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553/1

**BIOLOGY**

(Theory)

**PAPER 1**

July/August 2018

2½ hours



**WAKISSHA JOINT MOCK EXAMINATIONS**

**Uganda Certificate of Education**

**BIOLOGY**

**(THEORY)**

**Paper 1**

**2 hours 30 minutes**

**INSTRUCTIONS TO CANDIDATES:**

- This paper consists of three sections; A, B and C.
- Answer all questions in sections A and B, and any two questions from section C.
- Any additional questions answered will not be marked.
- Answers to section A should be written in the boxes provided, on the right side.
- Answers to section B should be written in the spaces provided.
- Answers to section C should be written in the answer booklet/sheets provided.

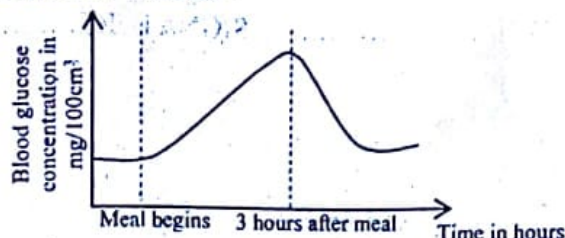
For Examiner's use only		
Section	Marks	Examiner's Initials & No.
A		
B	No. 31	
	No. 32	
	No. 33	
C	No.	
	No.	
Total		



## SECTION A (30 MARKS)

Answer all questions in this section.

1. The following graph shows the blood glucose concentration in a healthy person before, during and after a meal.



What hormone causes the decrease in glucose level three hours after the meal?

- A. Antidiuretic hormone.
  - B. Glucagon.
  - C. Insulin.
  - D. Oestrogen.
2. Which one of the following terms describes the change from plant proteins to ammonium compounds:
- A. Nitrification.
  - B. Putrification.
  - C. Fermentation.
  - D. Denitrification.
3. In cell division chromosomes align along the equatorial region during
- A. Anaphase.
  - B. Telephase.
  - C. Prophase.
  - D. Metaphase.
4. The success of a mosquito in spreading pathogens may be attributed to presence of ;
- A. wings and claws.
  - B. legs and wings.
  - C. proboscis and wings.
  - D. proboscis and claws.
5. Essential Amino acids are referred to as essential because they
- A. are the only one the body requires.
  - B. are of high biological value and the body can make them.
  - C. can only be provided from an artificial source.
  - D. are of high biological value and the body cannot make.
6. Which sequence describes the flow of energy in an ecosystem?
- A. Carnivore → herbivore → plant → sun
  - B. Plant → herbivore → carnivore → sun
  - C. Sun → carnivore → herbivore → plant
  - D. Sun → plant → herbivore → carnivore
7. A field produces a poor crop yield of maize after being used for the same crop for several years. Beans were grown and the following year maize was grown again successfully. Which of the following is the probable explanation of the effects of beans on the soil? The...
- A. texture of soil was improved.
  - B. amount of humus in the soil was increased.



- C. nitrogen content was increased.
- D. acidity of the soil was reduced.

8. Which part of the brain controls reflex activities of the body?

- A. cerebrum.
- B. cerebellum.
- C. medulla oblongata.
- D. hypothalamus.

☐

9. In which of the following parts of the maize grain are most carbohydrates stored?

- A. Cotyledon.
- B. Radicle.
- C. Endosperm.
- D. Plumule.

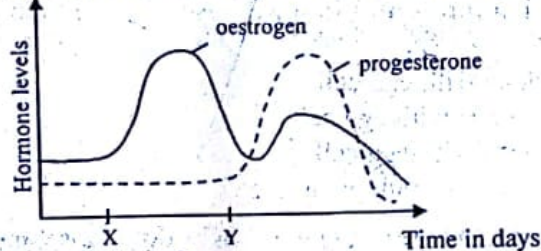
☐

10. Which one of these cell organelle would be most active at sites where substances move against diffusion gradient?

- A. Nucleus.
- B. Mitochondria.
- C. Chloroplasts.
- D. Ribosomes.

☐

11. The following graph shows the concentration of female sex hormones in the blood over time.



What happens at point X and Point Y?

- | X                               | Y                            |
|---------------------------------|------------------------------|
| A. Menstruation                 | Ovulation                    |
| B. Menstruation                 | Repair of uterus wall lining |
| C. Repair of uterus wall lining | Menstruation                 |
| D. Repair of uterus wall lining | Ovulation                    |

☐

12. The first step in the test for starch in a leaf, is to place the leaf in boiling water for about one minute. What is the purpose of this step? To...

- A. denature all enzymes in the leaf.
- B. make the leaf softer so that it is easier to test for starch.
- C. remove air in the leaf.
- D. remove chlorophyll from the leaf.

☐

13. Low land athletes report for a sports competition organized on high lands three months before the competition? This would be in order for them to acquire.

- A. higher fat deposits under their skin.
- B. larger muscles.
- C. higher erythrocyte numbers.
- D. higher leucocyte numbers.

☐

14. A scout standing for long in a parade may faint and fall down. Which of the following is the best explanation?

- A. There is less oxygen supply to brain.
- B. The leg muscles became paralysed.

☐

Turn Over



- C. He could have drunk a lot of alcohol before.
- D. There was accumulation of lactic acid in the muscles.

15. Which conditions would cause a plant to wilt most rapidly?

- A. High humidity, high temperature, high wind speed.
- B. High humidity, low temperature, high wind speed.
- C. Low humidity, high temperature, high wind speed.
- D. Low humidity, low temperature, high wind speed.

☐

16. Suppose one's pancreas gets damaged; what would happen to that person?  
He would develop;

- A. Kwashiorkor.
- B. Diabetes insipidus
- C. Diabetes mellitus.
- D. Malaria.

☐

17. A pastoralist will always retain within his herd a bull whose characteristics are desirable. This is an example of

- A. crossing over.
- B. artificial insemination.
- C. cross breeding.
- D. artificial selection.

☐

18. Which of the following forms of fusion will result into formation of the primary endosperm in seed?

- A. The tube nucleus with egg cell.
- B. Generative nucleus with egg cell.
- C. one male nucleus with egg cell.
- D. Second male nucleus with polar nuclei.

☐

19. Which of the following changes when one walks out of a brightly lit place to a poorly lit place? The...

- A. pupils become larger.
- B. lens becomes longer.
- C. pupils become narrower.
- D. lens becomes thicker.

☐

20. Which of the following eye defects is corrected by using cylindrical lenses

- A. Hypermetropia.
- B. Glaucoma.
- C. Myopia.
- D. Astigmatism.

☐

21. Accumulation of Lactic acid in muscles of an athlete during exercise is due to

- A. Perspiration.
- B. Anaerobic respiration.
- C. Panting.
- D. Aerobic respiration.

☐

22. The diagram below shows part of a section through a stem



Which one of these parts A, B, C, D is responsible for secondary growth?

☐

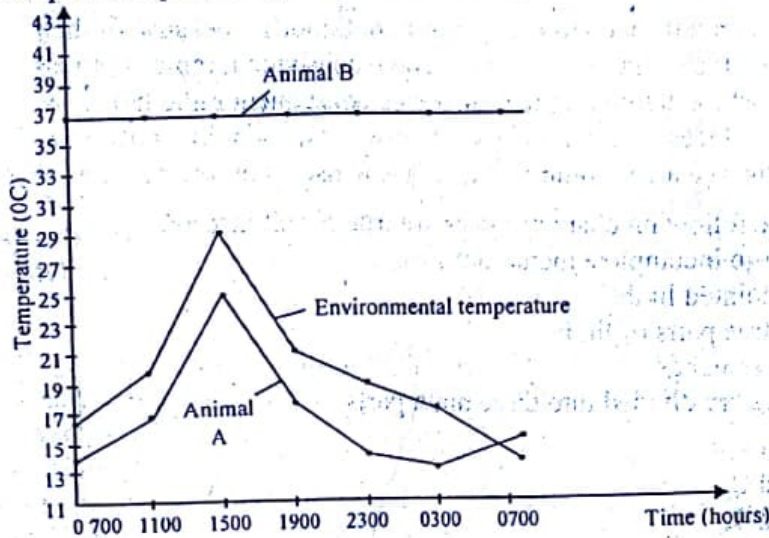


23. The following events occur during the upstroke of flapping flight in birds except  
 A. pectoralis minor muscles contract.  
 B. pectoralis major muscles relax.  
 C. pectoralis minor muscles relax.  
 D. wings are pulled up wards.
24. Very small mammals need to feed almost continuously because of their  
 A. high surface area: volume ratio hence consequent rapid heat loss.  
 B. low surface area: volume ratio hence consequent rapid heat loss.  
 C. high surface area: volume ratio hence consequent low heat loss.  
 D. low surface area: volume ratio hence consequent low heat loss.
25. Which of the following characteristics are true for all insects?  
 P undergo incomplete metamorphosis.  
 R bear jointed limbs.  
 S bear three pairs of limbs.  
 Q possess wings.  
 T bodies are divided into three main parts.  
 A. P and S.  
 B. T and Q.  
 C. T and S.  
 D. R and P.
26. Which one of the following cells are for food storage in plant?  
 A. Collenchyma cells.  
 B. Guard cells.  
 C. Parenchyma cells.  
 D. Sieve tube cells.
27. Which of the following bones are connected to form a pivot joint?  
 A. Atlas and Axis.  
 B. Femur and tibia.  
 C. carpels and wrist.  
 D. Humerus and scapula.
28. The best method to determine the population of Oxalis species plant is?  
 A. quadrat method.  
 B. capture mark, recapture method.  
 C. line transect.  
 D. direct counting.
29. After a volcanic eruption has covered an area with lava, which of the following is the most likely order of succession of the area?  
 A. Lichens → grasses → shrubs → trees  
 B. Mosses → grasses → lichens → trees  
 C. Grasses → trees → Mosses → lichens  
 D. Shrubs → grasses → trees → lichens
30. Which one of the following parts of the middle ear is linked to the inner ear?  
 A. Auditory nerve.  
 B. Eardrum.  
 C. Cochlea.  
 D. Oval window.

## SECTION B (40 MARKS)

Answer all questions in this section, writing your answers in the spaces provided.

31. The figure below shows graphs of body temperature of animals A and B plus the environmental temperature plotted against time of the day.

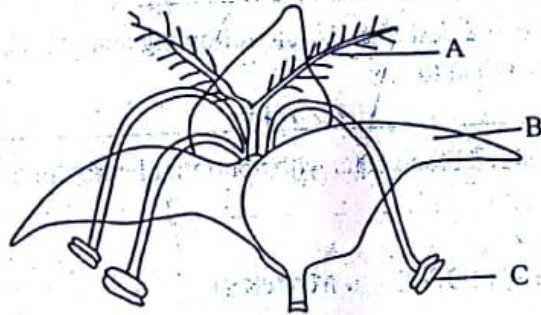


- a) What is the relationship between environmental temperature and the body temperature of animal?
- i) A \_\_\_\_\_ (1 mark)
- ii) B \_\_\_\_\_ (1 mark)
- b) Explain the relationship between environmental temperature and the body temperature of animal.
- i) A \_\_\_\_\_ (1 mark)
- ii) B \_\_\_\_\_ (1 mark)
- c) From the graphs predict and explain how active the animals A and B would be at night time. (5 marks)
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- d) What advantage does this give one animal over the other in respect of being active? (5 marks)
- \_\_\_\_\_



e) How are mammals in cold areas adapted to temperature control? (6 marks)

32. Study the diagram below of flower of a plant and answer the questions that follow.



a) Name the parts labelled A, B and C. (1½ marks)

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

b) Suggest the agent of pollination for the flower. (½ mark)

c) State the adaptations of the flower for the agent of pollination mentioned in (b) above. (4 marks)

d) State the conditions that promote cross pollination in flowers. (4 marks)

Turn Over

33. a) Name a vitamin, an enzyme and a mineral element that are involved in the blood clotting process. (3 marks)  
 Vitamin \_\_\_\_\_  
 Enzyme(s) \_\_\_\_\_  
 Mineral element \_\_\_\_\_
- b) Give reasons why knowledge about human blood groups is important during transfusion. (3 marks)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- c) State two ways by which white blood cells fight micro-organisms. (2 marks)  
 \_\_\_\_\_  
 \_\_\_\_\_
- d) Name the diseases of blood described by the following symptoms. (2 marks)
- i) In ability of the blood to clot.  
 \_\_\_\_\_
- ii) Crescent-shaped red blood cells with abnormal hemoglobin.  
 \_\_\_\_\_

### SECTION C (30 MARKS)

Answer any two questions from this section.

34. a) What is soil conservation? (2 marks)  
 b) State four ways through which soil fertility can be conserved. (4 marks)  
 c) Explain why some fish die when large amounts of fertilizers are eroded into the lake. (3 marks)  
 d) Besides fertilizers, state three other water pollutants and their respective effects to aquatic life. (6 marks)
35. Describe how the following parts of the human digestive system are adapted to their functions.
- i) mouth. (4 marks)  
 ii) stomach. (5 marks)  
 i) duodenum. (4 marks)  
 ii) colon. (2 marks)
36. a) What is sexual reproduction? (2 marks)  
 b) Describe the growth of the pollen tube and the process of fertilization in flowering plants. (7 marks)  
 c) Describe an experiment to show that oxygen is necessary for germination. (6 marks)
37. a) State the differences between short sightedness and long sightedness. (5 marks)  
 b) How is a human eye suited for sight. (8 marks)  
 c) Name two other eye defects. (2 marks)

END



WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST: \_\_\_\_\_

100%

O&A

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WAKISSHA MARKING GUIDE 2018

EXPECTED NUMBER OF SCRIPTS: 47,000.

SECTION A:

- |        |       |       |       |
|--------|-------|-------|-------|
| 1. C ✓ | 8. C  | 15. C | 23. C |
| 2. B   | 9. C  | 16. C | 24. A |
| 3. D   | 10. B | 17. D | 25. C |
| 4. C   | 11. A | 18. D | 26. C |
| 5. D   | 12. A | 19. A | 27. A |
| 6. D   | 13. C | 20. D | 28. A |
| 7. C   | 14. A | 21. B | 29. A |
|        |       | 22. D | 30. D |

(30) Marks  
01 MK @

30

SECTION B:

31. q)

(i) A: The body temperature of animal A changes/varries as environmental temperature changes/varries; 01 mark 5

OR

Body temperature of Animal A increases with increase in environmental temperature and decreases with decrease in environmental temperature;

(ii) B: The body temperature of animal B remains constant as environmental temperature changes/varries; 01 mark 5

Ref: body temperature remains constant alone.





# WAKISSHA JOINT MOCK EXAMINATIONS

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(#)

b)(i) A: - The body temperature of animal A changes/ varies as environmental temperature changes because it lacks a mechanism of maintaining a constant body temperature; / can't thermoregulate

01 Mark

Acc: Can not regulate its body temperature

(ii) B: - The body temperature of animal B remains constant as environmental temperature changes because it has a mechanism of maintaining a constant body temperature; / can thermoregulate

01 Mark

Acc: Can maintain its body temperature

c) - Animal A would be less active; due to low environmental temperature; since it can not maintain a constant body temperature; while animal B would be more active; as it can maintain a constant body temperature;

05 Marks

01 MK @

OR

- Animal A would be less active; than Animal B; due to low environmental temperature; because animal A can not raise its body temperature; while animal B can raise its body temperature;

Rej: inactive for less active

Acc: Active for more active

Acc: Remains active as it can maintain its body temp.

Rej: Explanation alone with no or wrong prediction.

0 WRITE  
Acc: reduced for less active.

d) - Animal B would respond faster; than animal A; (to stimuli) since animal B can maintain its body temperature constant; at all times; than Animal A; which increases chances of survival of animal B; max 5

05 Marks

01 MK @





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Acc: structure  
alone  
Rej: Function  
alone

- e) - Have a lot of fur; (that traps air) to insulate the body against heat loss;  
- Have a lot of fat; to insulate the body against heat loss; / Conserve heat Rej: fats are broken down to produce energy / generate heat  
- Large; and so have a small surface area to volume ratio for less heat loss;  
- They are generally large; to produce much heat; (to compensate the lost heat).  
- Have small extremities; to reduce surface area for less heat loss;

Any 03 correct pairs

06 Marks

Acc: Structure alone

TOTAL = 20

01 MK @

Rej: Function alone without structure.

32. q) A - Stigma; Rej: - Wrong spelling  
B - Bract & glume - plurals  
C - Anther; 0 1/2 marks, 0 1/2 MK @

b) Wind; 0 1/2 MK

- c) - Long flexible filaments; to allow Anthers to hang freely (outside) and shake with the slightest wind to release pollen grains;  
- Long feathery stigma; / extended / exposed / divided to trap pollen grains in air;  
- Large anthers; to produce many pollen grains;

Full marks  
2 per point.

max  
op

Acc: if b is wrong as long answer Any 02 correct pairs  
Apply: independent marking 04 marks

Rej: Any other characteristics of wind pollinated flowers not portrayed by 1 in the diagram -3-

01 MK @





# WAKISSHA JOINT MOCK EXAMINATIONS

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- d) - stigmas are above the anthers;  
 - self sterility in some plants; / incompatibility  
 - When the stigma matures before anthers; / protogyny  
 - When the anthers mature before stigma; / protandry  
 - When male and female flowers are borne on different plants; / unisexual flowers / dioecious plants  
 - stamens hang outside the corolla;  
 - physical barriers between stamens and stigma; / herkogamy

04  
Any 04  
04 Marks  
01 MK @

TOTAL = (10) MARKS

33 a)

Vitamin - Vitamin K; / phylloquinone

Enzymes - Thromboplastin; / thrombokinase or  
 - Thrombin. 01 MK @

Reg:  $Ca^{2+}$  Mineral - Calcium; 03 Marks

- b) - For matching of antigens; / antibodies of  
 (donor and recipient) to prevent agglutination; /  
 for safe blood transfusion. 03 Marks  
 01 MK @

Reg: blood for blood groups - Matching of blood groups; to prevent agglutination;

- c) - phagocytosis / engulfing microbes / ingesting microbes; 02  
 - production of antibodies; / antitoxins 02 Marks  
 01 MK @

d) (i) - Haemophilia; / bleeders' disease 01 Mark

(ii) - Sick cell (anaemia);



02

01 Mark

TOTAL = (10) MARKS



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## SECTION C:

34 a) - Soil conservation is the protection/preservation/ and careful management of soil; to maintain its fertility/ productive.

02

b) - Muching:

- Addition of organic manures/ fertilizers;
- Addition of inorganic/ artificial fertilizers;
- Crop rotation;
- Extended fallowing/ bush fallowing;
- Biogeochemical/ nutrient cycles; / carbon cycle and nitrogen cycle;
- Irrigation;
- Terracing;
- Mixed cropping/ intercropping/ strip cropping
- Contour ploughing
- Afforestation/ reafforestation

max  
04

c) - Large amounts of fertilizers in the lake cause rapid algal growth; (aquatic plant growth)/ algal blooms/ Eutrophication.

max  
03

When aquatic plants/ algae die they are decomposed by aerobic bacteria; which decrease oxygen levels in water; causing fish to suffocate and die;

- Artificial fertilizers lead to change in the pH of the water.

01 MK @

03 marks





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d). Pollutant

Effect

- Untreated sewage;

- Decomposed by aerobic bacteria and reduces dissolved oxygen in water;

- Leading to death of fish / migration

06 marks

- Acids;

- Kill fish and other organisms;

- Lead / Mercury / Copper;

- Toxic to many aquatic organisms;

- Pesticides / herbicides;

- Toxic to aquatic organisms and kills them;

- Oil;

- cuts off entry of oxygen into water

leading to suffocation of aquatic organisms

- Thermal / heat pollution  
hot water;

- Kills most of the aquatic organisms.

- Domestic wastes / refuse;

- cut off oxygen supply leading to death

06 MKS

- Silt / soil;

- reduces light penetration / affects vision

- Detergents;

- lead to algal bloom / eutrophication;

Any three pollutants and their effects

TOTAL = (15) MARKS 01 MK @

35: (i) Mouth:

- Has teeth; for cutting / tearing / chewing / mastication;  
to increase surface area for enzyme action  
and easy swallowing

- Has salivary glands; which secrete saliva; to  
soften and lubricate food for easy swallowing;

max  
04

- Saliva; contains salivary amylase / ptyalin that  
catalyses the breakdown of starch to maltose;

- Has muscular tongue; to turn the food for proper  
mixing with saliva; rolls food into bolus for  
easy swallowing

04 Mark

0 1/2 MK @





# WAKISSHA JOINT MOCK EXAMINATIONS

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### ii) Stomach:

- Has cardiac sphincter; to allow food into the stomach;
- It's elastic; to stretch and store food for digestion;
- Has pyloric sphincter muscle; to allow food retention of food for digestion; max 05
- Has circular, longitudinal and oblique muscles; to churn food into chyme by relaxation and contraction. max 05
- Has gastric glands; that secrete mucus to protect wall from digestive enzymes;
- Gastric juice contains pepsin; that catalyses the breakdown of proteins to peptides/poly peptides;
- Gastric juice also has rennin; that coagulates caseinogen to casein;
- Gastric juice also contains hydrochloric acid; that kill bacteria in food; / provides optimum pH for digestion of proteins. 05 Marks

Acc:  
HCl

0 1/2 MK @

### (iii) Duodenum:

- Has secretory glands in its wall to produce alkaline fluid; and mucus to provide suitable pH for enzymes
- It's connected to the liver; that produces bile;
- It's connected to the pancreas that secretes pancreatic juice; / pancreatic enzymes. max 04
- Has secretory cells; that secrete secretin; which induces the release of bile from the liver and pancreatic juice from the pancreas
- Gen

04 Marks

0 1/2 MK @



# WAKISSHA JOINT MOCK EXAMINATIONS

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(iv) Colon:

- Has muscular walls; for peristaltic movements of indigested materials;
- It is folded; to increase the surface area/ provide enough time for absorption of water;

Rejected - It ~~secrete~~ <sup>secretes</sup> mucus which lubricates the ~~solid~~ <sup>solid</sup> ~~residue~~ <sup>residue</sup> 02 Marks

TOTAL = (15) MARKS

0.5 MK @

083

36 a) - sexual reproduction is the formation of new organisms; by fusion of (male) and (female) gametes;

~~Acc~~ Fusion of gametes o

01 MK @

b) - Once the pollen grain lands on the stigma, the pollen grains absorb water; and germinates to give rise to a pollen tube;

- The pollen tube develops and grows down the style; with the help of the tube nucleus; as the generative nucleus follows behind.

- As the tube continues to grow downwards, the generative nucleus divides by mitosis; to form two male nuclei (male gametes);

- Directed by a chemical the pollen tube enters the embryo sac <sup>ovule</sup> through the micropyle;

- On entering the embryo sac the tip of the pollen tube bursts/breaks; and the pollen tube nucleus disintegrates/degenerates;

- The two male nuclei/gametes enter the embryo sac;

- One male nucleus fuses with the egg nucleus; to form (a diploid) zygote;

- The other male nucleus fuses with two polar nuclei; to form (a triploid) endosperm;



07 Marks  
0.5 MK @

MAX

07  
marks



# WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST: \_\_\_\_\_

O&A

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c) Aim: An experiment to show that oxygen is necessary for germination;  $0\frac{1}{2}$  mark

Materials:

- Two ~~conical~~ flasks;
- Two ~~corks~~; max  $1\frac{1}{2}$
- Viable ~~seeds~~; Any 03 correct materials
- Water;  $0\frac{1}{2}$  marks
- Cotton wool; ~~x~~
- Alkaline pyrogallol; (pyrogalllic acid in sodium hydroxide).

Procedure:

- Pour  $100\text{cm}^3$  of water in one flask 'A'; and in another conical flask 'B'  $100\text{cm}^3$  of alkaline pyrogallol; to absorb oxygen; Max  $2\frac{1}{2}$
- Tie/roll ten seeds in moist cotton wool; 04 MKS
- and suspend them in each flask using a thread; Max  $0\frac{1}{2}$
- Close the mouth of each flask using a cork;

Res: - Leave the set up to stand for 3 days; under same conditions of light and temperature; acid alone.

Observation:

- The seeds in flask 'A' germinated; while seeds in flask 'B' did not germinate; 01 MK

Conclusion:

- Oxygen is necessary for germination;  $0\frac{1}{2}$  MK  $\frac{1}{2}$

TOTAL = (15) MARKS





# WAKISSHA JOINT MOCK EXAMINATIONS

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37. a)

Short sightedness

Long sightedness

- Only near objects are focused clearly
- Images of far objects are formed in front of retina
- Caused by strong ~~and~~ lens ~~and long eyeball thick~~
- Caused by ~~long~~ eyeball
- A great curvature of the cornea is formed
- Corrected by use of concave/ diverging lens

- Only far objects are focused clearly;
- Images of near objects are formed behind the retina;
- Caused by weak/ lens; ~~and~~ ~~thick~~ <sup>thin</sup>
- Caused by short eyeball;
- Less/ little curvature of the cornea is formed;
- Corrected by use of convex/ converging lens;

Max  
05 marks  
  
01 mark

Any five  
05 marks

NB Mark only compatible differences

b) - Has retina; where images are formed;

- Has sclerotic layer; for attachment of muscles;
- Has choroid; for absorption of light;
- Has lens; for refracting light on the retina;
- Has cornea; for refracting light on the retina;
- Has aqueous humour; for refracting light;
- Has Vitreous Humour; for refracting light;
- Has optic nerve; to carry impulses to the brain;
- Has ciliary body/ ciliary muscles; which contract and relax to change the shape of the lens;
- Has suspensory ligaments; to hold the lens in position attach to the ciliary body;
- Has tear glands; to secrete tears to clean the eye for clear vision;
- Has Iris; to regulate/control the size of the pupil and amount of light entering the eye;

Max  
08 marks





# WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST: \_\_\_\_\_

O&A

Do not  
write  
in this  
margin

CANDIDATE'S NAME: \_\_\_\_\_ INDEX No. \_\_\_\_\_

SUBJECT: \_\_\_\_\_ PAPER: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_

Do not  
write  
in this  
margin

- Has pupil; to allow entry of light into the eye;
- Has thin transparent conjunctiva; to allow  $0\frac{1}{2}$  MK @ penetration of light into the eye;

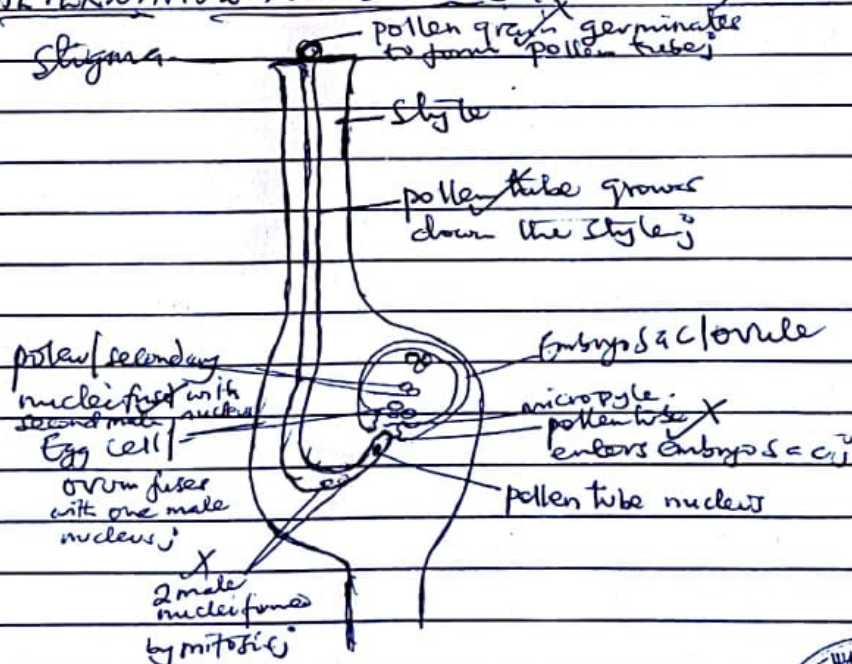
Any 08 correct  
pairs  
08 Marks

- c) - Astigmatism;  
- Presbyopia/old sightedness;  
- Thalmia; / dry eyes  
- Squintedness;

Any two  
01 MK @  
02 marks

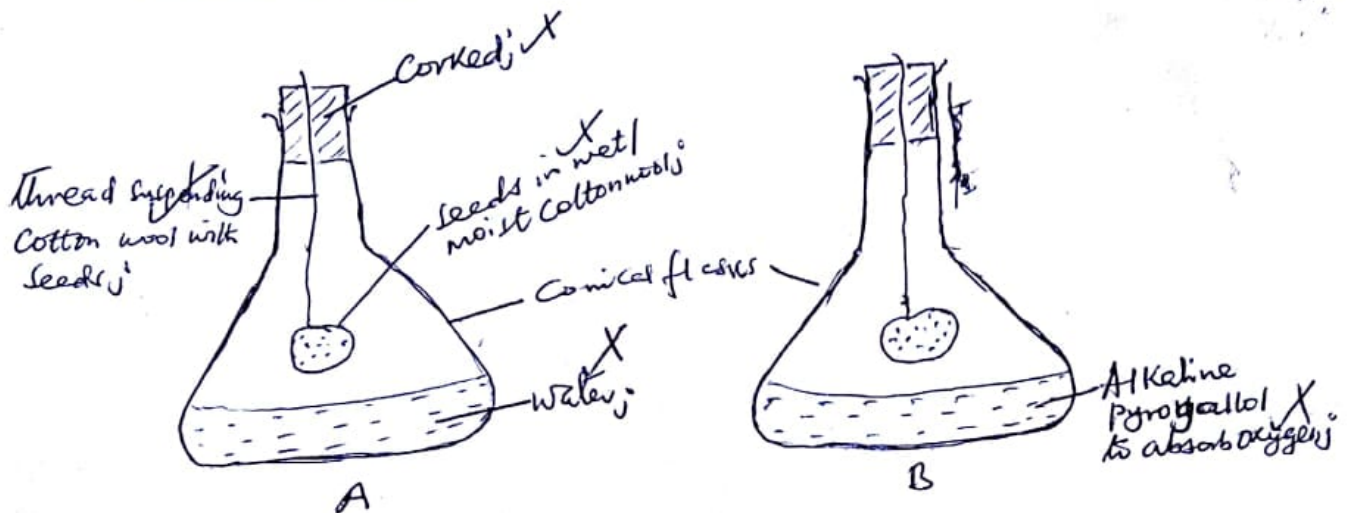
TOTAL = **(15)** MARKS

## ALTERNATIVE FOR Q 36 B (METHOD)





## ALTERNATIVE FOR NO 36 (C) METHOD



NB: If drawn under requirements/materials, award the parts 1½ marks  
eg cork (not corked)