NAME: MR. ONGOM FRED CENTRE/ INDEX No.....

SCHOOL.....TRUST HIGH SCHOOL SIGNATURE:.....

553/1
BIOLOGY
(Theory)
PAPER 1
July/August
$2^1/_2$hours

100%

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 of each question.*
- *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		30	OFE
B	No. 31	20	OFE
	No. 32	10	OFE
	No. 33	10	OFE
C	No. 34	15	OFE
	No. 35	15	OFE
Total		100	OFE

Turn Over

SECTION B (30 MARKS)

Answer **all** questions in this section.

Write the letter representing the most correct answer to each question, in the box provided.

1. Small sized plants with under developed yellow leaves is due to deficiency of .
   A. Zinc.
   B. Calcium.
   C. Nitrogen.
   D. Potassium.

   C ✓

2. Birds with long pointed beaks have evolved to feed on.
   A. Nectar.
   B. Seeds.
   C. Nuts.
   D. Fresh.

   A ✓

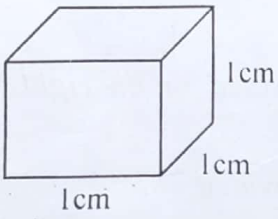
3. Which of the following shows the correct flow of deoxygenated blood to lungs?
   A. Posterior venacava ⟶ Aorta ⟶ Pulmonary vein.
   B. Hepartic vein ⟶ Posterior venacava ⟶ Pulmonary artery.
   C. Aorta ⟶ Posterior venacava ⟶ Pulmonary artery.
   D. Aorta ⟶ Hepartic vein ⟶ pulmonary vein.

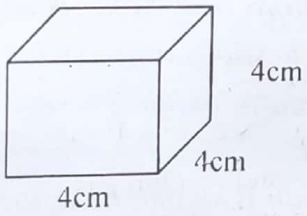
   B ✓

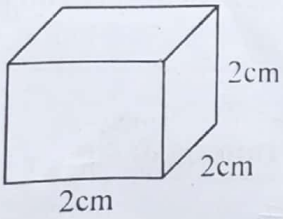
4. Succus entericus is secreted by
   A. Salivary gland.
   B. Pancreas.
   C. Stomach walls.
   D. Walls of small intestines.

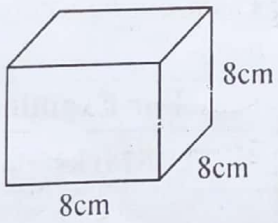
   D ✓

5. Which of the following cubes would take in the highest quantity of dye, when all are immersed at the same time?

   A.
   

   C.
   

   B.
   

   D.
   

   A ✓

6. Which one of the following human blood groups lacks antibodies in its serum?
   A. O
   B. A
   C. AB
   D. B

   C ✓

7. The associations between fungi and plant roots are called
   A. Parasitic.
   B. Commensalism.
   C. Saprophytism.
   D. Mycrorrhizae.

   D ✓

07

8. In a plant leaf, gaseous exchanges occurs in the
   A. Palisade layer.
   B. Mesophyll.
   C. Upper epidermis.
   D. Lower epidermis.

B ✓

9. Which one of these is located in the dermis of the skin?
   A. Sebaceous gland.
   B. Malphian layer.
   C. Granular layer.
   D. Cornified layer.

A ✓

10. Organisms in cold areas are characterized by
   A. small size.
   B. hairless body.
   C. small extremities.
   D. large ears.

C ✓

11. Which one of these is the least concentrated in urine than in plasma.

	Substance	% in plasma	% in urine
A:	Sodium	0.3	0.35
B:	Chloride	0.4	0.6
C:	Urea	0.03	2.0
D:	Uric Acid	0.004	0.05

A or D ✓

12. Which one of the following does not directly affect the pH of the soil?
   A. Absorption of bases by plant roots.
   B. Production of carbon dioxide by plant roots.
   C. Leaching.
   D. Water logging.

C ✓

13. Which one of these is an effector?
   A. Ear.
   B. Eye.
   C. Skin.
   D. Intestinal wall.

D ✓

14. Which set of pairs of organisms is endothermic?
   A. Mammals and amphibians
   B. Mammals and birds.
   C. Amphibians and birds.
   D. Fish and reptiles.

B ✓

15. The following results were obtained during an experiment to determine the amount of air in soil. Soil = $20cm^3$, Water = $30cm^3$, Water and soil after stirring = $45cm^3$. What was the percentage of air in the soil?
   A. 10%.
   B. 20%.
   C. 25%.
   D. 30%.

C ✓

16. If a diploid number of chromosomes of a certain species is 20, what would be the number of chromosomes from its skin cell?
   A. 40.
   B. 20.
   C. 5.
   D. 10.

B ✓

09

17. In which region of the mammalian vertebral column do the vertebrate have vertebraterial canals?
A. Neck.
B. Lumber.
C. Thoracic.
D. Sacrum.

A ✓

18. At what stage of meiosis does the pairing up of homologous chromosome occur?
A. Prophase II.
B. Prophase I.
C. metaphase I.
D. metaphase II.

B ✓

19. In the colonization of a bare rock, the next most likely groups of plants after the lichens are the;
A. Trees.
B. Shrubs.
C. Grasses.
D. Mosses.

D ✓

20. Which one of the following is richest in iron?
A. Liver.
B. Milk.
C. Butter.
D. Cheese.

A ✓

21. Which one of these is the functional part of the kidney?
A. Cortex.
B. Pelvis.
C. Medulla.
D. Nephron.

D ✓

22. Slow rate of repair of the uterine wall after menstruation in mammals is due to deficiency of;
A. Luteinizing.
B. Progesterone.
C. Oestrogen.
D. Follicle stimulating hormone.

C ✓

23. Which one of these is a dry indehiscent fruit?
A. Berry
B. Caryopsis
C. Legume
D. Capsule

B ✓

24. Which one of these modes of reproduction is sexual?
A. Conjugation
B. Spore formation
C. Budding
D. Fragmentation

A ✓

25. Which one of these farming practices cause soil exhaustion?
A. Strip cropping.
B. Crop rotation.
C. Mono culture.
D. Mulching.

C ✓

26. Which one of the following organs excretes urea?
A. Bladder.
B. Lungs.
C. Liver.
D. Tongue.

C ✓

27. Which one of the following would not contribute to the accuracy of the capture-recapture method of estimating population size?
A. Using a stable population.
B. Using a small mark.
C. Allowing time before the recapture.
D. Capturing animals selectively.

D ✓

28. Which one of the following is NOT an adaptation of a leaf for absorption of carbondixide.
A. Presence of air space in mesophyll layer.
B. Presence of chloroplasts.
C. Its exposure to air.
D. Its thinness.

B ✓

29. Control of rolling in fish is by
A. dorsal and anal fins.
B. pectoral and pelvic.
C. pectoral and anal fins.
D. caudal and dorsal fins.

A ✓

30. A hormone secreted in the body in the event of danger is
A. Secretin.
B. Thyroxine.
C. Adrenaline.
D. Insulin.

C ✓

06

SECTION B

Answer **all** questions in this section.

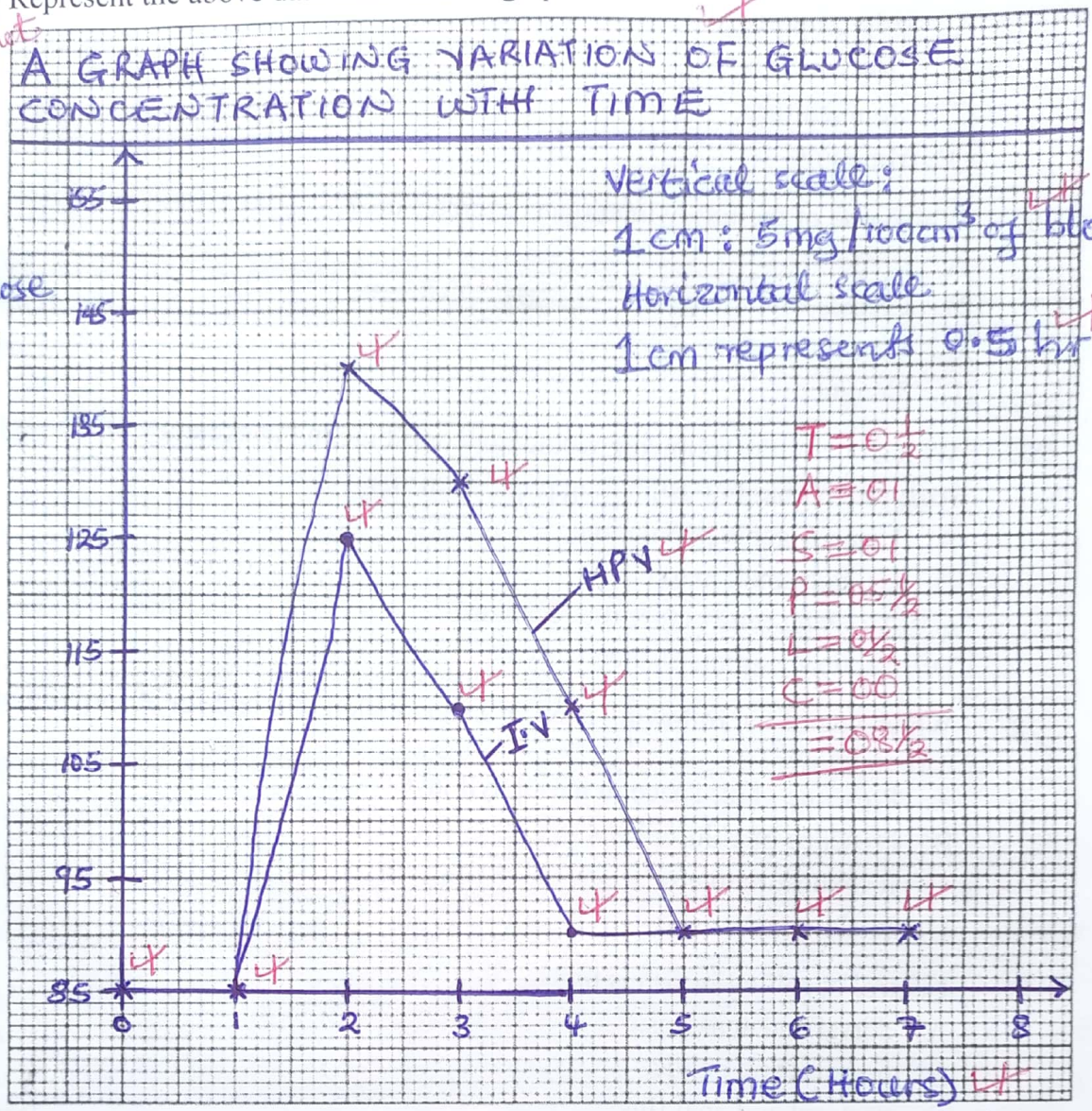
All answers **must** be written in the spaces provided.

31. A hungry person had a meal after which the concentration of glucose in blood was determined.
This was measured hourly as blood passed through the hepartic portal vein (HPV) and iliac vein (IV) in the legs. The results are shown in the table below.

Time/ hour		0	1	2	3	4	5	6	7
Conc. of glucose (mg/100 cm^3 of blood)	HPV	85	85	140	130	110	90	90	90
	IV	85	85	125	110	90	90	90	90

Acc. Column(:) use in scales
Acc. External graph used
Acc. Plotting without title;
Acc. Small squares/ small boxes;
• Accept. scales with bigger BUT correct ratios
• Accept. Titles with against.

a) Represent the above data on a suitable graph. (08½ marks)



Conc. of glucose in HPV and IV in mg/100cm³ of blood

Rej. Axes without units
Rej. Scale without units
Rej. Reps/=/;/→
Rej. Interchanged axes label
Rej. Undefined units

b) Explain the variation in the concentration of glucose in the hepartic portal vein (HPV) between;

(i) 0 – 1 hour (02 marks)

Glucose concentration remained constant; No glucose had been formed yet from digestion; hence no glucose absorption into bloodstream

Rej. use of steady to mean constant;

Marks for explanation tied to correct description of correct graph;

(ii) 1 – 2 hour. (01½ mark)

Glucose concentration increased (rapidly); due to increased absorption of glucose; caused by increased formation of glucose from digestion; 01½

(iii) 2 – 5 hour. (01½ mark)

Glucose concentration decreases (rapidly); due to less glucose being absorbed; because of decreasing digestion; 01½

(iv) 5 – 7 hour. (01½ mark)

Glucose concentration remained constant; because no more glucose was being absorbed; since digestion was already complete; 01½

c) Explain the differences in the concentrations of glucose in the hepartic portal vein and iliac vein between 2-4 hours. (05 marks)

Higher glucose level in HPV; because HPV recieves non-assimilated (non-metabolised) glucose; just absorbed from ileum; lower glucose level in I.V; because I.V recieves blood partly metabolised | used | respired; some converted to fats 05

32. a) The cell sap of plant cells is usually 0.3M when ~~contracted~~ concentrated. Explain what would be observed if such plant cells were placed in

(i) 0.2M solution. (03 marks)

Plant cell enlarges | swells | increases in size | becomes hard | becomes turgid; because being hypertonic to the solution; the cell absorbs | takes in water; by osmosis 03

(ii) 0.4M solution (03 marks)

Plant cell shrinks | plasmolyses | collapses | becomes soft | becomes flaccid | reduces in size; because being hypotonic to the soln; the cell loses | releases | gives out water; by Osmosis. 03

b) Explain the effects of taking sea water at 3% salt concentration by a person whose blood salt concentrate is 1%. (03 marks)

The Person passes out less conc. urine | Feels thirsty | experiences dry skin 03 | experiences increased osmotic pressure of blood; because his cells | tissues loses water to the concentrated blood; by Osmosis

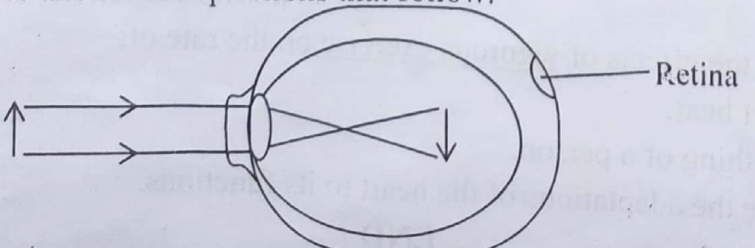
c) Name one area in the human body where the physiological process in 33(b) above applies. (01 mark)

The Kidney | Kidney nephrone | Kidney tubules 01

33. a) Describe the changes in (a) shape of (iris) muscles as a person looks up from reading a book to see a distant object. (02 marks)

Circular iris muscles contract; while radial iris muscles relax; Iris lengthens; Reducing | Narrowing pupil; 02

b) The diagram below shows the position of an image formed by a defective eye. Use it to answer the questions that follow.



(i) Identify the eye defect illustrated in the diagram above. (01 marks)

Kidney / Kid

Short sightedness / Myopia ✓ 01

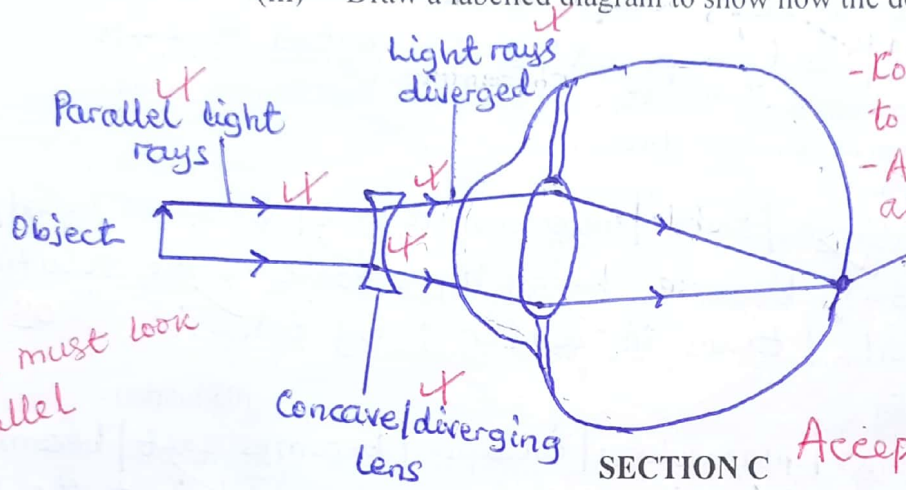
(ii) Explain how the defect is brought about. (03 marks)

When eye ball is long / large (short / strong / thicu lens);
so light rays from distant object greatly refracted
Image focused before retina (image blurred)
03

Rej. Explanation without cause;

Accept: Correct cause alone;

(iii) Draw a labelled diagram to show how the defect is corrected. (04 marks)



- Correct labelling is tied to correct drawing;
- Accept: Correct drawing alone;

Rays must look Parallel

04

Accept: [as the concave lens

SECTION C

Answer any **two** questions from this section.

Answers to these questions **must** be written in the answer booklets/sheets provided.

34. Both air and water are respiratory media.
   a) Explain why air is a better respiratory medium than water. (06 marks)
   b) State how each of the following systems have been modified to increase surface area for gaseous exchange.
      (i) Tracheal system. (02 marks)
      (ii) Mammalian lungs. (02 marks)
   c) Explain why a tilapia fish suffocates immediately when it is removed from water. (05 marks)

35. a) What is meant by pollution? (02 marks)
   b) Explain the effects of the different air pollutants on human health. (13 marks)

36. a) Explain how photosynthesis is of value to man. (03 marks)
   b) Describe **six** adaptations of a leaf of a green plant for photosynthesis. (06 marks)
   c) State **six** ways in which the process of photosynthesis differs from respiration. (06 marks)

37. a) Explain the effects of vigorous exercise on the rate of;
      i) Heart beat. (05 marks)
      ii) Breathing of a person. (03 marks)
   b) Describe the adaptations of the heart to its functions. (07 marks)

END

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

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

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

O&A

Do not write in this margin

34(a)
- Air is less dense (less viscous) than water; so oxygen easily moved across the respiratory surface
- Air has higher oxygen content than water; so more oxygen obtained from same little quantity of air
- Oxygen diffuses faster in air than in water; so higher concentration gradient easily maintained between air and blood
- Oxygen concentration in air remains constant/unaffected; even at higher temperatures; hence air supplies oxygen even at higher temperatures.

Any 3 ≡ 06

b (i)
- Has trachea highly branched/divided; forming numerous tracheoles;

02

(ii)
- Have numerous alveoli; which are highly folded;

02

(c)
Air is less dense than water; so when a fish is removed out of water; gill filaments get closer/collapse; reducing surface area for gaseous exchange; fish continuously gets less Oxygen; which can not support its life in air;

05

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST: _____

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

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

O&A

Do not write in this margin

35 (a) Pollution is the (natural/Artificial) addition of (toxic/harmful) substances/Energy to an ecosystem/Environment; to such levels that can harm part of or the whole ecosystem. 02

Award 1 Mark when a student says addition of a pollutant; (pollutant = substance + Harm)

(b)
- Smoke ; Impares/reduces vision; Causes resp. diseases
  ; causes eye irritation;
  ; Contaminates air and causes choking
- Dust; Reduces vision
  ; Causes respiratory complications
  ; Causes ear clogging
- Noise/Excess sound; causes stress/discomfort
  ; May damage ear drum/ear structures
  ; May cause miscarriages in pregnant mothers
- Fog; Causes vision imparement
  ; Causes respiratory complications;
- Sprays/Insecticides/Pesticides;
  ; causes respiratory disorder/complications
- Carbon monoxide ; combines with haemoglobin reducing surface area for pacuing oxygen
- Carbon dioxide; accumulates and causes global warming
- Lead compounds; causes complications in head regions
- Nitrogen monoxide/Nitrogen dioxide/Dinitrogen oxide; causes respiratory complications
- Radiations; causes mutations
- Hydrogen sulphide gas; causes eye irritation
  ; Causes dizzines

Ace. any one correct effect of a correct pollutant

Rej. Effect without pollutant;

Rej. Smoking

Max. any 7 ≡ 14

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____ O&A

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

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

Do not write in this margin

36 (a)
- Photosynthesis leads to formation of food for man.
- photosynthesis leads to formation of oxygen for man
- photosynthesis regulates carbondioxide concentration 03

(b)
- Most leaves are broad; to increase S.A for trapping light
- Have transparent upper epidermis; to allow light Penetration
- Has waxy cuticle; to reduce/minimise water loss
- Has phloem; to transport away manufactured food
- Has xylem; to transport water to photosynthetic cells
- Has numerous stomata; to take in CO_2 for gaseous exchange
- Has many chloroplasts/closely packed palisade cells; to trap maximum sunlight.
- Has thin epidermal layer; reducing diffusion distance of O_2/CO_2.
- Palisade cells elongated without crosswall; to maintain maximum light penetration

First 6 pts ≡ 06 06

Consider first 6 points; Rej. Excess points; Award ½ for correct structure with wrong function; Rej. stomata without qtg (numerous)

(c)

Respiration	Photosynthesis
• Occurs in all plant and animal cells	• Occurs only in plants with chlorophyll pigment
• Occurs at all times	• Occurs only in presence of light
• Carbondioxide produced	• Carbondioxide raw material
• Oxygen used up in aerobic respiration	• Oxygen released as a bi-product
• Water is produced	• Water taken up/raw material
• Energy is produced	• Sunlight energy absorbed
• Slower process in green plants	• Faster process in green plants
• Glucose used/broken/catabolic	• Glucose prod/built/anabolic
• Occurs in Mitochondria	• Occurs in chloroplasts

Any 6 ≡ 06

* The two pts are tied; * Consider any first 6 pts * Mark with full ticks

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST: _____

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

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

O&A

Do not write in this margin

37(a) (i) Heart beat increases; to pump more blood; delivering more oxygen/nutrients; For muscles to generate more energy (Muscles to respire more quickly); to remove accumulated wastes from muscles. (Accept More energy for Muscle contraction) Max = 05

(ii) Breathing rate increases; to allow in more oxygen; for increased aerobic respiration; to remove accumulated carbon dioxide from body. Max = 03 03

(b) Adaptations of the heart to its functions

- Has (bicuspid/tricuspid) valves; to prevent back flow of blood / Allow blood flow in one direction
- Has (intraventricular) septum; to separate oxygenated blood from deoxygenated blood
- Walls of left ventricles are thick; enable generation of high pressure to pump blood to far distances
- Has strong / myogenic cardiac muscles; which contract and relax rythymically with out fatique; for allowing pumping of blood continuously.
- Has fat layer; to absorb shock
- Has coronary artery; to supply heart with oxygen and nutrients
- Has coronary veins; to remove wastes
- Has pericardial membrane; producing a pericardial fluid to reduce friction
- Has atria and ventricles; to recieve / accomodate blood (temporarily); and pump them
- Has sinoatrial Node (SAN); Generates impulses for the contractions of the heart

Accept Any 7 correct points.

Max. 7 ≡ 07