Explain why it is necessary to transplant woody plants with their roots at the correct depth.

The question was well answered by most candidates offering explicit detail and a good understanding within the answers of root requirement of oxygen, nutrients and water. Plant roots require to be planted at the correct depth in order to be able to perform well and which also avoids the suffocation of existing roots. Too high and roots may be exposed to the surface and dry out, be unable to obtain water and nutrients, be unstable and prone to damage. Too deep and rotting may occur on the stem due to water drainage being poor and absorption of air from within the soil.

- Q3. *State the historical period associated with EACH of the following features:*
- i) *parterres*
 - ii) *wild gardens*

The question proved very popular by the majority of candidates and in most cases was very well answered. Candidates were able to state the historical periods (Victorian/Edwardian) associated with the features listed (parterres and wild gardens), namely that a parterres is a formally patterned flower garden of intricate design displaying flat, regular flower beds forming decorative patterns within a particular design which are often complicated, bordered or outlined by low hedges. Wild gardens on the other hand, display informal groups of wild plant native species in overflowing beds and borders with no strong symmetrical, rigid or ordered lines, but exerting some regulated and controlled planting offering soft curved patterns, which are typical.

- Q4. *Explain the purpose of a 'focal point' in garden design and give TWO examples.*

The purpose of a focal point within a garden proved to be a very popular question and very well understood by almost all candidates; gaining full marks in the majority of cases. Candidates were able to quote some excellent examples of focal points from gardens that had been visited. The intention of a focal point is to draw the eye to an object or view within the landscape but further invites the person to explore the garden or landscape to particular areas, identifying such features as; avenues, fountain, end statues, vistas, distant off site objects or landscapes.

- Q5. *State the species used and proportion of EACH in a suitable, hard-wearing grass seed mixture for an all- year-round shaded area.*

It was important that candidates were able to quote the correct percentage of each of the grass seed species and varieties used to create the hardwearing mixture for a shaded area. Where candidates did so, good marks were awarded. The mixtures quoted were generally suitable and where appropriate species were used, high marks were awarded. It should be noted that *Poa annua* is not normally taken as a suitable lawn species, but species such as *Festuca rubra*, *Agrostis tenuis*, *Poa pratensis* and *Lolium perenne* are acceptable. Acceptable mixes are for example may include:

<i>Lolium perenne</i> Diablo	50%	or	<i>Lolium perenne</i>	20%
<i>Lolium perenne</i> Tara	45%		<i>Festuca rubra</i> <i>commutata</i>	40%
<i>Agrostis tenuis</i> Highland	5%		<i>Festuca rubra</i>	40%

or very slight percentage variation.

Q6. *Explain how existing vegetation and services may influence the design proposals of a new garden.*

Candidates were able to demonstrate the need to note the existing vegetation on a new site and to state that existing services should be recorded as these might influence the implementation of any new design. Few candidates mentioned the fact that existing vegetation could include the levels of acidity or alkalinity in the soil or perhaps its nutrient richness or paucity. Existing vegetation such as large trees or large existing plantings may influence the design by including them into the design. Existing species type may further indicate the type of site conditions wet, dry, acid, alkaline etc or the need to disguise services such as manhole covers, electric generators, pylons as examples

Q7. *List **FOUR** plants of different genera suitable for use in a dry, gravel garden.*

Candidates displayed a good all round knowledge and were able to list suitable plants for a dry sunny gravel garden. Many candidates gained full marks here and some of the plant combinations showed considerable artistic skill/ability. This question proved very popular and highlighted the strength of plant identification and knowledge from the syllabus. Species, which would have been acceptable, are *Euphorbia*, *Carex*, *Dierama*, *Verbascum*, *Osteospermum*, *Leptospermum* or any other suitable subjects..

Q8. *State **FOUR** factors that influence soil suitability in the construction of soil embankments and slopes.*

This question asked candidates to **state** four factors that influence the stability of soil when constructing soil embankments and slopes. In general, the principles and practices of such work were well understood and many candidates gained high marks. Factors that would have been suitable are the soil structure, soil texture to permit some form of adhesion, and its ability to allow liquid to pass through such as porosity and permeability. Prevailing weather conditions were accepted, permitting the soil to reach a natural angle of repose opposed to being forced compaction and the ability to accept planting for stability.

Q9. Describe **ONE** method of improving

- i) *surface drainage;*
- ii) *sub-surface drainage.*

Candidates did not always manage to describe suitable methods of improving surface or sub-surface drainage. The question was broad in its approach and a wide variety of answers were forthcoming. However, it should be noted that increasing the slope of the site and shedding water that way was not a method of improving surface drainage. Sub-surface drainage was more clearly understood and answers received indicated this. Answers for surface drainage are incorporating grits and sharp sand into the soil texture, sand slitting on lawn, creating narrow slits and infilling with sand to distribute water flow to either a ditch or soakaway and chambering. Sub-surface drainage includes perforated piping beneath the surface at low inclination, introducing pea shingle/gravel, mole drainage (clay soils), french drainage system, sink holes and soak aways.

Q10. State the relative proportions of NAMED ingredients suitable for mortar mixes for:

- i) *spot mortar below concrete slabs;*
- ii) *a free standing full brick wall of buff coloured soft stock bricks.*

This question asked candidates to state the proportions of materials used to create specific mortar mix for specified tasks. Many candidates were unsure of the proportions and did not perform well, while others who clearly had more practical experience gave a much better account of themselves. Ideal answers looked for in i) spot mortar, were 1 part cement to 5 parts sharp sand to provide a dryish consistency inclusive of water. Plasteriser was often mixed as part of the finished material. Answers for part ii) free standing full brick wall, was a ratio of 1 part cement to 3 parts soft sand would be acceptable. Often the ingredients of plasteriser, water to form a creamy consistency was accepted. In this element of the question, additives of coloured dyes were also indicated.

Section B. Structured Questions (Design of Ornamental Gardens)

Q1. Describe how the apparent size of a small garden may be increased by using the following devices;

- i) *composition and shape of a space;*
- ii) *arrangement of colour;*
- iii) *scale and texture of surfaces;*
- iv) *size and height of ornamental plants.*

- i) Composition and shape and space – marks were awarded for the following
Proportion of mass should be around one third with the open space (void) being two thirds. Spaces should not be too cluttered, or too enclosed.
Spaces can decrease in width, or move away from viewpoint; apparent width can be increased by using rectilinear shapes at an angle, or ellipses and ovals; height of trellis can also decrease as moves away from viewpoint; borrow views from outside the garden; some degree of space division within the site; use of mirrors and false entrances.
- ii) Arrangement of colour – essentially marks were awarded for the following points:
Warm colours such as yellow, orange and bright red, foreshorten distance, therefore should be placed closest to viewpoint.
Cool colours such as pale blue, pale pink and grey, extend distance, therefore placed further away from viewpoint.
White, when used in quantity, should be treated as a warm colour as it foreshortens distance.
These colour effects can be used both with plants and hard features.
- iii) Scale and texture
Coarse textured plants and hard features tend to decrease apparent size; finer textured plants and materials tend to increase apparent size. Bold textures foreshorten distance; fine textures extend apparent size.
Textures can be altered by the use of large paving slabs and small tiles; cobbles compared with finer gravel; coarse-mown turf compared with fine turf; cluttered water surface compared with few plants used in a pond.
- iv) Size and height of ornamental plants
Avoid very large plants, or large trees and shrubs. Use a few large Shrubs, or small trees as focal points. Do not over-enclose a small space with plants; try and get variations in light and dark. Use bold foliage sparingly, using medium and finer foliage plants in the majority of planting.
Create false perspective by using taller plants towards viewpoints; shorter plants more closely planted further away.

Q2. Evaluate the factors which dictate to both:

- i) *the selection and arrangement of plants;*
- ii) *for a planting scheme.*

Candidates awarded highest marks were those who evaluated:

the factors which affect the selection and arrangement of plants , ie:

- ∞ The environment
 - temperature, exposure, frost pockets, light and shade, aspect and orientation.
- ∞ Soils
 - pH, texture, drainage, nutrient levels, physical size and shape space.
- ∞ Plant type
 - trees, shrubs, herbaceous, annuals, seasonality, aesthetics of the plants, including form and texture. Colour of flowers, fruit, leaves and stems.

Plant arrangement techniques

- ∞ colour use including:
 - warm and cold colour, colour contrast and harmony;
 - texture of foliage and stems, use of fine and bold foliage to provide contrast;
 - form and shape including variation in height to provide 'key' accent contrast;
 - grouping of plants to provide unity, movement and rhythm, symmetry and asymmetry.

Section C. Structured Questions (Plant Selection, Establishment & Maintenance).

Candidates who structured their answers and presented them in a clearly laid out manner gained higher marks. Candidates who produced diagrams to enhance their answers were rewarded. However, diagrams needed to be clear, well-labelled and referenced within the written text.

- Q3. a) State **FOUR** benefits of using climbing plants in a garden.
b) Name **FOUR** different climbing mechanisms used by plants and for **EACH**, give a **NAMED** plant example suitable for a south westerly aspect.
c) Using **ONE NAMED** example from b), write an account of the planting process, plant establishment and future management when planting against a brick wall.

- a) The majority of candidates were able to undertake this successfully. Candidates who just recorded locations for climbing plants, rather than stating the benefits of using climbing plants, failed to gain marks.
- b) A mixed response to this question:
Candidates who answered with full names of climbing mechanisms, e.g. twining leaf petioles rather than twining leaves, along with diagrams gained the highest marks.
The stipulation of climbing plants suitable for south-westerly aspects, along with linking this to the climbing mechanism, caused many candidates to lose marks.
- c) A question which clearly set out the parameters, however, many candidates responded with large essays on the subject which did not always, address the question.
Candidates who set out their answers in a logical format:

e.g. planting process)
 plant establishment) when planting against a brick wall
 future management)

gained the highest marks.

Many candidates seemed to ignore the fact that climber was to be planted up against a brick wall and therefore failed to gain marks as they did not identify the problems associated with this type of site.

Q4. *In relation to the use of a pedestrian cylinder petrol driven mover, explain the following:*

- i) P.U.W.E.R 1998;*
- ii) risk assessment;*
- iii) manual handling.*

- i) Many candidates were unable to answer this section:
It is very worrying that the Provision and Use of Work Equipment Regulations 1998 seem not to be better recognised and understood!
- li) Candidates were much more familiar with this piece of legislation and most were able to identify suitable risks associated with using a pedestrian cylinder petrol-driven mower. Candidates who structured their answers and listed the risks into categories, e.g. risk to user, risk to public, risk to environment, etc. gained higher marks.
- ii) Manual Handling again was an area most candidates were familiar with. Candidates who really identified the problems associated with the mower, rather than just general manual handling issues gained the highest marks.

Section D. Structured Questions (Ornamental Landscape Construction).

- Q5. a) *Explain how a level terrace, 20 x 10m, can be created from an existing sloping area of lawn.*
b) *Describe how the terrace in a) should be prepared for re-establishing a lawn.*
c) *Describe **THREE** methods for securing the banks with planting.*

- a) Many candidates spent far too long explaining techniques of level surveying, setting out and performing calculations, which was not required, and in most cases was very vague, incorporated incorrect terminology, showed a lack of practical experience or was totally irrelevant. Some didn't even go beyond this in answering this question.

No candidates made reference to the British Standards for Landscape Operations or Earthworks.

Most candidates were able to state that the operation should be approached by employing "Cut and Fill" strategies but few could go on to explain the principles in any detail and the fact that the "cut" should equal the "fill".

Diagrams were often produced but some of these were very poor, especially as to where and how retaining devices were to be employed; most answers indicating that this would be necessary at the bottom of the newly formed terrace but very few that it was also necessary at the top, where it was cut back into the slope, and fewer still that this would also need to be continued around the sides. Many answers included in depth details of the construction of a retaining wall, which was not required. Many candidates also missed out assessment of the drainage need, and possible solutions.

The inclusion of the dimensions in the question indicated that a machine would be required and this was often overlooked: in some cases it was even suggested that the turf should be lifted by hand and then boxed off. Only in a few cases were appropriate types of machines stated. Most answers correctly stated that the topsoil should be removed and stored and usually correct storage techniques were quoted. There was some confusion as to the next stage with many saying that the subsoil should be removed and stored rather than being re-modelled in situ. Bulking factors and correct consolidation methods were also poorly explained or omitted altogether in most instances. The return of the topsoil was also not described well; the possible need for subsoiling or correct depths for re-establishment of the lawn were not mentioned in the majority of answers. Some candidates read the question as that the resulting terrace would be paved but were totally inadequate in their descriptions as to how this would be carried out on made up ground.

- b) This was answered adequately by most candidates. However, once again, far too much time was spent in describing irrelevant or unasked for operations. Several answers suggested leaving the area for considerable lengths of time to settle or to break down over the winter – this would not be necessary if the above operations were carried out correctly, and although maybe ideal, would not usually be feasible in a commercial situation. Most candidates also described weedkilling techniques, especially involving the application of glyphosate, which would not be necessary and would be completely ineffective on the bare soil produced from the cut and fill process described in a). Consolidation by treading, raking to a tilth and stone/debris removal was adequately, albeit briefly, described in most cases. Some candidates suggested the use of tractor mounted ploughs, rollers and harrows which, would not be effectively manoeuvrable in an area this size. Most candidates then went on to describe in some detail seed sowing and/or turfing procedures, and even aftercare, when the question only asked for description of the preparation.
- c) Most candidates could describe one or two methods but to gain full marks it was necessary to describe *how* the plant stabilised the bank and to give some examples of appropriate plants. Just to say plant “groundcover plants” or “trees” was not enough. In very few answers were there clear explanations of the difference between erosion control and soil stabilisation, and appropriate remedies using plants. To be able to quote three methods, most answers relied on mechanical stabilisation structures such as retaining walls, gabions or rock gardens, rather than planting, for at least one example. Although the inclusion of mats and netting is an acceptable practice, this is not really securing the banks with planting and it needed to be stated that these methods are supplementary to, or an aid in the establishment of the plants.

Q6. a) *Evaluate the following path surfaces for use in ornamental landscapes with public access:*

- i) 20mm scalping;*
- ii) In situ concrete;*
- iii) reclaimed bricks*
- iv) pea shingle*

b) *Describe the factors that will influence the depth of foundation for a paver surface.*

a) Most candidates who answered this question approached it by writing narratives which tended to be a “brainstorm” and was hence somewhat disorganised. Better answers were presented in tabular form that listed advantages and disadvantages.

Marks were awarded for appropriate comments regarding aesthetics and design possibilities, cost and availability of materials, cost and ease of installations, durability, resistance to slip, longevity, user friendliness and safety (including disabled use), maintenance requirements, and other relevant points. Marks were not gained in many cases because not enough explanation was supplied; just quoting that a surface was “cheap” or “attractive” was not generally enough unless put into context or compared with appropriate alternatives.

There was some confusion as to what “scalpings” are and some candidates were definitely unfamiliar with this term as referring to quarry waste (usually limestone) which is self binding, and hence a solid surface when compacted. This is a material that is used extensively in such places as National Trust carparks and woodland walks, where, although not ideal, it is considered suitable for wheelchair access. In such situations it is also not unattractive. Many candidates answers were based on widespread prejudices rather than a balanced evaluation; in situ concrete was familiar to everyone but was almost universally condemned as being ugly with few seeing its advantages in public situations for such things as wheelchair ramps, although most said that its appearance could be improved. This is a surface which is used extensively in attractive shapes, colours and textures in most of the big theme parks, which would be considered to be ornamental landscapes. Slipperiness and safety problems were often quoted as disadvantages of concrete surfaces but this certainly would not be tolerated in these situations.

The suitability and properties of reclaimed bricks were not well understood in most cases; high porosity isn't the same as low frost resistance and old bricks are not inherently soft. The point here is that usually the provenance and original specification is unknown and therefore they cannot be relied upon to be of uniform quality or sufficiently durable. Most answers also stated that the bricks would be bedded on sand and would therefore be subject to breaking up and unevenness – in an area with public access this would not really be a suitable method of construction. If the bricks were of suitable quality and correctly laid on mortar and pointed, a smooth, safe, hardwearing surface should result.

Most candidates were familiar with pea shingle and could state the advantages and disadvantages as a surface, but many said that it was only suitable for small areas whereas it is used extensively in stately homes in often quite vast expanses. The unsuitability for wheelchairs and children's buggies when laid too deep was quoted in most answers. There were mixed opinions as to whether the sound produced when walking on this surface was good or bad.

- b) Most candidates were able to briefly describe the two main factors as being soil conditions (often with vagueness between soil structure and texture and confusion with horticultural soil science) and weight of traffic (correctly differentiating into pedestrian and vehicular). Very few candidates went beyond this, but to gain full marks the descriptions needed expanding to include:
- ∞ The need to have a stable formation on subsoil.
 - ∞ The need to be deep enough to reduce the effect of swelling and shrinking of clay subsoil.
 - ∞ The depth of topsoil and the need to be below this.
 - ∞ Proximity of tree roots.
 - ∞ Drainage and height of the water table.
 - ∞ The proposed finished level, allowing for necessary falls etc.
 - ∞ Problems with made up ground.
 - ∞ Building regulations – i.e. damp course height.
 - ∞ Dimensions of materials (only that thicker paving materials will require more excavation to accommodate them NOT that they require more or less of a foundation).

Although not asked for, many candidates included cross section diagrams, but this did show an understanding of terminology and appropriate dimensions in most cases.

There was some confusion between depth of the foundation and the thickness of the base, which although related to each other; are not the same thing.

There was some confusion over different paving surfaces and flexible or rigid construction requiring more or less of a foundation – for the same usage on the same soil all types of paving will follow the same criteria for the depth of the foundation.

A few candidates quoted the California Bearing Ration (CBR) but then showed little understanding of its application. This is really only used for roadway construction and would not normally be applied to a *paver* surface.