4.5 BIOLOGY (231)

4.5.1 Biology Paper 1 (231/1)

1. (a) The scientific system of giving **two** names (Genus and species) to living organisms; (1 mark)

   (b) The Genus name starts with a capital letter while the species name starts with a small letter;
   The two names are typed in italics/two names underlined separately; (2 marks)

2. (a) The pentadactyl limb/homologous structures; (1 mark)

   (b) Divergent evolution/adaptive radiation; (1 mark)

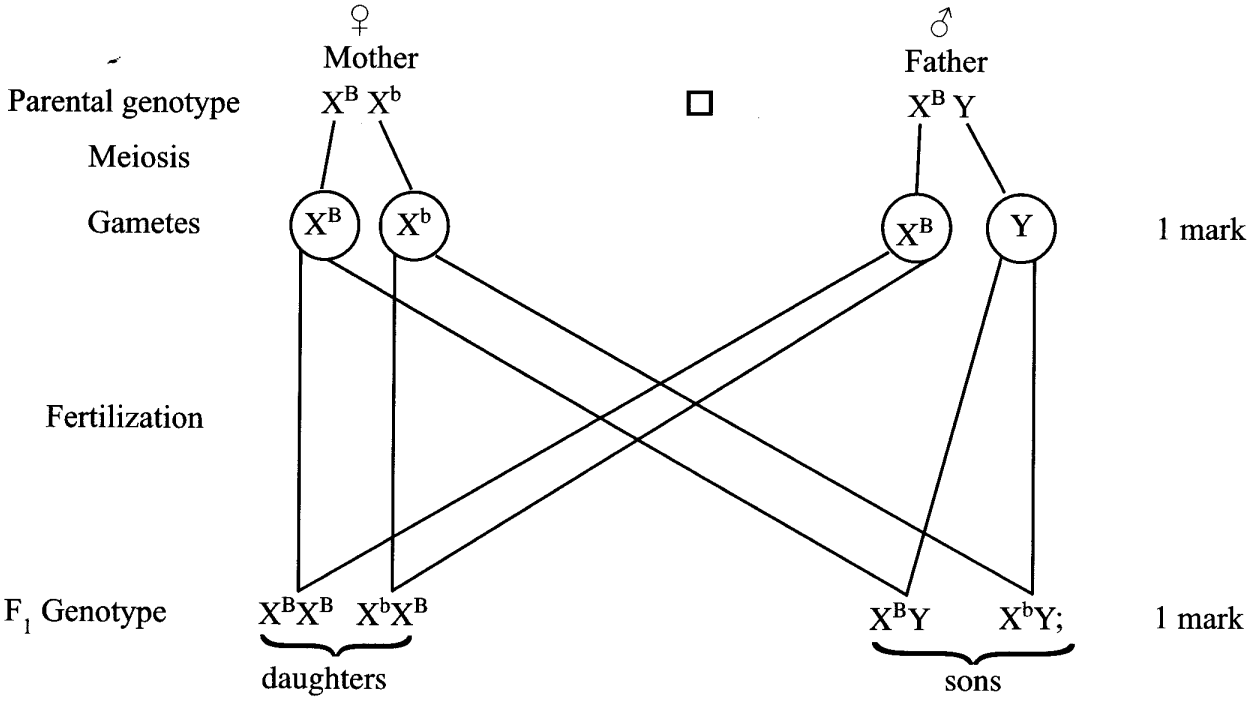
   (c) Comparative anatomy; (1 mark)

   (d) It allows the organisms to exploit different habitats to reduce competition; (1 mark)

3. (a) (Antigen) B;
   Rhesus (antigen)/Rheus factor/Antigen D

   (b) Has antibody **a** in the blood plasma of the recipient and will correspond with antigen **A** in the donor's blood, hence there will be antigen antibody reaction/agglutination.

4.



25% chance that a son will be colour blind; (1 mark)

OR

Punnet square

Parental genotypes X^BX^b × X^BY

♀ \ ♂	X^B	Y
X^B	X^BX^B	X^BY
X^b	X^BX^b	X^bY

25%;

5. (a) (i) To hold the specimen in place;
(ii) Protects specimen from dehydration/drying up/dust particles;
Protect objective lens from staining. (2 marks)

(b) Click the low power objective lens into position. Bring it down to the lowest level using the coarse adjustment knob;
With eyes on the eyepiece lenses and using the coarse adjustment knob gradually raise/ lower the low power objective lens to bring the specimen into focus; (2 marks)

6. (a) Osmosis; (1 mark)

(b) Absorption of water from the soil; opening and closing of stoma; feeding in insectivorous plants; support (in seedlings, leaves,herbaceous plants);
Movement of water from cell to cell in plants.
Any correct 1 (1 mark)

(c) The thistle funnel gained water by osmosis; because the sucrose solution was hypertonic; (2 marks)

7. - Thin/elastic outer wall; it bulges outwards;
- Thick/less elastic inner wall; it curves to open the stomata/straightens to close the stomata;
- Has chloroplasts; for photosynthesis/synthesizedd sugar (glucose/sucrose/fructose) that is osmotically active. (4 marks)

8. (a) (i) *Plasmodium spp/malariae, vivax, Ovale, falseparum*;
(ii) Anopheles female mosquito; (2 marks)

(b) - Controlling mosquitoes/vectors/cleaning breeding sites/draining stagnant water/use of insecticides;
- Vaccination/taking prophylactic drugs;
- Sleeping under mosquito nets / use of mosquito repellants.
Any two correct (owtte) (2 marks)

9. (a) To show that carbon (IV) oxide is produced during respiration in plants; (1 mark)
(b) (i) Absorb carbon (IV) oxide from the (incoming) air;
(ii) Exclude light / to prevent photosynthesis; (2 mark)

(c) No colour change in tube F / no observable colour change.
Carbon (IV) oxide removed/absorbed from air by potassium hydroxide. (2 marks)

10. a)

Structure	Chimpanzee Skull	Human Skull	
Parietal bones	- less curved/flatter - towards the back - smaller	- more curved - more central - larger	Any correct 1 mark
Mandibles	- larger	- smaller	1 mark
Browridge	- thicker /more protruding - conspicuous/prominent	- less protruded - less conspicuous/prominent	1 mark

(b) Accommodate large sized brain in humans; (1 mark)

11. - Stomata (in leaves);
- Lenticels (in stems and roots)/pneumatophores; (2 marks)
- Epidermis (roots)
- Cuticle

12. (a) (i) Pyramid of biomas represents total dry mass weight of organisms in each trophic level;
(ii) While pyramid of numbers represents the total number of organisms at each trophic level/feeding levels/nutrition levels; (2 marks)

(b) Appropriate examples for;

Grass (Vegetation)		Cattle (antelope)		Man (pastoralist)		Lion		Vulture
Producer	→	Primary consumer	→	Secondary consumer	→	Tertiary consumer	→	Quartiranery consumer

(2 marks)

13.

Mitosis	Meiosis
- two daughter cells	- Four daughter cells
- Daughter cells diploid	- Daughter cells haploid/are gametes
- Identical to mother cell/no variation	- Results in variation

(3 marks)

14. (a) Smooth muscles/visceral muscles; (1 mark)
Cardiac muscles; (1 mark)

(b) Smooth muscles - tubular visceral organs; (1 mark)
Cardiac muscles - heart (1 mark)

15. (a) (i) Mitosis;
(ii) Formation of two daughter cells. (2 marks)

(b) (i) Metaphase;
(ii) Chromosomes are at the equator. (2 marks)

16.

	Millipedes	Centipedes
-	Cylindrical body	Dorso - ventrally flattened
-	Head has two clumps of many simple eyes	Head has a pair of simple eyes
-	Each segment has two pairs of walking legs (except the first thoracic segment)	Each segment has a pair of waking legs
-	Head has a pair of short antennae;	Head has a pair of long antennae.
-	No poison claws	Has poison claws
-	Three body parts - head short, throrax, and trunk	Two body parts - head and trunk
-	Has anterior genital aperture	Has aposterior genital aperture
-	Has 9 - 100 segments	Has 15 - 21 segments

(4 marks)

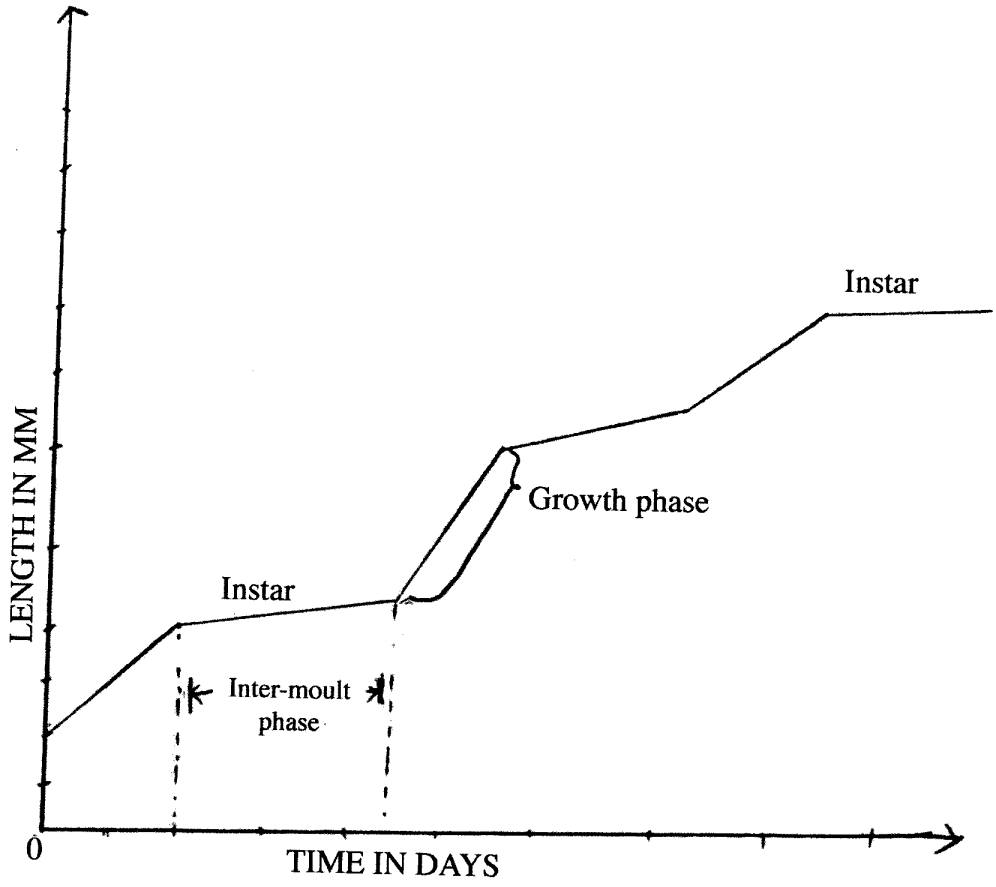
17. (a) (i) Has gastric glands; that secrete gastric juice; (2 marks)
(ii) Thick muscular wall; that contract and relax;
Accept a component of gastric juice (pepsin, Rennin, mucus, hydrochloric acid). (2 marks)

(b) - Used in plant respiration to produce energy;
- Converted to starch/sucrose/lipids/proteins/cellulose and stored; for future use. (2 marks)

18. - P - the low temperature/freezing temperature; inactivated enzymes; (2 marks)

- Q - Boiling eliminated oxygen; oil layer prevented entry of oxygen necessary for respiration during growth; (3 marks)

19. (a)



(b) Intermittent growth is as a result of the shedding of the exoskeleton/moulting/ecdysis. The growth rate slows down (flattening) as the exoskeleton hardens; after moulting, growth occurs rapidly (steep slope) until the exoskeleton hardens.

20. Pain receptor → Sensory neurone; Interneurone → CNS; Motor neurone → Muscle.

OR

Pain receptor → sensory neurone; inter neurone → CNS → interneurone; motor neurone → Muscle.

Pain receptor → sensory neurone; CNS → interneurone; motor neurone → muscle