R3101

PLANT TAXONOMY, STRUCTURE & FUNCTION

Level 3

Wednesday 29 June 2011

09:30 – 11:00

Written Examination

Candidate Number:.....

Candidate Name:.....

Centre Number/Name:.....

IMPORTANT – Please read carefully before commencing.

i) The duration of this paper is **90 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.

ANSWER ALL QUESTIONS

MARKS

Q1 a) Describe, using a **NAMED** example in **EACH** case, **TWO** major divisions of the plant kingdom. **8**

MARKS

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b) State **TWO** differences in flower structure between dicotyledons and monocotyledons. **2**

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MARKS

Q2 a) Distinguish between inter-specific and inter-generic hybrids, with a **NAMED** example in **EACH** case. **6**

MARKS

b) i) State what is meant by the term graft hybrid. **2**

ii) Give **ONE** example of a graft hybrid. **2**

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MARKS

Q3 a) Describe the following types of dry fruit, in **EACH** case naming **ONE** plant example:

i) capsule; **2**
ii) siliqua; **2**
iii) legume. **2**

MARKS

b) Describe, with the use of **TWO NAMED** examples, what is meant by a multiple fruit. **4**

Total Mark

Please turn over/.....

MARKS

Q4 Name and describe **FOUR** tissues that make up bark. **10**

Total Mark

Please turn over/.....

MARKS

Q5 a) State **SIX** factors that may limit the rate of photosynthesis in protected structures. **6**

MARKS

b) Explain how the limiting effect of any **ONE** of the factors named in a), can be reduced for plants growing in protected structures. **4**

Total Mark

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MARKS

Q6 a) Explain the difference between an absorption spectrum and an action spectrum for chlorophyll. **5**

MARKS

b) Describe how light is different for plants growing in the shade of taller plants. **3**

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c) Explain what is meant by the term compensation point. **2**

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MARKS

Q7 Describe the mass flow hypothesis of phloem transport. **10**

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Q8 a) When flower stems are knocked over by the wind in the open garden, after a short while the tip of the plant becomes vertical. State **TWO** possible mechanisms for this. **4**

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MARKS

b) The same effect occurs when cut inflorescences in boxes in cold storage are laid down horizontally. State which of the two possible mechanisms given in a) could also explain this. **1**

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c) Explain the hormonal basis of the effect in parts a) and b). **5**

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MARKS

Q9 a) Daminozide (B-nine) is a synthetic growth regulator that acts by inhibiting gibberelline production. Explain **ONE** effect that spraying with this substance could have on young plants. **2**

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b) Explain **FOUR** effects likely to occur in plants as a result of spraying with an anti-auxin. **8**

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MARKS

Q10 Describe, with the aid of fully labelled diagrams, the tissue changes that occur in the stele of a stem during the process of secondary thickening. **10**

Total Mark

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RHS LEVEL 3 CERTIFICATE IN THE PRINCIPLES OF PLANT GROWTH, HEALTH AND APPLIED PROPAGATION WRITTEN EXAMINATION

09:30am Wednesday 29 June 2011

R3101

PLANT TAXONOMY, STRUCTURE & FUNCTION

Candidates Registered	**69**		**Total Candidates Passed**	**12**	**23.08%**
Candidates Entered	52	75.37%	Passed with Commendation	3	5.77%
Candidates Absent	8	11.59%	Passed	9	17.30%
Candidates Deferred	6	8.70%	Failed	40	76.92%
Candidates Withdrawn	3	4.35%			

Two general comments need to be made about this examination. The first is that frequent blank pages are being left by candidates where they are omitting entire questions. It must be realised that in every examination, every learning outcome will be tested so every part of the syllabus must be prepared by candidates. The second is that attention should also be paid to the wording of the question. Thus in question 6a candidates wasted time by 'describing' when only 'stated' was needed while in question 10 many only produced diagrams instead of 'Describing, with the aid of diagrams'.

Q1 a) Describe, using a **NAMED** example in **EACH** case, **TWO** major divisions of the plant kingdom.

b) State **TWO** differences in flower structure between dicotyledons and monocotyledons.

Any major division of the plant kingdom was acceptable e.g. Bryophyta, Anthophyta. In part b, candidates were usually very clear about the difference in floral parts but less confident with the difference in floral whorls.

Q2 a) Distinguish between inter-specific and inter-generic hybrids, with a **NAMED** example in **EACH** case.

b) i) State what is meant by the term graft hybrid.

ii) Give **ONE** example of a graft hybrid.

The first part was usually done quite well but a common error was to describe intergeneric hybrids as hybrids between two genera instead of two species from different genera. The graft hybrid was usually confused with grafted fruit trees.

Q3 a) Describe the following types of dry fruit, in **EACH** case naming **ONE** plant example:

i) capsule;
ii) siliqua;
iii) legume.

b) Describe, with the use of **TWO NAMED** examples, what is meant by a multiple fruit.

The types of dry fruit were quite well known but many candidates failed to gain marks by not knowing the botanical names for pineapple, fig or mulberry as examples of multiple fruits.

Q4 Name and describe **FOUR** tissues that make up bark.

Acceptable tissues were phellem (cork), phellogen (cork cambium), phelloderm (secondary cortex), cortex and phloem. Descriptions of the tissues were usually lacking, most candidates naming the tissue and then describing its function (not asked for).

Q5 a) State **SIX** factors that may limit the rate of photosynthesis in protected structures.

b) Explain how the limiting effect of any **ONE** of the factors named in a), can be reduced for plants growing in protected structures.

Most candidates stated six factors clearly although not many differentiated between light quantity and light quality. The second half of the question was usually done well if light quantity or carbon dioxide were chosen as the limiting factor.

Q6 a) Explain the difference between an absorption spectrum and an action spectrum for chlorophyll.

b) Describe how light is different for plants growing in the shade of taller plants.

c) Explain what is meant by the term compensation point.

Most candidates were unclear as to the difference between an absorption spectrum and an action spectrum. However, most knew that light would be limited under taller plants and different in wavelength, although the details of the latter were not always clear. Compensation point was usually well known.

Q7 Describe the mass flow hypothesis of phloem transport.

Most attempts at this part of the syllabus were very confused. The best answers clearly stated that at a 'source' sucrose was loaded into the phloem by active transport, this reduced water potential, drawing water in from surrounding cells and pushing solutes down the phloem. Sucrose would then be actively removed at 'sinks'.

Q8 a) When flower stems are knocked over by the wind in the open garden, after a short while the tip of the plant becomes vertical. State **TWO** possible mechanisms for this.

b) The same effect occurs when cut inflorescences in boxes in cold storage are laid down horizontally. State which of the two possible mechanisms given in a) could also explain this.

c) Explain the hormonal basis of the effect in parts a) and b).

Candidates were often able to state that the alternatives in part a) were positive phototropism or negative geotropism and that the observations in part b) suggested negative geotropism. Although the hormonal basis of tropisms was widely known and despite geotropism being the effect needing explanation, many candidates went on to explain phototropism.

Q9 a) Daminozide (B-nine) is a synthetic growth regulator that acts by inhibiting gibberelline production. Explain **ONE** effect that spraying with this substance could have on young plants.

b) Explain **FOUR** effects likely to occur in plants as a result of spraying with an anti-auxin.

This question was not usually well answered. Many candidates could state dwarfing in part a) but had much more difficulty choosing four effects in part b). The expected effects were dwarfing, bushiness, leaf drop and lack of tropic responses although any correct effect was given credit.

Q10 Describe, with the aid of fully labelled diagrams, the tissue changes that occur in the stele of a stem during the process of secondary thickening.

This question was answered poorly, despite only requiring a basic description of secondary thickening as it affects the stele. Many described the entire stem, many only used diagrams in their answer (labelled not annotated) and some drew roots.