

## NUTRITION IN PLANTS AND ANIMALS MARKING SCHEME

**1. 1989 Q1 P1**

Reaction I: - Condensation

Enzyme B: - Sucrase

**2. 1990 Q1 P1**

- i) Salting – This removes/absorbs water by osmosis from the micro-organism cells which then die due to dehydration. Meat also becomes dehydrated and thus unsuitable for microbial growth.
- ii) Refrigeration- Low temperature renders the micro-organisms inactive ( Enzymes do not work at low temperatures)
- iii) Canning – Boiling kills all micro-organisms in the food; sealing under pressure excludes all micro-organisms and ensures that no growth takes place.

**3. 1991 Q4 P1**

Similarity- Both are heterotrophic.

Difference: Predators kill to get food while parasites obtain foods without ( necessarily) killing the host.

**4. 1991 Q9 P1**

Pancreatic juice containing digestive enzymes; is prevented from reaching food Insulin(and glucagons) which regulates sugar is released directly into the blood stream.

**5. 1992 Q1 P1**

- a) ATP, Oxygen, Hydrogen/Reduced NADP.  
Acc. H<sup>+</sup>, NADP.H<sub>2</sub>
- b) Such plants grow in nitrogen deficient soils; insect provides them with nitrogen

**6. 1992 Q12 P1**

- a) i) Herbivorous
- ii) Absence of incisors in the upper jaw  
Presence of diastema/Absence of canines
- b) –Long flat body suitable for fitting into the alimentary canal providing large surface area for absorption of food.
  - Presence of suckers/hooks for attachment/preventing it from being egested(moved out)
  - Produces Chemicals/mucus to neutralize/inhibit/prevent digestion of hosts enzyme.
  - Loss/lack of simplified digestive systems because they are not needed
  - High eggs production to ensure next generation
  - Tolerance to low oxygen content/anaerobic.

7. **1993 Q1 P1**  
 -Mould/fungal spores (in the air) land on the bread; they germinate and develop into mycelin/hyphae; when the mycelin mature they form black sporangia
8. **1993 Q5 P1**  
 - Roughage provides grip needed for peristalsis/lack of roughage results in slow/no movement of food leading to constipation. ( Acc. Add bulk to food peristalsis to take place:)
9. **1993 Q18 P1**
- a) Use of chemicals/preservative/ash  
 Canning/tinning/bottling  
 Smoking  
 Refrigeration/cold storage/freezing  
 Salting/honey/sugar  
 Drying/heating  
 Pasteurization
  - b) (i) Chemical/ash/preservatives- Denature the protein in bacteria/kills bacteria also stops the growth of micro-organisms/multiplication.  
 ii) Canning/bottling/tinning- Sterilizing/killing micro-organisms and subsequent scaling prevents entry of micro-organisms.  
 iii) Radiation- Kills/initiates micro-organisms.  
 iv) Smoking- Has drying effect, which kills the micro organisms by dehydration/ coagulating proteins, and also contains formaldehyde which kills the micro-organisms.
  - v) Drying/heating- Dehydrates the food making the environment suitable for the growth of micro-organism; when they're dehydrated their growth is also reduced.
  - vi) Refrigeration/cold storage- Inactivate the enzymes in food preventing autolysis; metabolic activities of micro-organisms is reduced/inactivated therefore no growth/multiplication; the water in micro-organisms food, also gets frozen stopping them from multiplying.
  - vii) Salting/putting in sugar/honey- Dehydrates the food thus making the environment unsuitable for the growth of micro-organisms; which may also be dehydrated thus reducing their growth/multiplication
  - viii) Pasteurisation/boiling/UHT- kills micro-organisms  
 Rej. Germs for micro-organisms  
 Acc. Bacteria for micro-organisms
10. **1994 Q20 P1**

- i) Bacteria- Used in the manufacture of: antibiotics, butter/cheese/  
fermentation of milk/curing leaf/tobacco, Vitamin K,  
enzyme such as amylase/invertase, vinegar/lactic/citric acid
- Septic tanks/modern sewage marks make use of bacteria in the treatment of sewage/biogas production.
  - Saprophytic bacteria are used to compost decomposition.
  - Symbiotic bacteria in ruminants help in digestion
  - ( some) bacteria cause disease to man/animals/plants
  - Many bacteria destroy/spoil/decay food
  - Nitrifying/nitrogen fixing bacteria increase soil fertility/  
make nitrates available
  - Denitrifying bacteria reduce fertility/reduce nitrates in the soil/convert nitrates to nitrogen gas

- ii) Fungi – ( Some) cause decay/destroy/spoil our food
- ( Some) cause diseases to human/animals
  - May be used as food e.g mushroom/yeast
  - Used in the production of antibiotics e.g penicillin/streptomycin
  - Cause diseases to our crops/plants e.g potato blight
  - Yeast used in brewing industry/baking/source of vitamin
  - Important in recycling nutrients in the soil/cause decay
  - Mycorrhizal association is important in water absorption/nitrogen fixation in forests

11. **1995 Q5 P1**  
Provide energy required for splitting water molecules/ photosynthesis.
12. **1995 Q7 P1**  
Nitrogen  
Making cell walls  
Magnesium / mg
13. **1996 Q4 P1**  
Scurvy
14. **1996 Q7 P1**  
(a) To split water/ Photosynthesis/hydrous  
(b) Glucose/carbohydrate/ starch/ sugar.
15. **1997 Q10 P1**  
Vitamin D- Rickets/Osteoporosis  
Iodine- Goitre
16. **1997 Q20 P1**

- (a) Breakdown of (complex) food substances by enzymes; to simpler compounds (which can be absorbed)
- (b) Small intestines are long/coiled: to offer large surface area for digestion and absorption:  
 The walls are muscular: for peristalsis/ inner walls possess mucus glands/ accept goblet cells that secrete mucus; for lubrication; and protection of wall from digestive enzymes:  
 The inner walls have digestive glands: that secrete (digestive) enzyme:  
 The inner walls have villi: to increase surface area, absorption/ diffusion; accept 'epithelium is one cell thick'  
 The Villi have numerous blood vessels: for transport of the end products of digestion; accept at least two correctly named examples/ end products of glucose amino acids/ mineral salts vitamins.  
 The villi also have vessels for transport of fats/lipids  
 Accept illustrations of cell are thick epithelium

**17. 1998 Q2 P1**

Yellowing of leaves/stunted/ growth/chlorosis/ lack chlorophyll

**18. 1998 Q14 P1**

- (a) Light; Rej: light intensity  
 (b) Test for starch  
 (c) (i) The covered part of the leaf remain brown/yellow/ retain color of iodine, and the uncovered parts turned blue/ black; rej blue alone black alone.  
 (ii) Starch was formed in the covered part of the leaf (because of the presence); while starch was not formed in the uncovered part of the leaf ( because of lack light)  
 (d) To destarch the leaf; OWETT

**19. 1998 Q20 P1**

The mammalian intestines are relatively long/coiled/folded. This allows food enough (enough) time/increases surface area for digestion and absorption of products of digestion. The intestinal surface area for absorption. The glands have enzymes which secrete enzymes for digesting e.g. of correct enzyme, maltase, sucrase, lactase, enterokinase and peptidases. Some glands/goblets cells also produce mucus which protects the intestinal wall from being digested, reduce friction. Intestines have opening of ducts which allows bile/pancreatic juice into the lumen. The intestines have circular and longitudinal muscles whose contraction/relaxation/peristalsis leads to the mixing of food with acc.

At least enzymes/juices facilitating rapid digestion and helps push food along the gut. Intestines are well supplied with blood vessels to supply oxygen/remove digested food. Presence of lacteal vessels for transport of fats/lipids. Have thin epithelia to facilitate fast/rapid absorption/diffusion. Allow increase in surface area for absorption only.

Cell biology/cytology. Occurrence of cell e.g. mitochondria, ribosome's, nucleus, cytochromes organelle point to a common ancestry.

**20. 2001 Q5 P1**

Act as valves for regulations of food movement/ to close or open various parts of the canal.

- Churning (acc. mixing food with enzymes) pushing food along peristalsis

**21. 2001 Q12 P1**

(a) (i) More active sites of enzymes available, for a large number of Molecules of substrate; hence increase in the rate of reaction ( rapid of fast increase in the rate of reaction)

(ii) B and C

Enzymes/ substrate are in equilibrium / All active sites are occupied; hence rate of reaction is constant.

(b) Raising concentration of enzymes

(c) P<sup>H</sup>, temperature, inhibitors/ cofactors

**22. 2001 Q16 P1**

(a) (i) The more the feed the more the faecal output  
The less the feed the less the faecal output

(ii) The first four months

$$\frac{2.1 + 2.0 + 1.8 + 1.7}{4} \quad \left| \quad \frac{28.0 - 20.4}{4} \quad \left| \quad \frac{7.6; 1.9 \text{ (kg)}}{4}$$

The last two months

$$\frac{14 + 0.1}{2} \quad \left| \quad \frac{29.5 - 28.0}{2} \quad \left| \quad \frac{1.5}{2} = 0.75\text{kg}$$

(iii) Fast/ rapid/Active growth hence increase in weight

The last two months

Slow growth, reached maturity

(iv) Feed X

Give reason for your answer

Group A gained (more) weight, on less food while group B lost weight on more food.

b) growth, repair, protection, energy production

c) a solvent, transport medium.. Hydrolyses of food, maintenance of temperature.

**23. 2002 Q3 P1**

a) Substances that activate enzymes

b) Metallic ions e.g. iron / mg / Zn / Cu /(accept correct iron forms)

Fe<sup>2+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, Mn<sup>2+</sup>, CO<sub>2</sub><sup>+</sup>, Kl, mo<sup>2+</sup>, (Reject wrong charges).

24. **2002 Q10 P1**  
 Converted into fatty acids and stored beneath skin (adipose tissue)
25. **2003 Q8 P1**  
 Absorption of water; accept absorption of salts / calcium / iron;  
 secretion of mucus
26. **2004 Q9 P1**  
 Nitrogen;  
 Magnesium;  
 Iron, acc. Magnesium ion/ iron rej symbols of elements
27. **2006 Q8 P1**  
 Prevents scurvy/ prevent bleeding of gums/ prevent bleeding of gums/ Prevents  
 poor healing of wounds/ prevent degeneration of muscle and cartilages/ prevent  
 red spot on skin/ prevent anaemia  
 Excretion absorption of iron  
 Enables absorption of iron  
 Boost immunity  
 Development of healthy gums  
 Synthesis/ maintenance of collagen fibres/ connective
28. **2006 Q11 P1**  
 Stimulates conversion of excess glucose to glycogen for storage  
 Enhances break down of glucose; stimulates glucose converts to fats and stored.
29. **2006 Q17 P1**  
 (a) Homodont – having same kind/ type/ similar teeth. Heterodont – having  
 different type kind of teeth  
 (b) Cutting/ chopping/ Shearing/ Slicing/ crusting  
 (c)  $\begin{array}{c} \underline{C} \quad \underline{O} \quad \underline{P} \quad \underline{M} \quad \underline{3} \quad \underline{M} \quad \underline{3} \\ 1 \quad 3 \quad 3 \end{array}$   
 Either capitals or small letters accepted. Their must horizontal line  
 separating upper jaw from lower jaw.
30. **2006 Q18 P1**  
 (a) Emulsification of fats/ breaking into small droplets; Increase surface area for  
 digestion; Neutralizes acidity of chime/ provides alkaline media for enzyme  
 action.  
 (b) Increase in substrate concentration rise enzyme action up to a certain point and  
 further rise of substrate will have no effect.
31. **2006 Q27 P1**  
 Hydrogen; Oxygen
32. **2007 Q6 P1**

Take place in the grana of the chloroplast. Light is absorbed and used to split water molecules into hydrogen ions and oxygen, photolysis. Energy is formed and is stored in form of ATP

**33. 2007 Q7 P1**

- (a) (i) – Pre- molar tooth
- (ii) – presence of two roots
  - Presence of cusps of the crown
- (b) Has nerve cells that increase sensitivity of the tooth to heat and pain
  - Has a blood vessel that provides nourishment to the tooth and remove Waste products

**34. 2007 Q8 P1**

- (a) Vitamin D, Vitamin K.
- (b)- Transmission of nerve impulses
  - Ionic balance/ osmotic balance
  - Contraction of muscles

**35. 2007 Q25 P1**

- (a) In the stomach there is acid medium and ptyalin only acts at slightly alkaline medium
- (b) High temperature above 40<sup>0</sup>
- (c) Villi- microvilli

**36. 2008 Q5 P1**

- (a) Temperature PH co- factors, co- enzymes; enzyme product concentration; substance concentration/ metabolic poison
- (b) -Temperature- increase in temperature increases rate of enzymatic activity upto an optimum/ low temperature increases enzymatic activity/ too high temp about optimum point denatures enzymes/ enzymatic activity occur at optimum temp.
  - Ph- Enzymes work best at optimum ph/ or extreme for ph denatures enzymes.
  - Enzyme con – Increase in con increase enzymatic activity occur at optimum temperature
  - Co- enzymes – denatures enzymes increasing rate of activity
  - Strate/ enzyme cone- increase in concentration increase enzymatic activity upto certain level.

**37. 2008 Q9 P1**

- (a) Body size; sex; age

**38. 2008 Q10 P1**

- (a) Antigen B, Antigen A
- (b) Flexible/ able to change in shape

**39. 2008 Q15 P1**

Muscles respire anaerobically; resulting in accumulation of lactic acid in the tissue; causing fatigue/ muscle cramps.

40. **2008 Q16 P1**  
(a) Photosynthesis  
(b) Carbon (iv) Oxide/ Temp/ chlorophyll
41. **2008 Q18 P1**  
Transparent to allow light to penetrate photosynthetic tissue/ single layer of cells/ thin to reduce distance over which light penetrate photosynthetic tissue; presence of stomata for gaseous exchange; closely fitting cells to protect inner tissues
42. **2008 Q23 P1**  
(a) Canine  
(b) Pointed/ sharp for piercing/ tearing/ cutting food  
(c) (i) C- Absorption of iron/ prevent scurvy/ quick healing of wounds/ best immunity/ antioxidant/ prevents anaemia/ formation of connective tissues/ K – blood clotting
43. **2008 Q24 P1**  
Light reaction – Granum/ lamellae/ mitochondria/ thylakoid  
Dark reaction - Stroma
44. **2009 Q18 P1**  
(a) Rate of photosynthesis increases as CO<sub>2</sub> concentration increases up to a certain level / optimum level and (vice versa);  
*NB: Must mention up to optimum level or certain level*  
*Acc: Reverse: The rate of photosynthesis decreases with decrease in CO<sub>2</sub> concentration until it stop*  
b) Rate of photosynthesis increase as the light intensity increases up to an optimum level (and vice versa)
45. **2009 Q22 P1**  
Large / powerful for cracking / breaking / crushing bone;/ slide past each other / scissor – like for shearing / cutting / slicing (off) flesh / tendons / skin from bone;
46. **2009 Q23 P1**  
A component of hemoglobin / formation of haemoglobin; *Acc: Myoglobin*
47. **2009 Q24 P1**  
(a) Young people are actively / rapidly growing hence require more energy than older people *NB: Growth has to be mentioned*  
(b) Manual workers require more energy than secretary workers  
(c) Males are more muscular hence require more energy than females
48. **2009 Q2 P2**  
(a) Herbivorous: *Rej Herbirore Acc Herbirory*

- (b) Tooth J is narrow / sharp / chisel like while tooth L is broad / ridged.  
*Accept: J has one root while L has 2/3/4 roots*

**Functional**

- (b) (i) Diastema  
(ii) For manipulation of food by the tongue  
(c) Calcium phosphate; Rj calcium / phosphorous / phosphate.

**49. 2010 Q16 P1**

Emulsification / breaking down of fats into (tiny) droplets  
Creating alkaline medium for digestive enzymes/ neutralizing acidic  
chyme (from the stomach)

**50. 2010 Q17 P1**

- (a) Herbivorous; Rej Herbivores  
(b) Lack canines/ incisors on upper jaws

**51. 2011 Q2 P1**

a) I  $\frac{2}{2}$  c  $\frac{1}{1}$  pm  $\frac{2}{2}$  m  $\frac{3}{3}$ ; (1 mark)

b) Dental carries  
Periodontis; gingivitis / pyorrhoea (2 marks)

**52. 2011 Q13 P1**

Source of energy; Storage materials; (2 marks)

**53. 2011 Q18 P1**

- a) Sublingual gland ; sub maxillary gland; parotid gland first one (2 marks)  
b) Lubricating food; digestion; moisten food; provide alkaline medium;  
(2 marks)

**54. 2012 Q1 P1**

Plants make their own food from carbon (IV) oxide and water in the presence of  
light/photosynthesis/autotrophic, while animals eat readymade food (from plants and  
animals) heterotrophic

**55. 2012 Q11b P1**

- (b) Stomach – smooth  
Bone – skeletal

**56. 2012 Q29 P1**

water; mineral ions/salts; vitamins

**57. 2012 Q3 P2**

Solutes/sodium ions/potassium chloride ions are reabsorbed into the bloodstream.