- Homologous chromosomes separate; are moving towards poles of the cell. *(2 marks)*

(b) Spindle fibre(s). *(1 mark)*

18.
- Offspring can inherit undesirable characteristics from parents.
- Sexual reproduction takes a long time.
- Fewer offspring are produced.
- Involves two different sexes (which must mate). *(2 marks)*

19. (a) Low temperature; light (O_2); water/ water moisture. *(2 marks)*
(b) Hypocotyl. *(1 mark)*

20. (a) Allele refers to alternative form of a gene; one of two or more alternative states of a gene of two or more states of a gene. *(1 mark)*
(b) (i) ***Deletion:*** Some bases nucleotides of a gene reversed. *(1 mark)*
(ii) ***Inversion:*** The order of some bases nucleotides of a gene reversed *(1 mark)*
(c) A cross made between a homozygous recessive parent and a parent of unknown genotype (to determine whether the unknown type is homozygous or heterozygous for a dominant gene). *(1 mark)*

21. (a) A situation where organisms have a homologous structure; which is modified to perform different functions; so as to grow to different ecological niches/habitat. *(1 mark)*
(b) The organisms mutate. *(1 mark)*

22. (a) Brain/Spinal cords/Central nervous system. *(1 mark)*
(b) (i) Motor. *(1 mark)*
(ii) **P**: Dendrites.
Q:Axon / Axoplasm. *(2 marks)*

23. (a) Indole Acetic Acid. *(1 mark)*
(b) Growth response of part of a plant when in contact with an object. *(1 mark)*

24. (a) Vertebraterial canal. *(1 mark)*
(b)
- Collenchyma.
- Sclerenchyma.
- Xyllem/trancheid and vessels. *(2 marks)*

25. (a) Acidic medium due to presence of hydrochloric acid. *(1 mark)*
(b) High temperature, extreme (changes) pH. *(1 mark)*
(c) Increased presence of villi; coiled. *(2 marks)*

26.
- Time of birth.
- Breast feeding. *(1 mark)*

24.4.2 Biology Paper 2 (231/2)

1. (a) **K** - Pleural membrane(s).
L - Alveolus/Alveoli.

M - Intercostal muscles/internal and external muscles. ***(3 marks)***

b)

- Has ring of cartilage, which keeps it open at all times.
- Cilia that move mucus/particles to top of the trachea.
- Mucus to trap dust/solid particles/micro organisms.
- Hollow for passage of air. ***(3 marks)***

(c) Diffusion. ***(1 mark)***

d) Mycobacterium tuberculosis. ***(1 mark)***

2. (a) Excess amino acids are deaminated/amino group is removed. Amino group is converted to ammonia, which combines with carbon dioxide (in ornithine.cycle) to form urea. The carbohydrate group is converted to glucose for respiration/glycogen for storage. ***(3 marks)***

(b)

- Glomerulus; Bowman's capsule.
- Proximal convoluted tubule; distal convoluted tubule. ***(3 marks)***

(c)

(i) Production of copious urine/large amounts of dilute urine.
(ii) Diabetes insipidus. ***(2 marks)***

3. (a)

(i) ***Protandry:*** a condition in which the male parts/ anthers/ stamens of a flower mature before the carpel/ stigma/ pistil/ female parts. ***(1 mark)***

(ii) ***Self-sterility:*** Pollen grains from anthers of a flower are sterile/ fail to germinate on the stigma of the same flower or flower on the same plant. ***(1 mark)***

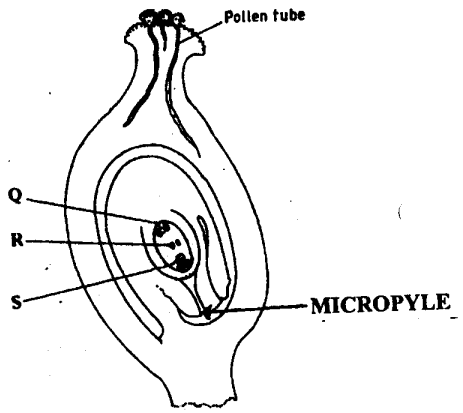
(b) (i)

Q - Antipodal cell; antipodals, embroysac.
R - Polar nucleus or Polar nuclei.
S - Ovum/egg cell. ***(3 marks)***

(ii)

- Secretes enzymes that digest the stigma/style/ovary tissue.
- Offer passage for male nuclei to ovum and polar nuclei/embryosac. ***(2 marks)***

(c)



(1 mark)

4. (a)

Type of Muscle	Where found
(i) Skeletal/striated/stripped muscles	On bones
(ii) Smooth muscles	Alimentary canal/blood vessels
(iii) Cardiac muscles	In the heart

(3 marks)

(b) Ball and socket joint allows movement in all planes (360^0) while Hinge joint allows movement in one plane (180^0). *(1 mark)*

(c)

- Shock absorber/ distributes pressure/ cushions.
- Lubricates joints/ reducing friction.
- Provides nourishment to the cartilage. *(2 marks)*

(d)

- Supports/ protects the delicate inner parts.
- Waterproof/prevents drying up of the body.
- Provides a surface/ space for muscle attachment. *(2 marks)*

(a)

(i) Parental phenotypes purple grains x purple grains.
Genotypes GG × Gg;

Gametes	G	G
G	GG	GG
g	Gg	Gg

Genotypic ratio 2GG : 2Gg
1 : 1 *(5 marks)*

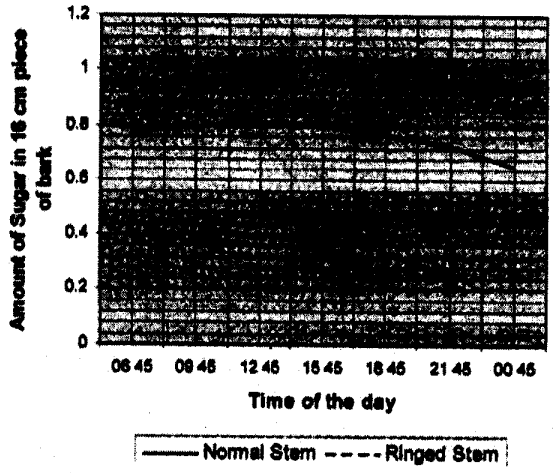
(ii) All offspring have purple grains. *(1 mark)*

(b) Genetic manipulation to produce desired characteristics. *(1 mark)*

(c) A situation where offspring show characteristics which are superior to either of the parental stocks. *(1 mark)*

6. (a)

GRAPH OF THE AMOUNT OF SUGAR AGAINST TIME



(6 marks)

(b) (i) 15 45hrs; 9.45pm
(ii) 12.45hrs; 12.45pm *(2 marks)*

(c)
- 0.80 grammes/16cm^3
- 0.81grammes *(1 mark)*

(d)
- Stored sugar.
- Photosynthesis had started taking place. *(2 marks)*

(e)
(i) 0.645hrs to 15.45 hrs: Fast/high/rapid increase in sugar level; due to photosynthesis; and accumulation of sugar (above the ring).
(ii) 15.45 hrs to 00.45hrs: Decrease in sugar level due to respiration/ slowed down rate of photosynthesis.
(2 marks)

(f) Sieve tube elements/ Sieve elements/Sieve tubes; cytoplain study /filaments/Protein fibres/filaments. *(2 marks)*

(g)
- Amino acids;
- Hormones;
- Oils/lipids
- Resins;
- Vitamins. *(2marks)*

7. The outer ear/pinna collects/channels sound waves (down the) auditory canal/meatus. The auditory canal concentrates /directs sound waves to the tympanic membrane/tympanum/ear drum which sets into vibration/vibrates/converts sound waves into vibrations. The vibrations are transmitted to the ear ossicles malleus incus and stapes that amplify the sound vibrations. The vibrations are then transmitted to the oval window which amplifies vibrations/transmits to the fluids in the cochlea. The sensory hairs/cells are set into Endolymph and Perilymph producing nerve impulses in the auditory nerve which transmit nerve impulses (by the auditory nerve) to the brain (for interpretation); for hearing.

In the inner ear are semi-circular canals/ utriculus/ suculus/ vestilular apparatus which become stimulated due to movement of the fluids/endolymph in them generating sensory impulses. The auditory nerve transmits impulses to the brain (for interpretation); of the position/positive balance of the body. The Eustachian tube connects the middle ear to the back of the throat and equalizes the air pressure in the middle ear with the atmospheric air pressure. *(20 marks)*

8.
- ***Domestic effluents/ sewage/faeces/urine***: nitrogenous wastes, garbage, detergents pollute water. Pollution caused by domestic effluents may be controlled by treating domestics waste using biotechnology, banning the use of phosphate – based detergents, using plastic pipes instead of those made from lead and recycling of garbage.
- ***Industrial wastes/ radioactive wastes***: heavy metals in industrial wastes include lead/zinc/copper chromium/mercury/ hot water/ hot effluents which pollute water. Pollution caused by industrial wastes may be controlled by treating/ cooling industrial wastes/ carrying out environmental impact assessment before establishment of industries.
- ***Spillage of oils***: oil spillage may be controlled by cleaning spilled oil/biotechnology and penalizing the companies /industries/individuals which cause oils spills/water pollution.
- ***Agro chemicals***: these include inorganic fertilizers; herbicides/insecticides/pesticides/fungicides. Pollution caused by agrochemicals may be controlled by using mechanical/biological control of weeds/pests, biodegradable organic fertilizers/herbicides/insecticides/pesticides, organic farming/educating farmers on use of correct amounts of agrochemicals.
- ***Silting:*** soil erosion contributes to silting and may be controlled by appropriate farming practices/contour farming/reafforestation/building gabions/terracing. *(20 marks)*