

**30.4 BIOLOGY (231)**

**30.4.1 Biology Paper 1 (231/1)**

1. (a) Xylem.  
(b) Phloem.  
(c) Apical meristem. **(3 marks)**
  
2. (a) **Ultrafiltration**:- to remove toxic/ harmful substances/urea/nitrogenous waste from the blood stream.  
(b) **Selective reabsorption**:- to return useful substances/glucose and amino acids back into the blood stream. **(2 marks)**
  
3. (a) Hepatitis B.  
(b) (i) *Vibrio cholera*.  
(ii) *Candida vaginalis/albicans/vaginitis*. **(3 marks)**
  
4. (a) The red blood cell was placed in a hypertonic solution; it lost water by osmosis; and became crenated. **(2 marks)**
  
5. (a)
  - Temperature; pH; co-factors; co-enzyme; substrate concentration
  - Cell wall inhibitors; enzyme concentration; product concentration. **(2 marks)**
  
6. (a) Failure of homologous/sister chromatids to segregate during meiosis.  
(b) Height; weight/mass; length of toe/finger. **(3 marks)**
  
7. (a) Preserved remains of dead organisms that lived in ancient times.  
(b) Convergent evolution occurs when two dissimilar species/structures/organisms of different embryonic origin change in response to similar environmental conditions and develop similar characteristics/modified to perform similar functions. **(4 marks)**
  
8. (a) Anaphase.  
(b) (i) Chromatid pairs move towards opposite pole/ends of the cell/sister chromatids separate.  
(ii) The spindle apparatus have disappeared/spindle fibres have disappeared.  
(iii) Root tip/shoot tip/young leaves. **(4 marks)**
  
9.
  - Basal metabolic rate (B.M.R); sex.
  - Occupation/activity; age; body size. **(3 marks)**
  
10. (a) Antigens A; and B/rhesus factors/rhesus antigens/antigen D.  
(b) Pliable/flexible/able to change its shape. **(3 marks)**
  
11. (a) The ability of organisms to maintain a stable/constant internal environment.  
  
(b)
  - Breathing mechanism/gaseous exchange.
  - Thermoregulation/temperature regulation.
  - Osmoregulation/regulation of water and ions/excretions.
  - Regulation of blood sugar level/glucose; regulation of pH value . **(4 marks)**
  
12.
  - Transport of protein.

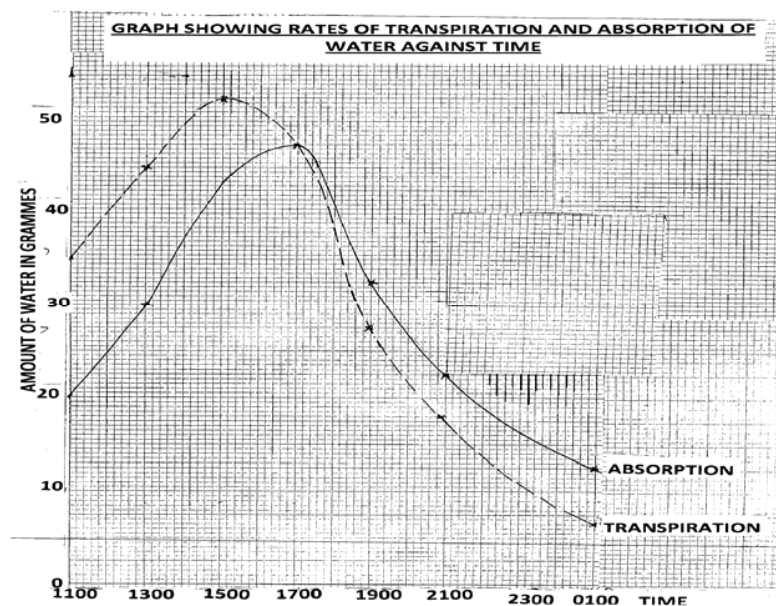
- Transport/synthesis of lipids/steroids.
  - Provision of sites of attachment of ribosomes.
  - Stores calcium in skeletal muscles.
  - Storage of proteins/enzymes/hormones.
  - Detoxification of organic materials. (2 marks)
13. (a) Fovea/yellow spot/fovea centralis.  
 (b) Image is
  - upside down/inverted.
  - back to front/reversed.
  - smaller than object/diminished.
  - real. (3 marks)
14.
  - **Growth**:- increase in numbers/decrease in numbers/change in numbers/growth rate.
  - **Dispersion**:- spread or distribution of organisms in a habitat.
  - **Density**:- the number of individuals per unit area. (3 marks)
15. Muscles are subjected to respire anaerobically resulting in accumulation of lactic acid in the tissue; causing fatigue/muscle cramps. (2 marks)
16. (a) Photosynthesis.  
 (b)
  - Carbon IV oxide (concentration).
  - Temperature.
  - (Amount) of chlorophyll. (2 marks)
17. (a) **Lag phase**:- the number of cells dividing are few/the cells have not yet adjusted to the surrounding environmental factors.  
 (b) **Plateau phase**:- most cells fully differentiated/few cells are still dividing. Rate of cells dividing is equal to rate of cells dying. (2 marks)
18.
  - Transparent to allow light to penetrate the photosynthetic tissue;
  - Single layer of cells/thin to reduce distance over which light penetrates;
  - Photosynthetic tissue;
  - Presence of stomata for gaseous exchange;
  - Closely fitting cells to protect inner tissue. (2 marks)
19. (a) Cardiac muscle/tissue.  
 (b) Contraction of the heart. (2 marks)
20. (a) Circulatory system in which blood passes through two capillary systems before flowing back to the heart/blood passes only once through the heart to complete the circuit.  
 (b) Earthworm/Leech/Ragworm/fish.  
 (c) Ostium. (3 marks)
21. (a) A state during which a seed cannot germinate/resting before seed germination.  
 (b) Abscisic acid. (2 marks)
22.
  - Large air spaces.
  - Thin cell walls. (2 marks)
23. (a) Canine.  
 (b) pointed/sharp for piercing/tearing/cutting food.  
 (c) (i) **C**:- maintenance of healthy cells promotes absorption of iron/prevents scurvy/quick healing of wounds/prevents bleeding of gum/boosts immunity.

- (ii) **K**:- Participates in clotting of blood. (4 marks)
24.   
 ▪ **Light reaction**:- Grana.   
 ▪ **Dark reaction**:- Stroma. (2 marks)
25.   
 ▪ **Bean plant**:- Dicotyledonae; leaves are net-veined/leaves with petiole/star-shaped xylem with Phloem in between arm of xylem/tap root system.   
 ▪ **Bat**:- Mammalia; presence of fur/hair/mammary glands. (4 marks)
26. (a) **Colchicine**:- Used in inducing polyploidy.   
 (b) **Papain**:-Used as meat tenderizer. (2 marks)
27. (Anaerobic) micro organism/break down harmful substances in sewage. (1 mark)
28. (a) Budding.   
 (b) (i) **Protandry**:- stamens/anthers/male parts mature before the carpels/pistil/female parts/Stigma of a flower.   
 (ii) **Protogyny** :- carpels mature before the stamens of a flower. (3 marks)
29. Cushions foetus against shock/provide a suitable medium for embryo to grow. (1 mark)
30. (a) Pelvic girdle.   
 (b) Femur.   
 (c) Obturator foramen. (3 marks)

### 30.4.2 Biology Paper 2 (231/2)

1. (a)   
 ▪ **F**:- Oestrogen.   
 ▪ **G**:- Progesterone. (2 marks)
- (c)   
 ▪ **F** :- Promotes healing and repair of the uterus.   
 ▪ **G** :- Causes thickening of the uterine lining. (2 marks)
- (c) (i) Leutinizing hormones.   
 (ii)   
 ▪ Causes ovulation.   
 ▪ Induces graafian follicle to become corpus luteum. (3 mark)
- (d) 12<sup>th</sup> to 16<sup>th</sup> day (1 mark)
2. (a) Parental genotypes   
 ▪ Round seed plants – Rr.   
 ▪ Wrinkled seed plants – rr. (2 marks)
- (c) Gametes from   
 P1 i Rr  $\longrightarrow$  R and r   
 P2 ii rr  $\longrightarrow$  r and r (2 marks)





- (b) 17.00 – 19.00 hrs. (7 marks)  
(1 mark)
- (c) (i) Transpiration
- **11.00 – 19.00 hrs:** (Rapid) Increase; in the rate of transpiration due to high light intensity/high temperature.
  - **10.00 – 03.00 hrs:** Decrease. in the rate of transpiration due to low light intensity (or absence of light)/low temperature. (3 marks)
- (iii) Absorption
- **11.00 – 19.00 hrs:** Increase; in the rate of absorption of water to replace water lost through transpiration.
  - **19.00 – 03.00 hrs:** Decrease; in rate of absorption of water due to the fact that the rate of transpiration has declined. (3 marks)
- (d) Both transpiration and absorption decrease. (2 marks)
- (e) Wind, humidity, atmospheric pressure. (2 marks)
- (g)
- **Wind:-** The rate of transpiration is faster when it is windy/than when the air is still.
  - **Humidity:-** When humidity is low, the rate of transpiration is faster due to a steep diffusion gradient; than when it is high.
  - **Atmospheric pressure:-** The rate of transpiration is high at low atmospheric pressure due to a high diffusion gradient between inter cellular spaces and the atmosphere than at high atmospheric pressure. (2 marks)

7. During thunderstorm nitrogen gas combines with oxygen to form nitrogen oxides. Nitrogen oxides dissolve in water to form nitric acid. Acid is deposited in the soil by rain; nitric acid combines with chemical substance to form nitrates which are absorbed by plants. In the soil, symbiotic bacteria such as Rhizobium which are found in root nodules of leguminous plants fix free nitrogen to nitrates free living bacteria such as clostridium and Azotobacter fix nitrogen to nitrates. Nostoc algae and Anabaena fix nitrogen to nitrates. Plants use nitrates to form plant proteins from nitrates. Animals feed on plants and convert plant proteins into animal proteins. Plants and animals die and are decomposed by bacteria and fungi. Decomposing plants and animals release ammonia which is converted to nitrites by nitrosomonas bacteria nitrites are converted to nitrates by nitrobacter bacteria. Nitrates in the soil can be converted to free nitrogen/denitrification by some fungi/pseudomonas/ thiobacillus bacteria.

(20 marks)

8. (a)
- Highly vascularized/network of blood capillaries.
  - Large surface area for gaseous exchange.
  - Thin membrane.
  - Moist lining.
- (4 marks)**
- (b) **Breathing in** :-External intercostal muscles contract internal intercostals muscles relax lifting the ribcage upwards and outwards. Muscles of diaphragm contract hence, it flattens the volume of the thoracic cavity increases, while the pressure decreases. Higher air pressure in the atmosphere forces air into lungs through nose.
- Breathing out**:- External intercostals muscle relax while intercostals muscles contract moving the ribcage downwards and inwards. The muscles of diaphragm relax hence, the diaphragm assumes dome shape, the volume of thoracic cavity decreases while pressure increases forcing air out of the lungs through the nose.
- (16 marks)**

### 30.4.3 Biology Paper 3 (231/3)

1. (a) **A:** Liver.  
**B:** Stomach.  
**C:** Spleen.  
**D:** Small intestines.  
**G:** Duodenum. **(5 mark)**
- (b) **E:** Store faeces/undigested food/indigestible food materials.  
**F:** It contains/stores/harbours bacteria; which produce cellulose/enzymes to breakdown/digest cellulose/digestion of cellulose. **(3 marks)**
- (c) Colon/large intestines. **(1 mark)**
- (d) (i) Male. **(1 mark)**  
(ii) Presence of the prostate gland/testis/seminal vesicles. **(1 mark)**
- (e) (i)  $\frac{9}{15} = X0.6 / \frac{3}{5}$
- (ii)  $\frac{14.6cm}{0.6} = 24.3cm$  **(4 marks)**

2.

Substance	Food substance being tested	Procedure	Observation	Conclusion
S	Protein.	To 1 ml of food substance add equal amount of sodium hydroxide. Add a few drops of copper sulphate solution dropwise. Shaking after each drop.	Purple violet colour.	Protein present.
T	“	”	No colour change/ blue colour.	Protein absent.
U	“	“	Light pale purple colour	Trace protein present.

**(9 marks)**

3. (a)

Specimen	Mode of dispersal	Feature that adapts the specimen to mode of dispersal
K	Animal(s).	Hooks.
L	Animal(s).	Fleshy/succulent/juicy
M	Wind.	Parachute hairs/pappus
N	Wind.	Winged/pericarp
P	Animal(s).	Fleshy/succulent
Q	Self mechanism/explosive	Lines of dehiscence/weakness/sutures

(12

marks)

(b) (i)

- Epicarp.
- Mesocarp.
- Endocarp.
- Seed.

(2 marks)

(ii) Axile/central.

(1 mark)

(c) Seed/endocarp.

(1 mark)