

ST FRANCIS GIRL'S SEC SCHOOL

BIOLOGY FORM FOUR PRE-MOCK EXAM

MARKING SCHEME

SECTION A

1	I	ii	iii	iv	v	vi	vii	viii	ix	x	
	D	E	C	D	A	E	A	A	A	B	

2	I	II	III	IV	V	
	E	A	D	G	I	

1 mark @ 1 x 10 = 10

1 mark @ 1 x 5 = 5

SECTION B:

3 i Sex-linked gene

Gene carried on sex chromosome but has no sexual characteristics - 01

ii Sex-determination

Chromosome responsible for determining the sex of an individual

Human being have 46 number of chromosome in each body cell except that of the sex-cell

Pair number 1 - up to 22 - are known as autosomes chromosome - deals with physical characteristics of the body.

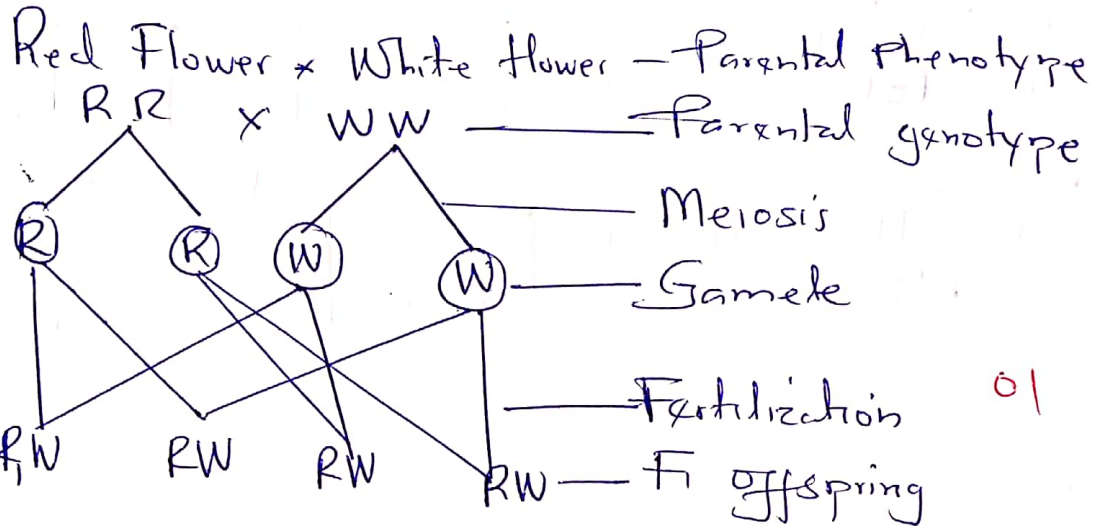
Pair number 23 - it is known as sex-chromosome
Male carries X and Y chromosome
Female carries both X.

Sex-limited character

These are characters which are restricted or confined more in one sex compared to another one 01

Example: Hairy ears, Facial hair, Lactation

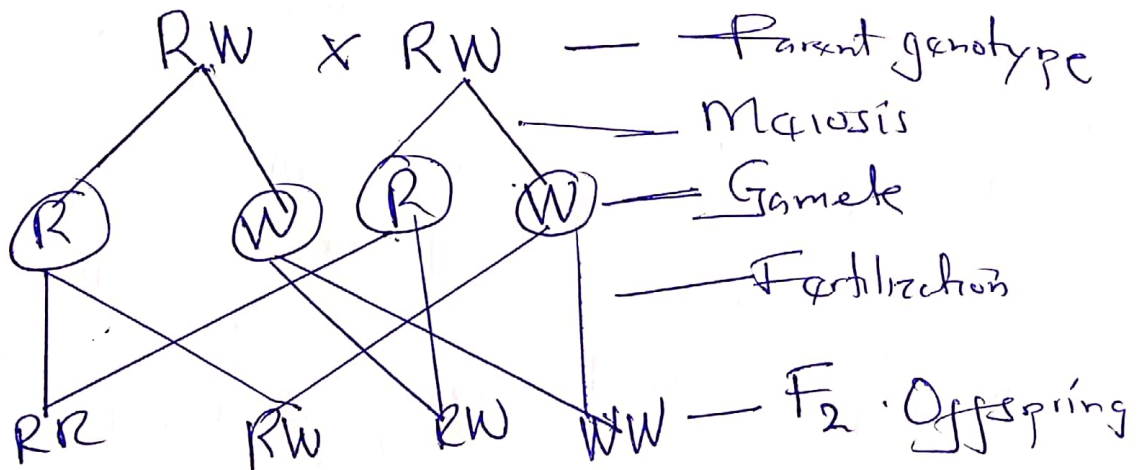
b) Let R - represent a gene for red flower
 W represent a gene for white flower.
 RR - Red flower
 WW - White flower.



01

F_1 Phenotype All were pink flower
 F_1 Genotype RW - Pink

On selfing Pink flower $\times$ Pink flower.



01

F_2 Phenotype
 $\frac{1}{4}$ - Red flower
 $\frac{2}{4}$ - Pink flower
 $\frac{1}{4}$ - White flower
 Ratio 1:2:1

1) Incomplete dominance

Neither of the parent is dominant or recessive. Both have an equal chance to express their character. In F_1 offspring resulting into blending of the character. (01)

4. On cornea

By saline enzymes from tear gland (01)

ST = 06

Branchus - Cilia and mucous membrane (01)

Stomach - Hydrochloric acid (01)

5) Plant use oxygen - during night and release carbon dioxide

Poor ventilated room

Burned charcoal release carbon monoxide which react quickly to haemoglobin - hence lead into inadequate amount of oxygen in body tissue. 01

c) Nose contain cilia and mucus with trap dust and Micro-organism

- Nose contain tiny blood capillaries, which warm up Cold inhaled air prevent alveoli from collapsing. 01

ST 06

5. Zygote:

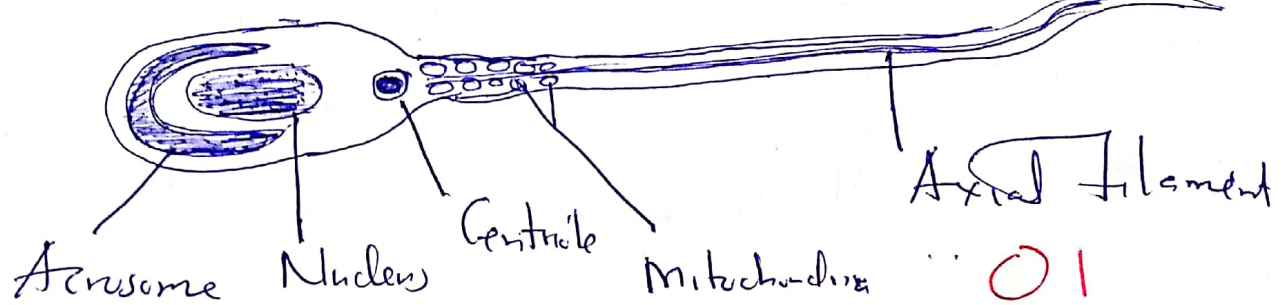
1) Formed by combine two cell - egg and sperm 01

ii) High Have high rate of cell division to form various cells 01

b) Q - Testes

Produce sperm (male sex cell) $\frac{1}{2}$

i) Produce testosterone hormone control male $\frac{1}{2}$ Secondary sexual character.



⑤ Adaptation:

I) Acrosome - Contain lytic enzymes which dissolve the egg-membrane during fertilization $\frac{1}{2}$

II) Mitochondrion Provide energy necessary for movement of sperm $\frac{1}{2}$
 (iii) Tail $\Rightarrow$ Help in propulsion of sperm (swimming side to side) $\frac{1}{2}$

IV) Nucleus - Contain a lot of DNA to pass the hereditary information to a new born $\frac{1}{2}$

V) Centrioles - Used for the formation of tail

6. Five biological Kingdom

Kingdom Monera - Bacteria $\frac{1}{2}$

Kingdom Protista - Amoeba $\frac{1}{2}$

Kingdom - Fungi - Mushroom $\frac{1}{2}$

Kingdom - Plantae - Maize plant (Rose plant) $\frac{1}{2}$

Kingdom - Animalia - Human being $\frac{1}{2}$

any 4 @ $\frac{1}{2} = 2$

$5 \times \frac{1}{2} = 06$

Species

Organism which has many features in common closely related together when they interbreed they produce fertile offspring $\frac{1}{2}$

Features of Species

- Have same number of chromosome 01
- Can interbreed freely and produce viable offspring 01
- Have many features in common 01
- Distinctly different to another organ. 01

$5 \times \frac{1}{2} = 06$

Germination

Process by which the seed develops into seedling
Young plants.

OR
Seed go through the initial stage of growth
and developing into seedling 01

b) Condition necessary for seed germination

Water — Provide suitable medium for enzymes to break
down the stored food. $\frac{1}{2}$

Oxygen — Oxidize the food to release energy $\frac{1}{2}$

Temperature — Optimum condition for enzymes activities $\frac{1}{2}$

c) Hypogeal germination

Seed cotyledon remain below the ground 01

Epigeal germination

Seed cotyledon brought above the ground. 01

c) Seed dormancy

i) Embryo immaturity

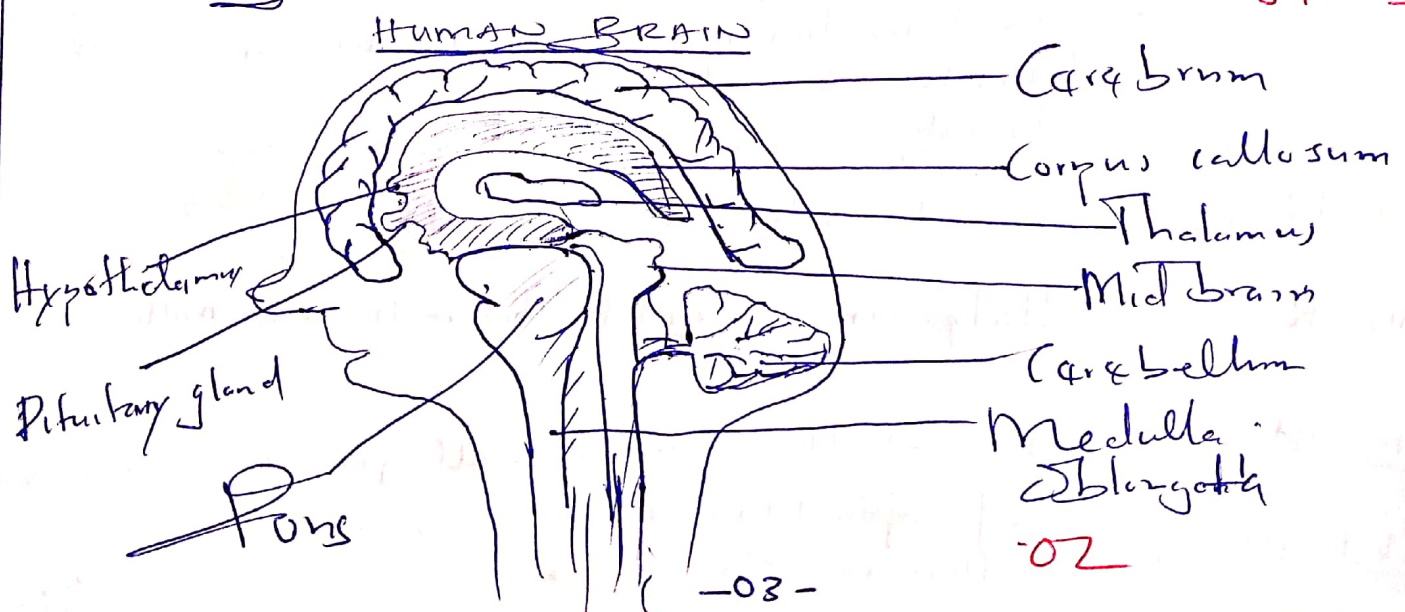
ii) Hardness of seed coat (Hard testa)

iii) Chemical inhibitors

iv) High/Low temperature any 3 @ $\frac{1}{2} = 1\frac{1}{2}$

v) Light.

ST = 06



Cerebrum

Receive information from all sense organs
Deals with vision, hearing, speech, emotion, reasoning,
language, argument, Thinking, decision making

Cerebellum

Balance and movement of the body,
Maintain posture.

Medulla Oblongata

Dealing with involuntary activities,
Breathing, Heart beat, swallowing, vomiting

c) Motor Neuron

Sensory Neuron

i) Have cell body at the end of axon	Cell body is within the axon
ii) Have large and irregular cell body	Have small and definite cell body
iii) Have dendrite on surrounding cell body,	No dendrites which surround cell body

9. L- Gastric gland - Produce gastric juice

Component of gastric juice

i) Hydrochloric acid

- Kill bacteria
- Provide medium for pepsin to work
- Convert inactive pepsinogen into pepsin
- Dissolve small bones
- Hydrolyse complex sugar to simple sugar

ii) Pepsin - Convert protein into peptide.

iii) Renin - Help in coagulate the milk into milk curd.

iv) Mucus - Prevent the stomach wall from corrosive nature of hydrochloric acid

v) Water - Help in digestion

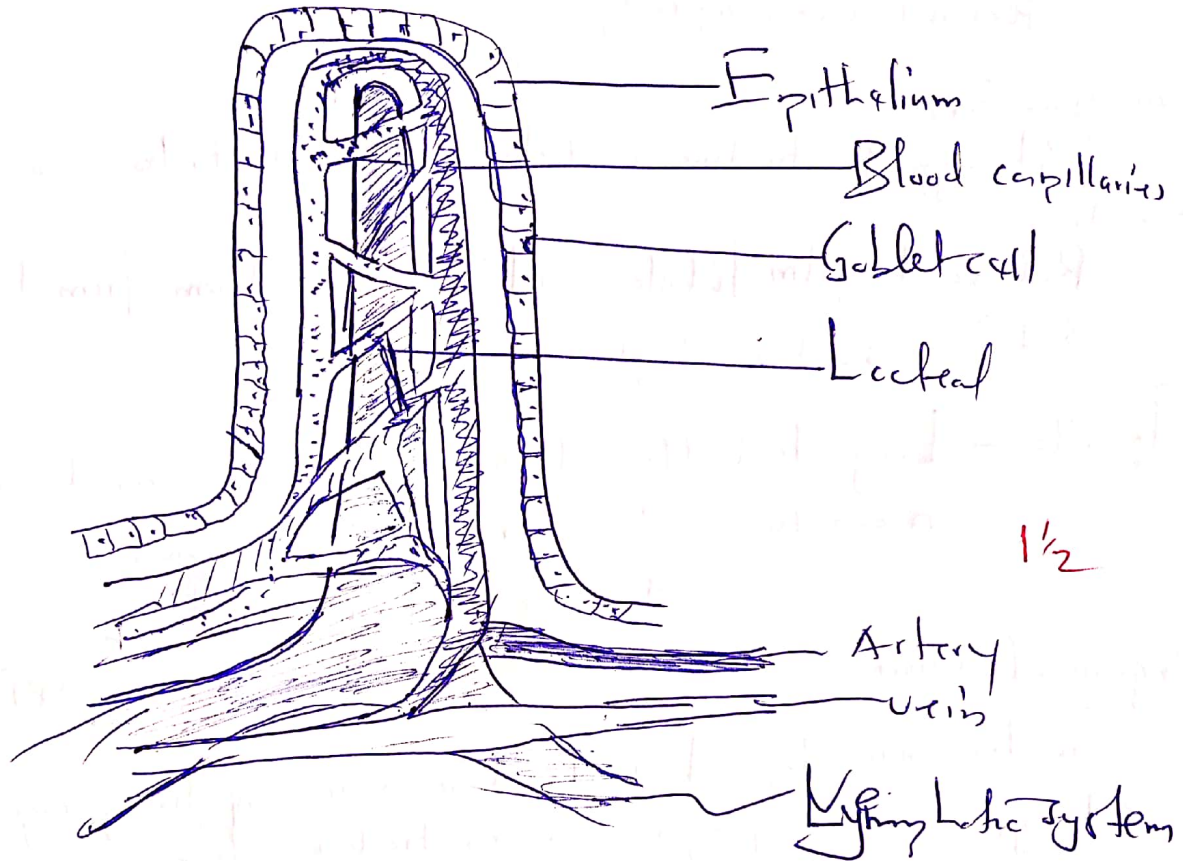
ii) Pancreas

Produce two hormones

- ① Insulin - convert excess glucose into glycogen 0.1
- ② Glucagon convert glycogen to glucose 0.1

iii)

STRUCTURE OF VILLUS



ST = 6

10) Agriculture

Practice of growing crops and rearing animals for food and money 0.1

Medicine / Pharmacy

Deals on how to prevent treat and cure of disease
Drugs / medicine preparation and distribution 0.1

Nutrition

- How organism produce food utilize food 0.1

Forestry

- Planting and taking care of trees 0.1

b) Features of pathogenic bacteria

Fimbriae - pilli

Hair like structure used for attachment

Toxins

Poisonous compound that harm host cell

Invasion/colonization

Reproduce very rapidly.

Transformation

Change its structure and become resistant to mode of treatment

Resistance

Release biofilm substance which prevent them from harmful substance such as drugs.

Flagella - Long tail like structure that help some bacteria to move to a site where they can survive.

any 4 point @ $\frac{1}{2}$ = 2

II Organic Evolution

GT = 06

Complex process by which the characteristics of living organisms change over many generations as traits are passed from one generation to the next.

Lamarck's theory

I) Environmental effect

II) Use and dis-use

III) Inheritance of acquired characters.

any 3 point @ $\frac{1}{2}$ = 1.5

Environmental changes.

When two organisms are placed into two environmental conditions which differ, organisms will develop features so as to be able to utilize available resources found in those environment - This will lead into those organisms to differ accordingly.

Use and dis-use

The organ or parts of the body which are used frequently develop - and become more strong while those organs which are less frequently used - become weak, or less developed and finally ~~be~~ disappear.

Inheritance of Acquired Character

⇒ Lamarck said that the trait which organism obtain as they interact with surrounding can be passed from one generation to another

IV) Darwin:

I) Overproduction

Organism reproduce at a rate which could potentially more than double their numbers at each generation

II) Struggle for existence

Life involve competition for survival in which many of the young die before reaching reproductive age

III) Variation

There is variation within every species and new variations appearing all the time
No two members are exactly alike

IV) Survival For the fittest

Some variations help organism to survive in the struggle for existence that is these variations have survival value

V) New Species

Inheritance ensures that features with survival value are passed on to the next generation which will also have its own unique set of variations. Any 5 point @ $\frac{1}{2} = 2\frac{1}{2}$

C) Example of vestigial structure

I) Appendix

II) Wisdom teeth

III) Ear wigglers. (05)

- III) Ear wiggling muscles
- IV) Tail / coxcoyx
- V) Wingless birds / Flightless living bird
- VI) Mammals in men
- VII) Rumi

any 4 point @ $\frac{1}{2} = 2$

12 Mitosis

ST = 06

Is a nuclear cell division which lead into formation of two identical daughter cell with full set of chromosome $2n$

Meiosis

Is a nuclear cell division which lead into formation of 4 daughter cell with haploid set of ~~gen~~ chromosome. n

B) Significance of Mitosis

- ⇒ Genetic stability
- ⇒ Help in growth
- ⇒ Cell replacement
- ⇒ Regeneration of body part

any 3 point @ $\frac{1}{2} = 1\frac{1}{2}$

Significance of Meiosis

- ⇒ Genetic divergence
- ⇒ Gamete formation
- ⇒ Maintain haploid state.

any 3 point @ $\frac{1}{2} = 1\frac{1}{2}$

Advantage of Sexual reproduction

- ⇒ Variation
- ⇒ Eradicating bad trait
- ⇒ Help to form organism which are more resistance to disease

any 2 point @ $\frac{1}{2} = 1$

Dis-advantage of sexual reproduction

- i) If one organism is missing it can not take place.
- ii) Undesired trait can be formed
- iii) Time consuming

any 2 point @ 01.5 = 06

SECTION C

3 Introduction

Drug - Is a chemical substance which when taken affect Central Nervous System (01)

Drug abuse - Mis-uses of drugs (01)

Causes of drug abuse.

- > Sense of belongingness to a certain group
- > Desire to have new experience
- > Curiosity to have knowledge about the effect of drugs
- > To draw attention and resist feeling of neglects
- > Recreational purpose
- > Escape from realities of life

any 4 @ 1 mark = 4

Effect of drugs.

- ⇒ Reduce man power / Lack of competence / inefficiency
- ⇒ School drop out
- ⇒ Risk of encounter STDs / Unplanned Pregnancy
- ⇒ Increase of crimes
- ⇒ Traffic offenses
- ⇒ Marriage break down
- ⇒ Economic burden
- ⇒ Effect body organ

any 4 @ 1 mark = 4

Ways to Prevent

- ⇒ Enactment of strong Law
- ⇒ Keep away from peer pressure
- ⇒ Engage in creative activities
- ⇒ Guidance and counselling
- ⇒ Good Parent regime
- ⇒ Abide on principle rules and regulations
- ⇒ Avoid over expectation / short cut life

any 4 @ 1 mark = 4

Conclusion

(01)

11 (15)

Urine formation

⇒ Introduction: (01)

Urine is formed in a kidney by three process)

1) Ultra filtration

2) Selective reabsorption

3) Tubular secretion

Ultra filtration

Kidney receive blood from the renal arteries which come with high pressure and enter into glomerulus. Nitrogenous waste, glucose, salts, water, vitamins and filter into the surrounding Bowman's capsule. Large ~~too~~ sized molecules in the ~~p~~ arteries like plasma protein and blood cell - are not filtered. Because the wall of the glomerulus and Bowman's capsule have small pore which do not allow them to pass. Much pass in the glomerulus leaving the blood with rich in plasma protein with little water. This process is called ultrafiltration and the filtrate formed are called - glomerular filtrate 03

Reabsorption - As glomerular filtrate passes through the renal ~~As~~ tubule and the loop of Henle which extends into the renal medulla before returning to the renal cortex many of the ~~dissolve~~ substances are absorbed. The transport of the materials in the proximal convoluted tubule need energy. It should be noted that materials are selectively reabsorbed because the body can not afford to lose them as they are so crucial for the body 03

Tubular secretion

When the concentrated filtrate move from the distal convoluted tubule it enter the collecting duct which drains it into the renal pelvis. As the filtrate flow some of the ions like H^+ and some protein eg creatinine are secreted into the tubules. The filtrate now passes urine through the ureter to the bladder as urine. When bladder is full the sphincter muscle relaxes and urine is passed out of the body through the urethra. 03

Introduction

Genetic is a field of Science which deals with the study of Inheritance of and Variation (1)

Application of Genetic

a) Blood transfusion (2)

b) Genetic Counselling (2)

c) Breeding (Plant/Animals) (2)

d) Genetic Engineering (2)

• Insulin Production

• Vaccine production

→ Environmental (cleanliness)

→ Pollution Control - Bioremediation

→ Fingerprint
Conclusion. 01