

BIOLOGY PAPER 2 MARKING SCHEME

1.
 - a) Name the bones labelled.
 U - Femur
 V - Tibia
 - b) W - Produce / secrete synovial fluid
 X - Absorbs shock / reduce friction / nourishes
 - c) (i) Articular cartilage
 (ii) Friction between the 2 bones
 - d) Coccyx
 - e) Calcium phosphate
2.
 - a) To investigate necessity of oxygen during germination.
 - b) A - Seeds did not germinate
 B - Seeds germinated.
 - c) Pyrogalllic acid absorbed oxygen which is necessary for germination
 - d) Seeds will not germinate to lack of moisture
 - e)
3.
 - a) A- Aquatic; have large bowmans capsule for more ultra filtration/ short renal tubule to reduce water reabsorption.
 B- Arid; small and few bowmans to reduce ultra filtration long renal tubules to increase reabsorption of water back to the blood stream.
 - b) i) uric acid
 ii) Requires less water to eliminate it
 - c) - Red blood cells
 - Large proteins.
4.
 - a) i) Roller RR, Rr
 ii) Non – rollers rr
 - b) Parental; phenotype: Rolls tongue ; Rolls tongue
 Parental genotype Rr x Rr
 Gametes R r R r

O	R	r
R	RR	Rr
r	Rr	rr

c) Discontinuous variation

5.
 - a) Thigmitropism / Haptotropism
 - b) Plants get support from other plants to obtain light
 - c)
 - (i) As the stem gets in contact with a hard object, auxins migrate laterally from the point of contact to the opposite side; high auxin concentration stimulates faster growth on the opposite side than the point of contact with object; causing the stem to curve;
 - ii)
 - Phototropism
 - Geotropism
 - Hydrotropism
6.
 - (a) Graph

- (b) 12.5%
- (c) 2.5 solution is hypotonic to the cells cell sap; water was drawn into the cells by osmosis; the cells became turgid; increased in size;
- (d) Before – more
After Reduces

7. **Insect pollination / entomophilous flowers.**

- Are scented to attract insects
- Have small sticky, stigma that occur inside the flower for pollen grains to stick on it
- Have nectaries to secrete nectar; nectar acts as a bait to attracts insects
- Have nectar guides to guide the insects to the nectaries
- Have special shaped corolla to provide a landing platform i.e. tubular or a funnel shaped corolla to increase chances of contact by insects.
- Large / heavy and rough / sticky / spiny/ spiky pollen grains which stick on the body of insects and on stigma
- Large; conspicuous flower with brightly coloured petal, bracts or inflorescence to attract insects.
- Anthers are small and firmly attached to filament to ensure insect brush against the anthers as they crawl into the flower hence collect as many pollen grain.
- Stigmas are small, sticky and occur inside the flower, so that pollen grains from insect body can stick onto it.
- Anthers are situated inside the flower to ensure that they are in contact with the insects
- Mimicry to attract insects/ flowers mimic female insects which attract male insects for mating eg orchids.

Wind pollinated / Anamophilous flowers.

- Anthers and stigma hang outside the flowers to increase chances of pollination; style / filament is long to expose stigma/ anthers.
- Stigma is hairy / feathery / branched /long to increase surface area over which pollen grains land/ to trap pollen grains.
- Pollen grains are smooth / dry/ light/ small to be easily carried by wind; large amount of pollen grains to increase chances of pollination.
- Flowers are small with inconspicuous petals, bracts or inflorescence.
- Flowers not scented and lack nectar
- Anthers are large and loosely attached to flexible filaments to enable them sway easily to release pollen grains. This ensures that pollen grains are released readily when wind blows.
- Pollen grains may have structures which contain air to increase buoyancy, flowers have long stalks holding them out in the wind.

8. a) Allergy is a hypersensitive reaction by the body to an antigen by producing antibodies to counter the effect of the antigen. Antigen antibody reaction takes place on the surface of cells that burst open releasing a chemical substance called histamine. Histamine causes inflammation and pain in tissues causing them to draw in fluids / water hence swells up leading to narrowing lumen of structures like trachea, bronchus, and bronchioles. When airways constrict, they allow little air through them producing a whizzing sound hence difficulty in breathing. This causes asthmatic attack. Histamine causes itching, reddening and feeling warm / hot on a particular part of the body. Allergic response to substances like pollen, dust, animal fur, mite, particular foods and emotional disturbance may provoke an attack. To counter the effect of histamine, anti-histamine substances are administered.
- b)
- High temperatures - These increase internal temperature of the leaf which increases latent heat of vaporization enhancing evaporation from the leaves. This increases rate of transpiration.
 - Low humidity - when atmosphere is dry or in low humidity, water vapour diffuses out of the leaf into dry atmosphere. Due to high saturation deficit, water diffuses faster hence increased rate of transpiration.
 - Wind - wind carries away water vapour as fast as it diffuses out of the leaves hence water vapour does not accumulate. This raises diffusion gradient between the inside and outside of the leaf, thereby increasing the rate of transpiration.
 - High light intensity - light intensity increases rate of photosynthesis where sugar is formed, which is osmotically active causing stomata to open, hence water vapour diffuses out at a higher rate, thereby increasing the rate of transpiration.
 - Low atmospheric pressure - reduces the weight of gases acting on the leaves causing a lot of evaporation from the leaves. This causes high rate of transpiration.