

July 2025(2 hours)

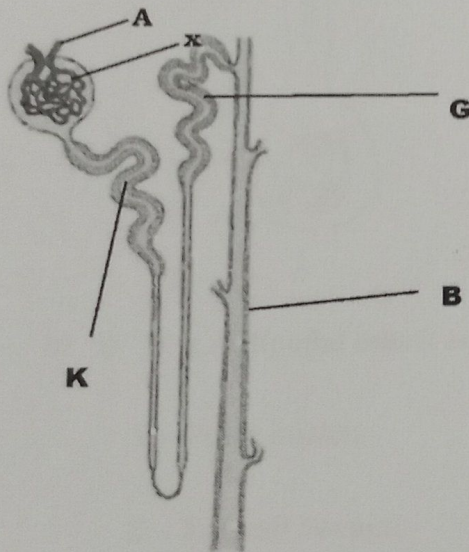
Section A

1) a. Osmosis

b. Water rises in cavity with salt crystals; salt crystals are moistened by cell sap making a strong solution ; salt solution is more concentrated than cell sap ;these cells lose water to salt solution by osmosis ; the cells become more concentrated drawing water from neighboring cells ; water moves from cell to cell up to cells in contact with the water

C i) the salt solution will not risk

ii) Boiling kills cells // Denatures cell membrane; thus osmotically inactive



2) a) A-Efferent arteriole//vessel // blood vessel; venule

B-Collecting tubule

b) X- Afferent arteriole is wider than efferent arteriole; this creates high pressure leading to ultrafiltration;

K -At proximal convoluted tubule all glucose, amino acids , some water and mineral salts; are actively selectively reabsorbed ( against concentration gradient using energy)

c) -Numerous mitochondria to provide energy for reabsorption

- Micro villi to increase surface area for reabsorption

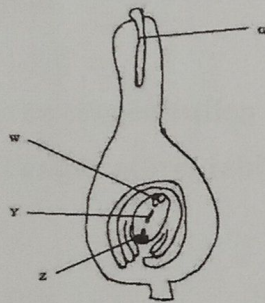
- Long to provide a large surface area

- Coiled to provide a large surface area //speed for more time // efficient ,reabsorption

- Numerous blood capillaries for efficient transport

3) 1) Stamen ripens earlier before stigma

ii) Development of fruit without fertilization



b) i) W - Antipodal cells // antipodals

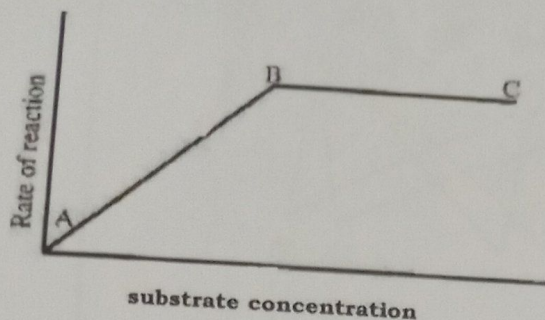
Y - Polar nuclei;

Z - Egg cell //ovum;

ii) -Secretes enzymes that digest the stigma // ovary tissue // style

- Offer passage for male nuclei to ovum and polar nuclei // embryo

c) Gibberellin



4) a) i) A and b

-Rapid increase in rate of reaction; more enzymes active sites available ;for a large number of substrate molecules

ii) B and C

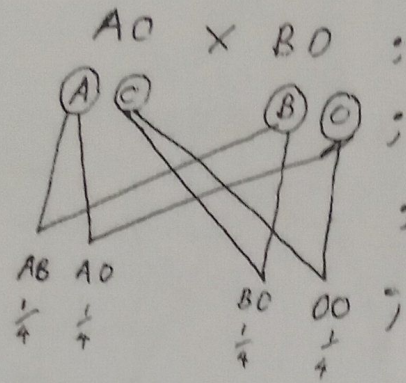
-Rate of reaction constant; all active sites occupied // enzyme-substrate in equilibrium

b) Raise the concentration of enzymes;

c ) pH ; Temperature; inhibitors// cofactors//metabolic poison// coenzyme

5) a) AO; BO

b) ,



Probability -  $\frac{1}{4}$  ;

c) -sex ; reg Gender

-ABO blood group system

- Ability to roll tongue

- Free // attached ear lobe

- Presence// absence of hair in nose // ear pinna

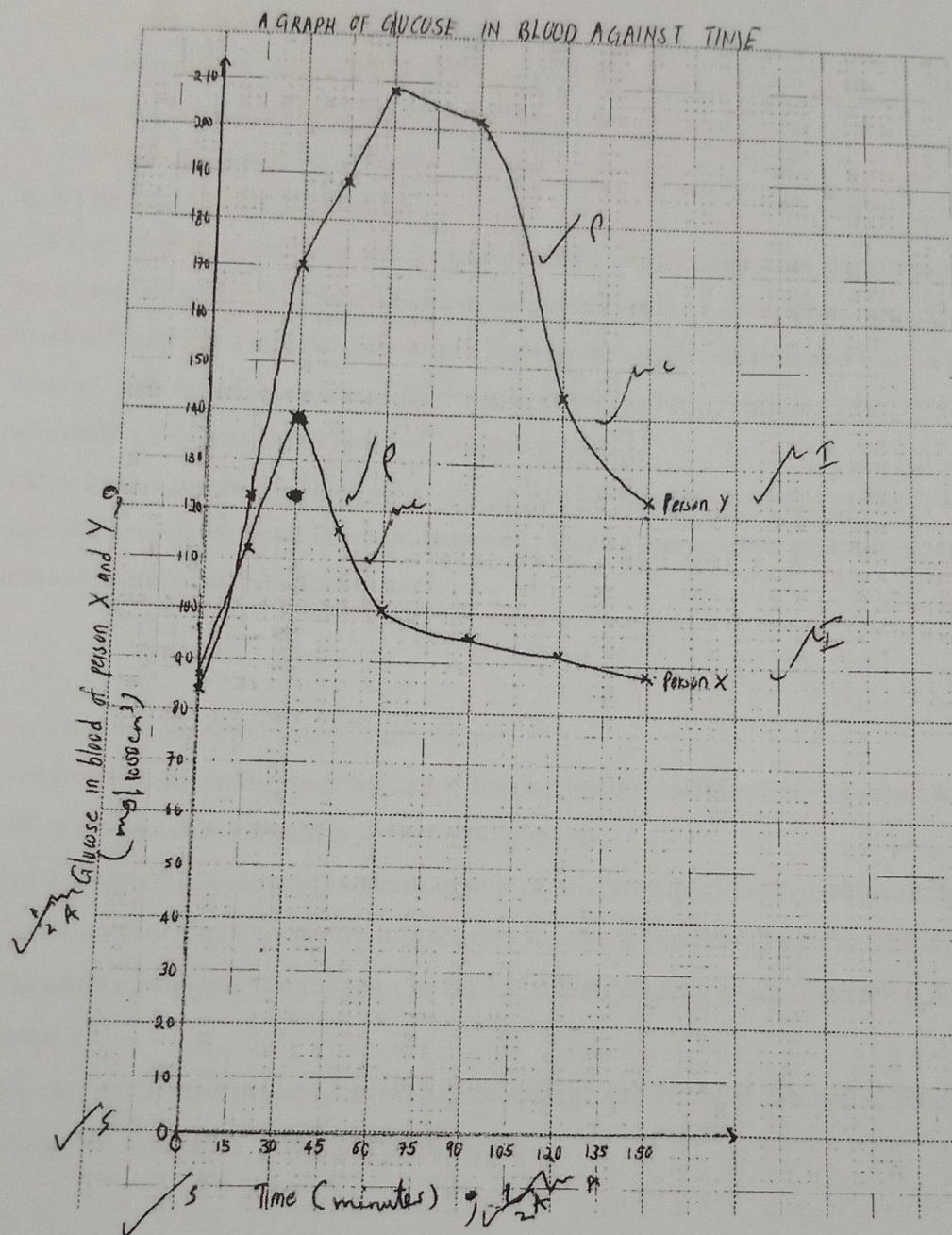
-Finger print

-Ability to test PTC// phenylthiocarbamide

-Wing length in drosophila/ size of abdomen in drosophila

SECTION B(40 marks)

6) a)



b) X- 124+3//124-3

Y -188+3// 188-3

c) -Person X is capable of regulatory glucose

-Person Y is likely to be diabetic

d) X- insulin released ( by islets of Langerhans)

-excess glucose converted to glycogen (in liver)

Y-insulin is not released ; thus the decline

-is due to glucose being released in urine

e) ATP//Adenosinetriphosphate

f) Blood flowing around the gut temperature is lowered; Blood temperature is detected by hypothalamus; efferent impulses generated;(to skin) Arterioles// superficial blood vessels constrict; blood does not reach close to the surface of skin and heat is retained; erector- pili muscles contract ; hair stands trapping air, retaining heat; sweat glands stimulated less; less sweat produced retaining heat;

Extra heat is produced ; by an increase in metabolic rate through contraction of skeletal muscles producing heat; Adrenal metabolic secrete Adrenaline, which increases metabolic activities producing heat

7) a)- When blood vessel is cut// injured;

-Platelets// thrombocytes// damaged tissue// wound sustained are exposed to air;

-They release thrombokinase// thromboplastin;

-An enzyme that activates the conversion of prothrombin; to thrombin; in the presence of calcium ion// $\text{Ca}^{2+}$  ; vitamin k is needed for the formation of prothrombin;

-Thrombin converts fibrinogen ; to fibrin; which forms a mesh // network across the wound ;

-The clot so formed prevents excessive bleeding; and entry of disease agents// pathogens// microbes // microorganisms

b) example

Asthma // hay fever//acc Any specified correct example ;

**Def:-**An allergic reaction is a hypersensitive response ; to an antigen by the body immune system; the body's immune system responds by over producing antibodies; against harmless antigens; the antigen –antibody reaction occurs on the surface of the body cells ; which bursts/open; and release histamine

**-Histamine** causes inflammation / itching/ breathing difficulties /swelling//pain// constriction of bronchi // dilation of capillaries// excessive secretion of mucus // anaphylaxis// diarrhea // vomiting /// coughing // sneezing;

**-Which** damages the body ;Allergic people are hypersensitive to materials like dust //pollen grains // some foods//some drugs// some pollutants// spores// feathers // fur// strong perfumes . etc

**Acc . allergen; - reaction ;**  
**Dust ; - Breathing system;**  
**Food ; - stomach ;**

**Max 10**

- 8) 1. Conjunctiva is a thin //transparent// tough ; to allow light pass through //to protect eye ball
2. Sclerotic layer made of fibres // fibrins: maintain shape of eyeball // protect eye;
3. Cornea is transparent //curve; refract light rays //allow light to pass through ;
4. Choroid black pigment ; to prevent internal reflection of light in the eye has blood vessels; that supply O<sub>2</sub> / nutrients to eye// remove waste from eye;
5. Retina has cones and rods; for color vision// bright light vision// low light vision
6. Blind spot has no cones and rods; place where optical nerve leaves or enters the eye;
7. Yellow spot// fovea has a high concentration of cones; for accurate vision // visual acuity
- 8 Optical nerve has nerve fibre// sensory neuron; for transmission of impulses to brain;
9. Lens biconvex// elastic // transparent ; to refract light rays// adjust to focus oc faror near objects// allow light to pass

10. Cilliary body has muscle fibres; contracts and relax to change shape / curvature of lens // cilliary body is glandular; produces aqueous humour;
11. Suspensory ligaments .elastic; Hold lens in position // attach lens to cilliary body
12. Iris has radial and circular muscles ; which control size of pupil
13. Pupil, hole at centre of iris ; light passes into the eye
14. Aqueous humour , fluid; oxygen / nutrients pass to cornea // lens ; maintains shape of eye ball// refracts light rays ;// transparent ; passage// refracts light
- 15 Viterous humour , fluid ; maintains shape of the eye// refracts light rays ; transparent; passage of light.