**NAME............................................................................................. INDEX NO..........................**

**SCHOOL......................................................................................SIGNATURE.........................**

Biology

Paper 2

**MARKING SCHEME**

1. **a)** 1 motor / efferent Neuron ;

2 Relay / intermediate Neuron ;

3 Sensory Neuron:

**b)** Towards the motor Neuron from the sensory

**c)** Grey matter rej any other ;

**d)** Impulse reaching the dendrite end of relay / Neurons ; causes the synaptic vessels to release acetylcholine / transmitted chemical ; which diffuse a cross the cleft and causes the depolarisation of the motor Neuron; 2 x 1 = (2mks)

2. **a)** Blood group O is a universal donor as it donates to all other blood groups;

Blood group AB is a universal recipient as they receive blood from blood from

all other groups.

Blood group A can receive blood from blood group O and A only.

Blood group B can receive blood from blood group O and B only.

Blood group O does not receive blood from other blood groups except group O.

**b)** To avoid agglutination/clumping of red blood cells.(1 mark)

**c)** Blood does not have pathogens. The Rhesus factor matches; (2 marks)

3 i) **T** - Bowman’s capsule;

**U** – Collecting tubule ; (2mks)

ii) a) Antidiuretic hormone/Vasopressin (2mks)

Where produced-Pituitary gland ; (2mks)

**b)** Dilute urine formed ; (1mk)

c) Glomerular filtrate // capsular fluid ; (1mk)

d) - Narrower efferent arteriole

- High pressure from pumping action of heart.

-Narrow glomeruli capillaries

- Tiny pores in capsular wall // endothelium of glomeruli; ***Any 2***  (2mks

4. a) (i) Man – XhY;

Woman – XHXh;

(ii) Parental phenotype carrier woman Haemophilia man

parental genotype XHXh X XhY;

Gametes

Fusion

Offspring XHXh XHY

XhXh XhY;

**N/B** (Penalise for gametes if they are not circled & If fusion lines do not intersect)

**b)** ¼ x ¼ = 1/16 (2 mrks)

**c)** Male requires defective gene to be haemophilic;(Because Y chromosomes does not have the corresponding allele; for the gene that determine or cause

haemophilia/Y chromosome is almost genetically empty.)

**5**. a) Sperm cell / spermatozoon;

b) A – Acrosome;

B- Nucleus

C- Mitochondria

c) Propels the sperm forward

d) Length of one cell = Diameter of field of view,

No.of cell across the Diameter of field of view.

1.25mm;

6

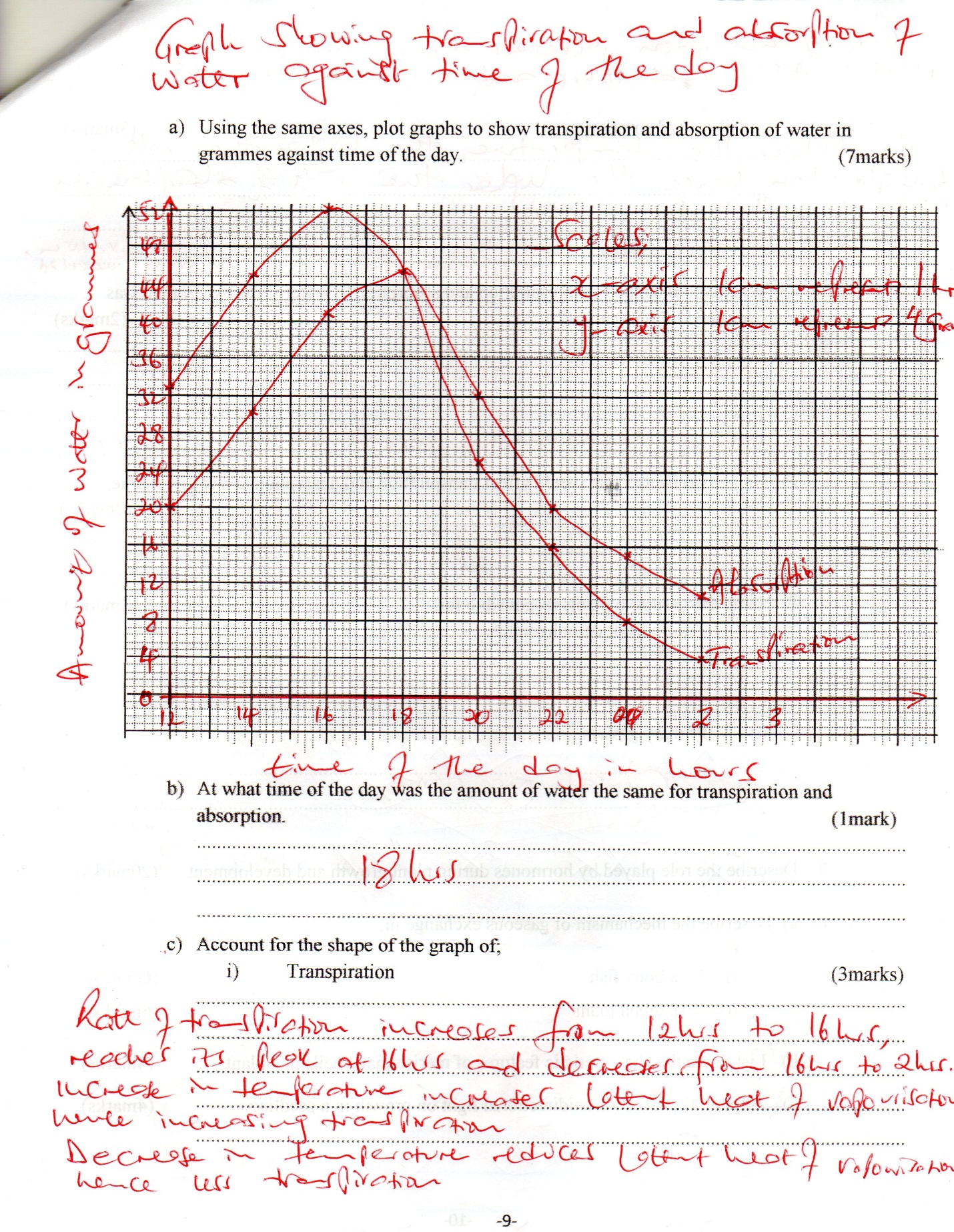
1 mm = 1000μm

0.208m

= 208μm

1. Using the same axes, plot graphs to show transpiration and absorption of water in

Grammes against time of the day. (7 marks)



*Scales - 2 mks Axis – 2mks Curve – 2maks Identify - 1mk = 7mks*

1. At what time of the day was the amount of water the same for transpiration and absorption. (1mark)

*18hours*

1. Account for the shape of the graph of;
2. Transpiration (3marks)

*Rate of transpiration increases from 12hours to 16 hours, reaches its peak and 16 hours and decreases form 16hours to 2 hours. Increase in temperature increases latent heat of vaporization hence increasing transpiration. Decrease in temperature reduces latent heat of vaporization hence les transpiration.*

1. Absorption (3marks)

*Rate of absorption increase from 12hours to 16 hours, reaches its peak at 16 hours and decreases form 16 hours to 2 hours.*

*The higher the temperature, the higher the rate of transpiration hence the higher the rate of absorption in order to replace lost water.*

*The lower the temperature the lower the rate of transpiration, hence the lower the rate of transpiration since less water is needed for replacement.*

1. What would happen to transpiration and absorption of water if the experiment was continued till 0500 hours? (2marks)

*Both transpiration and absorption would decrease. The rate of absorption would exceed the rate of transpiration.*

1. Name two factors that would affect transpiration and absorption at any given time. (2marks)

*Temprature/humidity/light intensity/wind*

1. Name the tissues in plants responsible for; (2marks)
2. Transport of carbohydrates

*Phloem*

1. Primary growth

-*Apical meristem*

7. **a).** -**Gill bar or gill arch** is long and curved to provide a surface for attachment of gill rakers

and gill filaments.

-**Gill filaments-**numerous and long to provide a large surface area for gaseous exchange.

-Gill filaments**-**are covered by a thin epithelium that shortens the distance to be covered by

respiratory gases.

-Gill filaments**-**are supplied with a dense network of blood capillaries for the

transportation of respiratory gases.

-**Gill rakers-**teeth-like structures that are pointed to trap or filter solid particles present in water.

-Gill rakers**-**prevent solid particles from reaching the delicate gill filaments.

-**Operculum-**protects the gills on either side of the head.

**b).** Gaseous exchange occurs in the **spongy mesophyll**; During the day, air diffuses into large air spaces of the spongy mesophyll; through the stomata; the carbon (IV) oxide in the air diffuses

into photosynthetic cells; in solution form; during photosynthesis, carbon (IV) oxide is used up; while oxygen is produced; some of the oxygen is used in respiration; while the rest diffuses out of the leaf; through the stomata;

During the night, air diffuses into the air spaces; through the stomata; the air dissolves into the film of moisture; oxygen in the air diffuses into the cells; and is used for respiration; carbon (IV) oxide produced; diffuses out through **stomata**; due to a concentration gradient/diffusion gradient; At night, carbon (IV) oxide accumulates in the leaf since photosynthesis does not occur; some gaseous exchange also takes place through the **cuticle**; and through the epidermis of young leaves, roots and stems; some plants exchange gases through **breathing roots/pneumatophores;** older stems exchange gases through **lenticels**;

**Max 15 mks**

1. **Sclera/sclerotic layer**; white fibrous layer; made up of thick connective tissue; protects the eye; maintains shape of eyeball; **Cornea**; transparent; disc-shaped layer; that allows light to enter the eye; refracts light towards the retina;

**Conjunctiva**; delicate membrane; lining the inside of the eyelid; protects the cornea/eye; Eyelids and eye lashes; thin muscle with hairs; protects the cornea/eye from mechanical/chemical damage/protects the eye from entry of foreign particles; protects retina from bright light; **Choroid**; dark pigmented and membranous layer; that prevents light reflection within the eye/absorbs light; to prevent distortion of the image; has blood vessels; that nourish eye/retina/supply oxygen/remove carbon (IV) oxide and wastes; extends to form the ciliary body and iris; **Ciliary muscles**; have elastic muscles that contract and relax; to alter shape/curvature of lens during accommodation; **Ciliary body**; thickened front edge of the choroids layer; that produces aqueous humour; **Suspensory ligaments**; made up of elastic connective tissue whose contraction and relaxation helps to adjust the shape of lens during accommodation/holds lens in position; **Lens**; transparent; biconvex; balloon-like; it refracts light rays/focus light onto the retina; **Vitreous humour**; nourishes cornea/lens; refraction of light; maintains eyeball shape; **Iris**; thin circular ring; with circular and radial muscles; it gives eye colour/absorbs light; controls the amount of light entering the eye/adjusts size of pupil;

**Pupil**; an aperture through which light enters the eye; **Retina**; has photoreceptor cells/rods/cones for image formation; generates impulses to the brain for interpretation;

**Fovea/Yellow spot**; with only cones; for high visual acuity/most sensitive part of the retina

**Blind spot**; point where nerve fibres emerge from the optic nerve/where optic nerve leaves eye/point where nerve fibres and blood vessels enter the eye; **Optic nerve;** transmits impulses

to the brain; **Muscles; inferior and superior oblique muscles**; move eye from left to right;superior and inferior rectus muscles; move the eye up and down; external and internal rectus muscles steady the eye in its up and down movement; **Tear/Lachrymal glands**; secrete a watery and saline fluid containing lysozymes/lytic enzymes/is antiseptic (tears); that moisten the conjunctiva and cornea; washes away dust and other foreign objects; kills microorganisms entering the eye; **Max. 20 mks**