
UNIVERSITI SAINS MALAYSIA

Final Examination
2015/2016 Academic Session

May/June 2016

JIB 324 – Plant Developmental Biology
[Biologi Perkembangan Tumbuhan]

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains **THREE** 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 **TIGA** 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 figure showing nitrogen cycle and explain the **five** major processes taking place.
Lakarkan rajah menunjukkan kitar nitrogen dan jelaskan lima proses utama yang berlaku.

(20 marks/markah)

2. (a) Explain the physiological changes that occur during leaf senescence.
Jelaskan perubahan fisiologi yang berlaku semasa kesenesensan daun.

(b) Describe the four types of plant senescence.
Terangkan empat jenis kesenesensan tumbuhan.

(20 marks/markah)

3. Explain the following stress effects on plant growth and development
Jelaskan kesan tegasan berikut terhadap pertumbuhan dan perkembangan tumbuhan
 - (a) Water deficit/drought
Defisit air/kemarau
 - (b) Soil salinity
Saliniti tanah
 - (c) High temperature
Suhu tinggi
 - (d) Air pollutants
Pencemar udara
 - (e) Heavy metals
Logam berat

(20 marks/markah)

4. (a) Compare vernalisation with photoperiodism in a table.
Banding vernalisasi dengan fotoperiodisme dalam satu jadual.

(b) Explain the methods of breaking seed dormancy.
Jelaskan kaedah memecah kedormanan biji.

(20 marks/markah)

5. List **four** stimulatory effects of the following hormones
Senaraikan empat kesan rangsangan hormon berikut

- (a) Auxin
Auksin
- (b) Cytokinin
Sitokinin
- (c) Ethylene
Etilena
- (d) Gibberellic acid
Asid giberelik
- (e) Abscisic acid
Asid absisik

(20 marks/markah)

6. With a diagram, describe the structure and development of

- (a) a pollen grain
- (b) an ovule

Dengan gambar rajah, terangkan struktur dan perkembangan suatu

- (a) *bijirin debunga*
- (b) *ovul*

(20 marks/markah)