

ADVANCED LEVEL NATIONAL EXAMINATION 2008**BIOLOGY I****SECTION A****ANSWER 001**

a)

- Nucleus
- Golgi apparatus
- Vacuoles
- Mitochondria
- Cytoskeleton
- Ribosomes
- Plasma membrane

b)

- Contrirole
- Cell wall
- Chloroplast(Plastids)

ANSWER 002

a) - a cell organelle loaded with potent digestive enzymes and enclosed in a single layer of membrane

b)

- to tear down of worn-out organelles so that their parts can be recycled by the cell or autophagic vesicle/Self-eating vesicle.

- To digest particles brought into the cell by phagocytosis or

- Lysosomes fuse with phagocytic vesicles and dump their contents into the space surrounding the phagocytosed particles .

or mini digestive tract in which engulfed particle is broken down and its building blocks made available, for use by the cell.

ANSWER 003

a) -Carrier proteins are proteins that spans the membrane or transport

coins: molecules across the membrane.

- Carrier proteins are also specific for a certain ion molecule
- Ions bind to specific receptor site on protein and protein changes shape and releases ion on other side of membrane

b) - carrier proteins are specific for a certain type of solute or

- They react specifically in the only a certain molecules or coins transported by a given carrier

c)

- Because cross links give the structure strength ability to stretch.

-Withstand pulling force/ tensile strength insoluble

ANSWER 004

Enzyme	Site of secretion *	Products
Amylase	Pancreatic juice	Maltose
Lactase	Lining of ileum	Glucose and galactose
Sucrase	Wall of small intestine	Glucose and fructose

ANSWER 005

- a) Nitrogenous waste product of amoeba: ammonia
- b) cell surface membrane engulfs or flows around food particles and membrane forms vesicle pinched off and membrane reforms.

ANSWER 006

- HIV infects vital cells in the human immune system such as helps T cells, macrophages and dendritic cells or
- Progressive failure of the immune system which allows life-threatening opportunistic infections and cancer to thrive

ANSWER 007

a) In (α) glucose, the -OH group on carbon 1 is below the ring

In (β) glucose, the -OH group is above the ring.

- b) - Glucogen is a polymer of glucose in which are 1,4 and 1,6 glucosidic bonds and is a branched chain found in liver (muscles of animal cells while
- Cellulose is a polymer of B glucose with 1, 4 glycosidic bonds only and is unbranched chain found in plants.

ANSWER 008

a) Hepatic portal vein.

b) Peristalsis or muscles contract and relax squeezing food forwards or

swaying movement

c) Absorb water, absorbs mineral ions.

ANSWER 009

Hydrogen ions removed by pump mechanism potassium ions diffuse into guard cells — PH in guard cell rises
 chloride ions diffuse in malate levels increase
 water potential more negative than surrounding cells
 water moves into guard cell and turgidity of cell increases.

ANSWER 010

a) A: Atrioventricular valve close when pressure in ventricle rises above

pressure in the atrium.

B: Semilunar / aortic valves opens when pressure in the ventricle

exceeds pressure in the aorta/ artery.

C: Semilunar/ aortic valve closes when pressure in the ventricle

D: Atrio-ventricular valves opens when ventricular pressure falls below

that of the atrium.

b) $60/0.8 = 75$ beats/min

ANSWER 011

Sino-atrial node or SAN sends out waves of electrical excitation which spreads over atria causing it to contract/ atria systole. This wave reaches AVN, excitation conducted down the bundle of His/ through Purkinje tissue, to ventricles, slight delay means that ventricles contract after atria.

ANSWER 012

- Rolled/ coiled leaf/ hinge cells to reduce area exposed to environment or to trap humid air to reduce the diffusion gradient/ or to reduce water losses by evaporation .
- Thick cuticle to reduce the loss of water by evaporation .
- Stomata sunken in pits, trap layer of still humid air to reduce evaporation.
- Hairs to reduce air movement/ to trap humid air to reduce evaporation.

ANSWER 013

a) Key: R is red flower, r is white

Parents: RR x rr

Gametes: R x r

F₁ : Rr: all pink

- b) F₁ parent : Rr x Rr
 Gametes : R or r X R or r
 F₂ : RR, Rr, Rr, rr (Genotypes)
 Phenotypes: 1 red: 2 pink: 1 white

σ^{\rightarrow}	R	r
φ		
R	RR	Rr
r	Rr	rr

Genetic cross

ANSWER 014

a) If there is too much thyroxine, it inhibits or suppresses the action of the hypothalamus and pituitary gland so less thyroxine is produced.

If there is too little, the hypothalamus and pituitary are not suppressed and thyroxine is produced.

b) Negative feedback or negative retrospective effect

ANSWER 015

a) Squeezing of blood plasma through pores in the capillary due to build up of high pressure.

b) Narrower diameter increases pressure inside capillary and forces plasma out of the blood into the Bowman's capsule.

c) Small molecules like: glucose, amino acids, ions, urea, water.

d) Filtrate in descending limb of loop of Henle flowing in opposite direction to filtrate in ascending limb cells of ascending loop actively pump out chloride ions, sodium ions follow, this makes fluid around loop more concentrated. Sodium and chloride ions diffuse into descending limb. Filtrate in tubules is most concentrated when it reaches the top of the loop, descending limb permeable to water which leaves descending limb and passes into surrounding capillaries or vasa recta.

ANSWER 016

a) Key: T is tall, t is short

W is white and w is red

Parental genotype: TTWW, ttww

b) Tt Ww : tall and white

Genotypes Phenotypes

c) Parents: Tt Ww x tt ww; gametes: Tw, Tw, tW, tw x tw

Gametes	TW	Tw	tW	tw
tw	Tt Ww Tall/white	Tt ww Tall/red	ttWw short/white	ttww short/red

Ratio: 1 Tall/ white: 1 tall/red: 1 short/white: short: red

ANSWER 018

a) $\text{Kj/m}^2/\text{year}$ (or $\text{Kj m}^{-2}\text{y}^{-1}$)

b) $470 - 40 = 430$

$\frac{40}{430} \times 100 = 9.3\%$

- C) -Energy losses from egestion or Excretion
 -Not all of an organism is eaten by a consumer
 -Losses due to respiration/metabolism
 - Death of an organism before it is eaten
- d) Indicate the quantity of energy locked up in the organism biomass does not give any indication of energy fresh biomass contains a Variable water content biomass values at one point in time.

ANSWER 019

- a) Ligament
- b) Tendon: allows the muscles to pull on bones
- c) Antagonistic muscles
- d) Bones:--provide support of the bodes/ helps form the shape
 -protect indispensable organs (brain, spiral cord, heart,...)
- e) Joints: allows the muscles to pull on bones make the skeleton Flexible or without them movements would be impossible.

SECTION C

ANSWER 020

Energy from the sun leads to plant photosynthesis and energy locked up in carbohydrates. Plants use this energy for growth reproduction, gross primary production -respiration animals consume plants ; net primary production is grosses primary production -respiration.

Not all plants eaten by consumer / death of plants causes losses ;only 10% of energy is transferred to net trophic level; primary consumers eaten by secondary consumer.
 Energy losses from respiration; energy losses from excretion /ejection.

At the end, the rock of decomposers/bacteria and fungi :-some energy is locked up is fossil fuels.

ANSWER 021

a) % of filtered quantity which is reabsorbed.

Substance	Quantity filtered into nephron /day	Quantity reabsorb per day	Quantity excreted per day	% of filtered quantity which is reabsorbed
Water	180 liters	178.5	1.5	99.2%
Glucose	800 mEq	799.5	0.5	99.9%
Urea	56 g	28	28	50%
Sodium ions	25200 Eq	25050	150	99.4%
Chloride ions	18000 mEq	17850	150	99.2%
Potassium ions	720 mEq	620	100	:86.1%.

(Formula: Divide the quantity reabsorbed by the quantity filtered and multiply by 100).

b) Glucose is required by body for respiration or is too valuable to be excreted.

c) Large quantity of glucose in urine indicates diabetes mellitus.

d) Concentration of urea higher in filtrate so diffuses into blood or diffuses down concentration gradient.