UNIVERSITI SAINS MALAYSIA

Final Examination
2016/2017 Academic Session

May/June 2017

JIB 324 – Plant Developmental Biology
[Biologi Perkembangan Tumbuhan]

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains **FOUR** printed pages before you begin the examination.

Answer **FIVE** questions. You may answer **either** in Bahasa Malaysia or English.

All answers must be written in the **answer booklet** provided.

Each question is worth **20 marks** and the mark for each sub question is given at the end of that question.

In the event of any discrepancies in the exam questions, the **English** version shall be used.

*Sila pastikan bahawa kertas peperiksaan ini mengandungi **EMPAT** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.*

*Jawab **LIMA** soalan. Anda dibenarkan menjawab soalan **sama ada** dalam Bahasa Malaysia atau Bahasa Inggeris.*

*Setiap jawapan mesti dijawab di dalam **buku jawapan** yang disediakan.*

*Setiap soalan bernilai **20 markah** dan markah subsoalan diperlihatkan di penghujung subsoalan itu.*

*Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi **Bahasa Inggeris** hendaklah diguna pakai.*

Answer **FIVE** questions.
*Jawab **LIMA** soalan.*

1. Draw a nitrogen cycle, and explain the **five** major processes taking place.
*Lakarkan kitar nitrogen, dan jelaskan **lima** proses utama yang berlaku.*

(20 marks/*markah)*

2. Explain the ways plants survive under the following stress :

(a) Water deficit

(b) High temperature

Jelaskan cara tumbuhan mandiri bawah tegasan berikut :

(a) Defisit air

(b) Suhu tinggi

(20 marks/*markah)*

3. (a) Distinguish the physical, chemical and mechanical seed dormancies.
Bezakan antara kedormanan fizik, kimia dan mekanik.

(b) What are the treatments needed to overcome each type of the dormancies?
Apakah rawatan yang diperlukan untuk memecah setiap jenis kedormanan tersebut?

(20 marks/*markah)*

4. Give **FOUR** roles for each of the following plant growth hormones:

(a) Abscisic acid
(b) Auxin
(c) Gibberellic acid
(d) Cytokinin
(e) Ethylene

*Berikan **EMPAT** peranan setiap hormon tumbuhan berikut:*

(a) Asid absisik
(b) Auksin
(c) Asid giberelik
(d) Sitokinin
(e) Etilena

(20 marks/*markah*)

5. With a diagram, describe the stages of:

(a) Microsporangium (pollen grain) development

(7 marks)

(b) Embryo differentiation/embryogenesis

(6 marks)

(c) Fruit ripening

(7 marks)

Berserta gambar rajah, terangkan peringkat:

(a) Perkembangan mikrosporangia (bijian debunga)

(7 markah)

(b) Pembezaan embrio/embriogenesis

(6 markah)

(c) Kemasakan buah

(7 markah)

6. Discuss the following factors on flowering induction :

(a) Florigen

(b) Photoperiodism

Bincangkan faktor berikut dalam induksi pembungaan :

(a) Florigen

(b) Fotoperiodisme

(20 marks/*markah*)

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