(d). The activated B-cells differentiate into plasma B-cells/effector cells and memory B-cells. 03-

In the second encounter memory B-cells will remember each specific antigen encountered, and is able to mount a strog response; 10.

45)

a(i) B= Carbondioxide; ✓1
C= ethanal. ✓½ 01

(ii) -NAD+ function as enzyme to carry out oxidation-reduction reactions; any 1
- It acts as a hydrogen acceptor to remove hydrogen atoms from a substrate;

b(i) A= pyruvate is first decarboxylated to Carbondioxide and ethanal; ✓
Ethanal is hydrogenated using ✓ hydrogen atoms $NADH_2$ ✓ to ethanol; 03
NAD^+ is then made available as a hydrogen acceptor;

(ii) Lactate is carried by the blood stream to the liver; ✓
In the hepatocytes lactate is to pyruvate; ✓ Most of pyruvate is ✓ Converted by gluconeogenic pathway to glucose-6-phosphate; Hydrogen atoms are provided by $NADH_2$; 03.

c) Ethanol is highly toxic to plant cells, ✓ its accumulation may cause death 02
of the plants; ✓

10:

46) (a).

Primary response is the response that occurs following the first exposure to a foreign antigen; ✓ 02

Secondary immune response is the reaction of the immune system when it Contacts an antigen for the second and subsequent times; ✓

b(i).

Following the first exposure to a foreign antigen, a lag phase occurs in which no antibody is produced, This lag phase is longer. But it longer in primary than in secondary; ✓

(c) Primary

- The lag / Latent period of antibody production is much longer; ✓
- Amount of antibody produced is relatively low / The peak height of primary response is lower 02
- Over a short time antibody level declines to a point where it may not be detected; ✓ 04

Secondary

- The lag phase is very short; ✓
- Amount of antibody produced increased rapidly to a higher peak ✓ 02
- Antibody levels remain high and for longer times

3 c(i)

Phenotype. Spartina alterniflora × Spartina maritima; ✓

2n = 62 ; 2n = 60 ; ✓

genotype AA ; BB ; ✓

gametes (A) n=31 ; (B) n=30 ; ✓

Fertilization

Max 04

F_1 S. townsendii • ✓

2n = 61 ; ✓

genotype AB sterile • ✓

↓ doubling of chromosomes

↓ polyploidy • ✓

Spartina anglica

genotype AABB 4n = 122. ✓

Fertile allotetraploid.

ii) • Polyploid crop plants,
- grow faster,
- larger and more robust increase yield by producing larger leaves, flowers, fruits and seeds due to increased number of chromosomes in the cells. (3mks)
- More resistant to diseases, climatic changes,
- Formation of new varieties and speciation;

10

44 a(i)

Glucose levels increase at first because was absorbed into blood; ✓
This rise in glucose cause insulin to be secreted from β-cells of the pancreas; ✓ 03

Insulin causes increased uptake of glucose into liver, muscles, Convert glucose to glycogen, fat, increase ✓ cellular activities respiration; ✓ the effect of reducing glucose levels.

(ii) X has diabetes and therefore intake of glucose does not stimulate insulin production. ✓
Glucose levels in blood continues to increase as there is no insulin to reduce its level. ✓ 03.
Glucose levels in blood remain high, decreasing only slightly below renal threshold; ✓

(b) Glucose is respired by cells, and it decreases, 01

(c). Type 1 diabetes mellitus is caused by autoimmunity disorder ✓ where β-cells of Islets of langerhans are destroyed; ✓ The pancreas cannot secrete insulin ✓ 03mk and the patient require regular ✓ frequent injections of insulin to decrease sugar glucose levels.

10

41(c) Bundle sheath cells are surrounded by ring of mesophyl cells. This arrangement ensures that bundle sheath cells are isolated from air inside the leaf; this prevents photorespiration; any 3
- PEP-Carboxylase has a higher affinity for CO_2;
- PEP-Carboxylase does not carry out oxidation and no photorespiration;
- PEP-Carboxylase operates at a higher optimum temperature; without being denatured

10

42 a(i) C = bipolar neurone. ½
D = ganglion cell. ½ 1

(ii) Light rays enter the eye through region of ganglion cell and bipolar neurone. 01
(Arrow drawn vertically upwards)

b(i)
Many rod cells synapse with a single bipolar neurone / relay neurone, Synaptic Convergence gives increased sensitivity to low levels of light; 02

(ii) Individual Cone cells have their own relay neurones; giving a greater visual acuity; 02

(c) Rod cells contain photosensitive pigment rhodopsin; which is made up protein opsin and retinal; ✓
Light causes retinal to change shape from its normal isomeric form to another isomeric form; ✓
As a result retinal and opsin split/ 02
break apart/ bleaching; ✓
This splitting in turn leads to creation of generator potential; which if it exceeds threshold level, an action potential is set up in the ~~bipolar neurone~~ ganglion cell

10

43) (a) Hybridisation is the production of one or more hybrid offspring by crossing or mating of genetically different parents; 01

(b) This is due to the absence of homologous chromosome pairs; ✓
During meiosis there is no pairing 02
and separation of homologous; ✓
chromosomes/ There is no formation of fertile gametes.

(c)

DRAFT GUIDE.

SECTION - B (60 MARKS)

(2)

41 a(i)

When CO_2 Concentration is a rate limiting, increasing Concentration of CO_2 increases the rate of photosynthesis in direct proportion to the increase in Concentration (region A); ✓ (03 marks)

At high light intensity as CO_2 Concentration increased; rate of photosynthesis increased rapidly to the highest point; and remained Constant; ✓ 03

At low light intensity as CO_2 Concentration increased, rate of photosynthesis increased gradually to the lowest point and remained Constant; ✓

(ii) A= CO_2 Concentration is rate limiting; ½ ½ 01.

B= Low light intensity is rate limiting;

(b) At high light intensities alot of ATP, and reduced $NADPH_2$; will be available from light dependent reactions; ✓

Increase in CO_2 Concentration means that more CO_2 will Combine with Ribulose bisphosphate using enzyme RuBisCO; ✓ 03

As a result Calvin cycle will proceed at a greater/higher rate, more glycerate phosphate will be Converted to triose phosphate which in turn made into more Carbohydrate / Hexose sugar ✓

Biology P1 P530/1

1. C
2. C
3. D
4. B
5. B
6. D
7. C
8. D
9. C
10. D

SECTION A. P530/1 (1)

11-B 21-D 31-D
12-B 22-A 32-C
13-A 23-D 33-C (40mks).
14-A 24-B 34-B
15-D 25-B 35-C
16-D 26-D 36-C
17-C 27-C 37-B
18-A 28-A 38-C
19-C 29-C 39-B
20-A 30-D 40-C