F.6 Mock Examination (2019-2020)
Suggested Answer

Section A

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
C	**B**	**D**	**C**	**B**	**A**	**C**	**D**	**A**	**A**
11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
D	**B**	**D**	**A**	**B**	**C**	**B**	**B**	**C**	**B**
21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
B	**A**	**C**	**A**	**D**	**B**	**B**	**C**	**B**	**C**
31.	32.	33.	34.	35.	36.				
A	**A**	**B**	**D**	**A**	**C**				

Section B

1(a) (i) controls the size of stomata (1)
(ii) H, I, J (1)
(iii) transport of water (1) and minerals

(b) Magnesium (1)
Leaves of plant H are yellowish due to the lack of chlorophyll. There is a lack of magnesium for chlorophyll synthesis. (1)

(c) Organic compound in egg shells are broken down into ammonium compound by putrefying bacteria/decomposer. (1)

Ammonium compounds are oxidized to nitrites and then nitrates by nitrifying bacteria. (1)

2(a) It has leaves with network of veins (1)

(b) (i) Plantae (1) (ii) Phylum (1) (iii) Bauhinia (1)

(c) The chromosomes from the two parents fail to pair up during meiotic cell division (1)
because they are not homologous chromosomes (1)
Therefore, *Bauhinia blakeana* fails to produce gametes.

(d) *Bauhinia blakeana* can only reproduce asexually/ by grafting. (1)
There is no genetic variation among offspring of *Bauhinia blakeana.* (1)
They are less adapted to environmental changes. If one disease can infect one individual, it can also infect another individual of the same species. (1)

3(a) It has no true roots, stems and leaves (1)
(b) (i) Chlorophyll molecules capture light energy and electrons of the chlorophyll molecules are excited. (1)
Energy is released when the excited electrons pass through the electron transport chain.(1)
Some energy released is used to split water molecules into hydrogen and oxygen. (1)
Aerobic bacteria were attracted by oxygen and were concentrated on the chloroplasts. (1)

(ii) As a control set-up to show that the distribution of the bacteria is due to the effect of light but not other factors. (1)

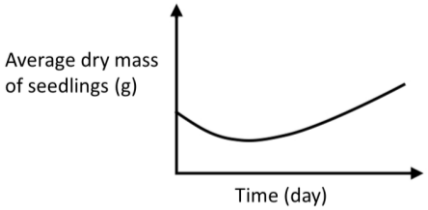
(c) (i) intensity of the light/ duration of exposure to light (either one x 1)
(ii) Photosynthesis occurs at similar rates in red and blue lights (1)
which are higher than that in green light (1)

4(a) **Redness:** Arterioles in nearby regions dilate. There is an increased blood flow to the region. (1)
Pain: Swollen tissue press on and stimulate pain receptors in the skin. (1)

(b) B cells are activated. They multiply and differentiate into plasma cells. (1)
These plasma cells produce antibodies. (1)

(c) **Dislocation during movement:** Ligaments (1) are damaged, they cannot hold bones in positions. (1)
Joint cannot be bent: Tendons (1) are damaged, they cannot transmit the force generated by muscle contraction to the bones. (1)

5(a) Title: **The change in average dry mass of seedlings in 30 days** (1)



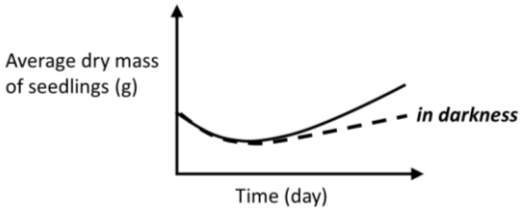
X-axis (time (day)) (1)
Y-axis (average dry mass of seedlings (g)) (1)
Curve (1)

(b) The dry mass decreases. Enzymes break down food reserves stored in the cotyledons (1)
to be used in respiration to provide energy/ to provide materials for growth. (1)

(c) To soften seed coat to facilitate emergence of the radicle /
To swell the seed to rupture seed coat /
To activate enzymes to break down the insoluble food reserves into soluble forms/
As a medium of transport of the soluble food substances (either one x 1)

(d) Heating an organism in an oven at slightly above 100^{o}C until a constant mass is obtained. (1)

(e) (i)



(ii) Light is not a necessary condition for seed germination. (1) Seed can still germinate and dry mass decreases (1) from day 0 to day 12.
However, green leaves are not able to carry out photosynthesis in darkness (1)
The production of food in the seedlings placed in darkness is lower than that in the seedlings placed under bright light. (1)

6(a) In flooded fields, availability of oxygen is very low.
Plants need to undergo anaerobic respiration which causes the production of ethanol (1)
A high concentration of ethanol is toxic to cells. (1)

6(b) Brown rice contains a larger amount of dietary fibre. (1)
which adds bulk to food. (1)
It stimulates peristalsis in the alimentary canal. (1)
and reduce the chance of constipation. (1)

(c) Starch is broken down into maltose by the action of amylase in the saliva/ pancreatic juice. (1)
Maltose is further broken down into glucose by the action of carbohydrases in the intestinal juice. (1)

7(a) Insulin is a protein which will be digested by protease in the pancreatic juice. (1)

(b) The pancreatic juice containing digestive enzymes cannot pass into the duodenum via the pancreatic duct. (1)
It accumulates in the pancreas. (1)
Proteases in the pancreatic juice digest these cells/
Lipases in the pancreatic juice digest the cell membrane of these cells (1)

(c) Insulin stimulates the liver cells to convert glucose to glycogen/ body cells to take up more glucose for respiration. (1)
Blood glucose level decreases. (1)

(d) Scientists build on the prior work of other scientists. (1)

(e)

	Type 1 diabetes mellitus	***Type 2 diabetes mellitus***
Major risk factor (1)	Heredity	Lack of exercise/Obesity
Can it be treated by the regular injection of insulin? (1)	Yes	No

8(a) Inner zone of the phospholipid bilayer is hydrophillic (1)

(b) (i) AUC AUC UUU GGU GUU UCC (1)
(ii) Ile Ile Phe Gly Val Ser (1)

(iii) Nucleotides 7, 8 and 9 are deleted (1)
The protein formed has a missing ***Phe*** amino acid (1)
which altered the conformation of the ion binding site. (1)

(c) If it is X-linked, the daughter should have two recessive alleles of this disease on each of her X chromosome (1)
One of the X-chromosome with the recessive allele must be inherited from her father (1)
As the father only possess one X-chromosome, he should have the diseases if it is X-linked (1)
Since the father is normal, the defective allele is not located on X-chromosome

(d) Several codons code for the same amino acid due to the degenerative nature of the genetic code, (1)
mutation in one base may not lead to a change in the amino acid coded, normal gene product can still be produced in some cases. (1)
OR
Most mutations are repaired by substituting/ replacing the changed nucleotide with the correct nucleotide, (1) so the normal mRNA can still be formed. (1)
OR
Changes in a few amino acids may not alter the conformation of the active site of the gene product, (1)
so the mutation may not affect the functions of the gene product. (1)

9. **Selective breeding (max: 4 marks)**

- Animals and plants with traits beneficial / desirable to humans are selected for breeding (1)
- This results in isolation (e.g. geographical isolation) of the selected organisms from its wild types (1)
- and stop the gene flow between the selected organisms and wild types (1)
- As time goes, genetic variations accumulated (1) such that
- the selected organisms and wild types can no longer interbreed to produce offspring (1)

Comparative molecular biology (max: 3 marks)

- each amino acid in a polypeptide is coded by a genetic code in the DNA (1)
- Mutation in the genetic code would result in a different amino acid being incorporated in the polypeptide (1)
- Organisms with closer evolutionary relationship would have fewer mutations OR fewer the number of different amino acids (1)

(+3 Effective communication)