

# HOME SCHOOLING MATERIAL

**PASS O' LEVEL**

**BIOLOGY, PHYSICS & ENGLISH**

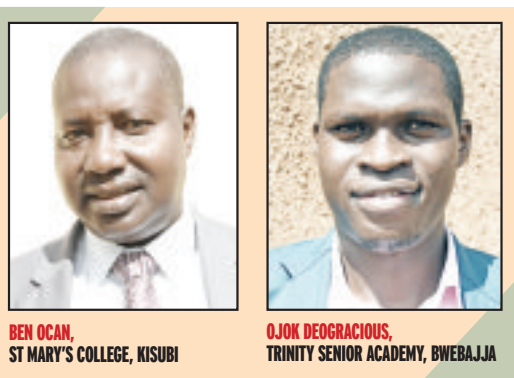


## YOUR GUIDE AWAY FROM SCHOOL

### BIOLOGY PAPER ONE SOLUTIONS (0B10007)

#### SECTION A

- A:** From the mirror light passes through the diaphragm, condenser, stage (or specimen), objective lens, eye piece lens up to the eye.
- C:** Plasmodia stay inside the body causing harm to it without the body benefitting from its stay in it.
- A:** As it allows the conservation of water in the body.
- B:** Mandibles having serrated edge for biting and crushing food materials.
- C:** It allows the movement in all planes unlike the other alternatives.
- C:** Since cohesion ensures that a continuous water column is formed. Adhesion ensures water clings to the wall of the xylem while transpiration sucks water up the plant.
- B:** it ensures firm anchorage and absorption of more water for the plant.
- A:** As it is the effective stroke because during that stage, a propulsive force is generated.
- D:** Because those are the pH levels during which the rate of reaction was highest.
- B:** This results in lower pressure in the lungs that facilitate inhalation.
- C:** After three months of pregnancy, the placenta is fully developed, hence corpus luteum degenerates.
- A:** It increases the oxygen carrying capacity of blood.
- A:** Cerebrum is part of forebrain and the largest part of the brain.
- D:** Since it uses ducts to release saliva in the mouth.
- A:** Bacteria are unicellular and do not have a nuclear membrane.
- C:** Since it is the movement of solutes along a concentration gradient.
- B:** Immunity is active if an individual produced the antibodies in his/her body, otherwise it is passive.
- D:** this is because the ratio of having a boy to a girl in human reproduction is 1:1.
- A:** Since most diabetic people cannot secrete insulin to stimulate the liver and body cells to carry out activities to reduce blood glucose level.
- C:** As respiration breaks down food nutrients that form part of dry mass, yet none of its products contribute to dry mass.
- A:** Since an organism showing a character determined by a recessive allele.
- C:** As the other alternatives are not simple nutrients.
- C:** Humus is lost after a dry soil is heated to red hot.
- B:** Atlas and axis are the first two cervical vertebrae.
- A:** A stimulus is a change in the environment an organism responds to.
- C:** Absciscic acid inhibits growth while auxins and Gibberellins promote growth.
- B:** The cytoplasm and nucleus make the living parts of the cell.
- B:** High temperature denatures all the enzymes in the microorganisms, including structures that are proteins in nature.
- A:** As water enters through the mouth but is exhaled through the opened gill cover valve.
- D:** Food materials are put in the mouth before other activities of holozoic nutrition can occur.

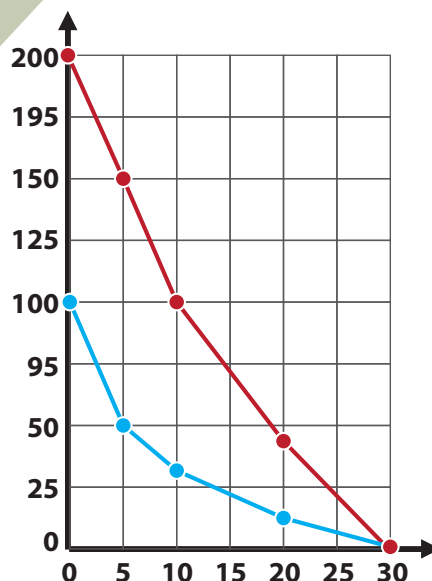


**BEN OCAN,**  
ST MARY'S COLLEGE, KISUMBI

**OJOK DEOGRACIUS,**  
TRINITY SENIOR ACADEMY, BWEBAJJA

#### SECTION B

31. a)



- With increase in thickness of mulch, the amount of surface runoff reduces more rapidly than the amount of top soil lost.
  - i) The thicker the mulch, the lower the surface runoff.  
ii) The thicker the mulch, the lower the amount of top soil lost.
  - Thick mulch reduces the speed of movement of water, diverts direction of water flow and prevents passage of water over the mulched area. This prevents any top soil from being carried away by wind, water and even animals from the mulched area to another area.
  - Terrace farming, strip farming and grass and tree planting.
- To absorb carbon dioxide.
    - To produce carbon dioxide.
  - Leaf from a plant enclosed with potassium hydroxide colours yellow.
    - Leaf from a plant enclosed with burning candle colours blue.
  - Potassium hydroxide absorbs carbon dioxide, hence the plant lacked carbon dioxide and did not carry out photosynthesis. Burning candle produced carbon dioxide which was absorbed by the plant hence carried photosynthesis.
  - Provides the carbon that is used to make glucose.
  - Presence of stomata that allows uninterrupted movement in of carbon dioxide.
    - Presence of numerous intercellular air spaces in the spongy mesophyll layer ensures rapid diffusion of carbon

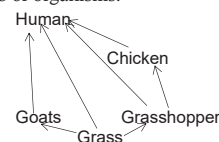
dioxide to all mesophyll cells.

- Complete metamorphosis** involves an organism undergoing a gradual change in form from egg, larva, pupa to adult, while **incomplete metamorphosis** involves an organism undergoing a gradual change in form from egg, nymph to adult.
  - Allows resource partitioning.  
- Prevents extinction of a species.
  - A male housefly initiates mating by knocking on or climbing on top of the female housefly. The female then lays spindle shaped eggs in batches in moist, shadowed and filthy environments.  
- The eggs hatch into larva also known as a maggot after 12 to 24 hours of being laid. The larva actively eat and grow and, therefore, moults 3 times.  
- The maggot prepares to pupate from a dry place after four or five days after egg laying. The pupa does not eat nor move and is enclosed in a pupal case within which differentiation and tissue reorganisation occurs.  
- After 8 to 9 days from egg laying, an imago emerges from the pupa case. Its wings unfold and it flies off. An imago is a young adult, which is the reproductive form that after 10 to 12 days, the female begins laying eggs.
  - Food should be covered.  
- Faeces should be deposited in the correct places.  
- Spraying using insecticides.  
- Covering dust bins with tight fitting lids.  
- Compost pits must be well-covered with a layer of grass, soil or burning.  
- Latrines should be smoked regularly.  
- Pit latrine holes should be covered

#### SECTION C

- Aa (ii) AA, Aa, aa
  - The possible is 25%. This is because the parents are heterozygous for albinism while the possible of a non-albino child is 75%.
  - The child will be a non-albino if both parents are homozygous for non-albino or if parent is homozygous while there is heterozygous for albinism. This is because there is no chance for the first child to inherit albino alleles from both parents.  
ii) The first child has a 50% chance of being an albino since it can inherit the albino allele from both parents.
  - Carriers of the sickle cell trait show co-dominance with some red blood cells having normal shape while other others having sickle shape. This is because the individuals are heterozygous for the sickle cell trait, with both alleles expressing their phenotypes.

- Is a feeding relationship of energy flow from the producers through the various levels of consumers showing what an organism eats and feeds on it.  
Grass → Grasshoppers → Chicken → Human
  - A **food web** is a complex system of food chains which are interlinked in an ecosystem, showing alternative food sources of organisms.



- This is addition of substances to the environment to such quantities that bring about undesirable change in the physical, chemical or biological characteristics of the environment, hence harming it due to human activities.
- Improper disposal of waste products.  
- Swamp reclamation for farming.  
- Cutting down of trees.  
- Use smoke or fume producing machines in factors and vehicles.  
- Manufacture and inadequate facilities for recycling of non-biodegradable wastes.  
- Use of fertilisers and chemicals in gardens that are washed into water bodies.

## From page I

- Making of loud noise consistently.
  - iii) - Proper disposal of waste products.
  - Practicing afforestation.
  - Creating water drainages and preventing swamp reclamation.
  - Implanting strict laws on swamp reclamation and deforestation.
  - Encouraging of waste recycling facilities.
- 36 a) - Calyx - group of sepals.  
 - Corolla - a group of petals.  
 - Androecium - a group of male parts of a flower (anther and filament).  
 - Gynoecium - a group of female parts of a flower (stigma, style and ovary).  
 b) The pollen grain absorbs water and nutrients from the stigma germinating into a pollen tube. The pollen tube controlled by pollen tube nucleus and being both positively chemotropic and negatively aerotropic, grows in the style towards the ovary. On reaching the micropyle, the generative nucleus divides by mitosis to form two male nuclei, the tip of the pollen tube degenerates releasing the male nuclei inside the ovule. One male nucleus fertilise the egg nucleus to form a zygote while another male nucleus fertilises the polar nuclei that later grow into an endosperm.  
 c) - A zygote develops into the embryo (plumule, radicle,

- cotyledons and endosperm)  
 - Ovule develops into a seed  
 - Integuments develop into a seed coat  
 - Ovary develops into a fruit  
 - Ovary wall develops into a fruit wall (pericarp)  
 - The corolla, calyx, style, stamen and stigma wither and fall off
37. a)i) ATP is highly energy rich compound formed between a chemical bond between ADP (Adenosine di phosphate) and inorganic phosphate groups. It is an immediate source of energy used by living things in various activities.  
 ii) This is the breakdown of food nutrients in the presence of oxygen, producing energy, carbon dioxide and water. It produces energy in form of ATP that is immediately used by the body.  
 b)  
 Title: An experiment to show that heat is produced during respiration.  
Apparatus and requirements  
 -Two vacuum flasks - Cotton wool  
 -Thermometer - Dead seeds  
 - Germinating seeds - Sodium hypochlorite
- Procedure  
 Sufficient seeds to fill two small vacuum flasks are soaked

in water for 24 hours and a half of them killed by boiling for 10 minutes.  
 Both lots of seeds are soaked for 15 minutes in a solution of sodium hypochlorite to kill fungal/bacteria spores on the grains (seeds) which may respire and produce carbon dioxide.  
 Seeds are rinsed in tap water. The living seeds are placed in flask labelled A and the dead ones in the second flask labelled B. Thermometers are inserted and the mouths of the flasks plugged with cotton wool.

Observation  
 After a few days, the temperature in the flask A is higher than that in flask B.

Conclusion  
 During germination of seeds, heat energy is released.

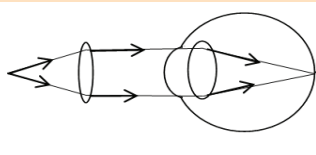
Explanation  
 Heat production is a good indication of energy release. Temperature rise in flask A is due to respiration by germinating seeds.  
 Temperature does not rise in flask B because killed seeds do not germinate and hence do not respire to release heat energy.

c) During photosynthesis, plants produce oxygen which is partly used by the plants themselves for respiration and the rest diffuses out to be used by animals for respiration. The process of respiration in animals releases carbon dioxide, which is used by plants in photosynthesis.

## BIOLOGY PAPER ONE QUESTIONS (0B10008)

### SECTION A

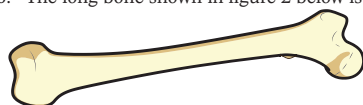
1. Figure 1 below shows the effect of a lens in treatment of a mammalian eye defect.



Which eye defect was being corrected above?

- A. Cataract.
  - B. Astigmatism.
  - C. Presbyopia.
  - D. Hypermetropia.
2. Which of the following is true about arteries? They;
- A. carry oxygenated blood
  - B. have no valves
  - C. carry blood to the heart
  - D. carry deoxygenated blood
3. The best method of measuring growth in organisms is by;
- A. measuring their height
  - B. obtaining their weight
  - C. daily observation of size
  - D. measuring dry mass regularly
4. Which of the following enzymes is secreted by intestinal wall?
- A. Lactase. B. Amylase.
  - C. Lipase. D. Rennin.
5. The hormones that majorly control development of growth secondary sexual characteristics are;
- A. oestrogen and luteinising hormone
  - B. testosterone and adrenaline
  - C. oestrogen and testosterone
  - D. adrenaline and progesterone
6. The part of the mammalian ear absent in the ears of amphibians is
- A. ear drum B. earlobe
  - C. Eustachian D. Oval window
7. The homologous structures provide evidence that organisms;
- A. have the same origin
  - B. are evolving towards a similar species
  - C. are of different origins
  - D. arise due to special creation
8. Which of the following is an adaptation to low environmental temperature?

- A. Vasoconstriction of skin blood vessels.
  - B. Thick fat layer.
  - C. Small body extremists.
  - D. Shivering.
9. Which of the following is found only in cervical vertebrae?
- A. Vertebra-arterial canal. B. Neural canal.
  - C. Neural arch. D. Neural spine.
10. The main blood vessel that transports absorbed nutrients from the alimentary canal to the liver is;
- A. hepatic portal vein B. pulmonary vein
  - C. hepatic vein D. hepatic artery
11. Which of the following vitamins is not soluble in fats?
- A. Vitamin A. B. Vitamin B.
  - C. Vitamin D. D. Vitamin K.
12. Which type of skeleton reduces the rate of water loss from an organism?
- A. Hydrostatic skeleton.
  - B. Endoskeleton.
  - C. Cytoskeleton.
  - D. Exoskeleton.
13. The two scars in a fruit are formed due to attachment of;
- A. funicle and style
  - B. filament and receptacle
  - C. receptacle and style
  - D. funicle and filament
14. Which of the following exocrine glands are important for chemical digestion of starch in mammals?
- A. Pancreas and intestinal wall.
  - B. Salivary gland and pancreas.
  - C. Gastric and salivary glands.
  - D. Gastric gland and intestinal wall.
15. In an experiment to determine amount of air in a soil sample, a student mixed 350cm<sup>3</sup> soil with 400cm<sup>3</sup> of water. The resultant volume of the mixture after stirring and leaving the setup to settle was 650cm<sup>3</sup>. What was the percentage of air in the soil sample?
- A. 28.5% B. 13.3%
  - C. 15.4% D. 25%
16. The long bone shown in figure 2 below is;



- A. Tibia B. Ulna
  - C. Radius D. Femur
17. Which of the following would occur to a plant cell placed in a solution more concentrated to its cell sap? The cell becomes
- A. Turgid
  - B. Plasmolysed
  - C. Flabby
  - D. Flaccid
18. Which of the following best describes a species?
- A. The lowest level of classification.
  - B. A group of closely related organisms.
  - C. Organisms with similar characteristics.
  - D. Organisms that interbreed to produce viable offspring.
19. Plant macronutrients are nutrients required by the plants
- A. of large sizes.
  - B. in small quantities.
  - C. in large quantities.
  - D. in the fertiliser.
20. In which of the following cell structures does respiration occur from?
- A. Nucleus.
  - B. Mitochondria.
  - C. Chloroplast.
  - D. Cell membrane
21. Which of the following groups of bacteria convert ammonium compounds into nitrates?
- A. Putrefying bacteria.
  - B. Nitrifying bacteria.
  - C. Denitrifying bacteria.
  - D. Nitrogen fixing bacteria.
22. In which of the following glands would mutations that occurred to it be passed to next generation?
- A. Sweat gland.
  - B. Gonad.
  - C. Adrenal gland.
  - D. Pituitary gland.
23. Which of the following does not result in energy loss from producers to consumers?
- A. Photosynthesis.
  - B. Egestion.
  - C. Respiration.
  - D. Excretion.
24. An environment comprises of plants, insects, birds, goats, cows and humans. Which of the ecological terms best describes the environment?

- A. Population.
  - B. Species
  - C. Community.
  - D. Ecological niche.
25. Which of the following characters vary discontinuously?
- A. Tongue rolling.
  - B. Body weight.
  - C. Body size.
  - D. Intelligence.
26. The uptake of water by seeds during germination before development of roots is
- A. inhibition
  - B. imbibition
  - C. activation
  - D. diffusion
27. The part of the Irish potato that is peeled off during the earlier preparation stage is.
- A. Epidermis.
  - B. Bark.
  - C. Cortex.
  - D. Piliferous layer.
28. Tendency of the head of a bony fish to plunge towards during movement is.
- A. Pitching.
  - B. Rolling.
  - C. Yawing.
  - D. Instability.
29. Which of the following is a form of chemical digestion in mammals?
- A. Breakdown of food due to mastication in the mouth.
  - B. Coagulation of milk proteins in the stomach.
  - C. Breakdown of food materials due to churning stomach wall.
  - D. Emulsification of lipids by bile in the duodenum.
30. The main reason for sweating during physical activities is to loss;
- A. excess heat
  - B. excess water
  - C. excess mineral salts
  - D. urea

### SECTION B

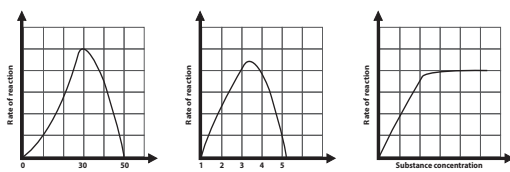
31. Figure 3 below shows the effect of various factors on the rate of reaction controlled by an unidentified enzyme.



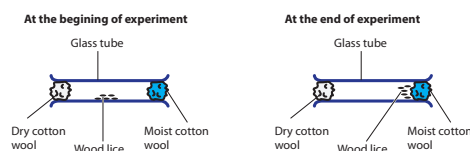
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# PASS O'LEVEL

Thursday, June 25, 2020



- State what each figure shows about the enzyme reactions.
  - Describe the effect of substrate concentration on the rate of reaction.
- Explain the effects shown in
- Figure 3a
  - Figure 3b
- Identify the properties of the unidentified enzyme using results shown in figure 3.
  - Based on figure 3a, explain the following.
    - Refrigeration in preservation of food.
    - Heat sterilisation in controlling microbial growth.
  - With a reason, suggest the part of the mammalian alimentary canal that the unidentified enzyme could possibly be found.
32. During an investigation on the effect of moisture on woodlice, woodlice were placed in the middle of a glass tube whose one end was plugged with cotton wool soaked in water while the other end was plugged with dry cotton wool. The setup at the start and end of the investigation was as below.



- Suggest the question that the investigation was set up to answer.
- What type of response was exhibited by the woodlice during the investigation?
- Explain the response of the woodlice during the experiment.
  - Suggest the importance of the type of response exhibited by the woodlice.
  - State three differences between tropic and tactic responses in organism.
- State any two relationships between parent cells and daughter cells formed by;
  - Mitosis.
  - Meiosis.
- Suggest the importance of;
  - Mitosis in asexual reproduction.
  - Meiosis in sexual reproduction.
- In a breeding experiment, a black bull was crossed with a white cow of the same species and all the offspring had black and white patches. Without using symbols explain the inheritance of coat or hide colour in cattle.

## SECTION C

- Describe the diversity of the major groups of seed-bearing plants.
- Discuss the various modifications of roots and stems of flowering plants for;
  - Storage of water and food nutrients.
  - Vegetative propagation.
- State the importance of stems and roots to a plant.
- Explain;
  - the concept of osmoregulation
  - role of stomata in removing waste products in plants
- Describe the process of;
  - Excretion in amoeba.
  - Urine formation in mammals.
- State the activity that occurs in each stage of growth and development in multicellular organism.
- Explain the importance of meristems to flowering plants.
- Describe an experiment to investigate the region of greatest elongation in a root of a flowering plant.
- State examples of natural resources found in Uganda.
- Suggest human activities that adversely affect natural resources.
  - Discuss the various methods of conservation of natural resources.
- During pandemics, the tourism sector declines, suggest various strategies that can be put in place to ensure continuation of tourism in Uganda during such conditions.

# ENGLISH LANGUAGE SOLUTIONS (OENG007)

## PAPER ONE

### MINUTES

Minutes are official notes or written records of a meeting. Those unable to attend the meeting can be able to know what transpired in the meeting. They (minutes) are also for future reference.

Minutes should have the following:

- A heading capturing which meeting or what it is about, the venue, date and time.
- Names of the participants i.e. those present, absent with apology, without apology and those in attendance (guests/visitors if any).
- Agenda i.e. items or issues to discuss, how they should follow each other and by whom.
- Main body or discussion e.g. actions and tasks, due dates, future decisions etc.
- Closure/closing remarks.
- Signing off i.e. secretary on the left and chairperson on the right.

**N.B** You can highlight some of the most crucial items or give

- them subtitles for easy identification and attention.
- others draw a column on the right showing who should do which task or whether it was fulfilled.
- Your minutes should bear a past simple tense since they are for future reference.
- Members who speak/contribute should be addressed as "a member" not with their names to avoid fingerprinting.
- You can use bullets.
- Avoid skipping lines in exams for fear of losing marks.

### SAMPLE OF MINUTES

MINUTES OF THE MUKASA FAMILY MEETING HELD IN THE SITTING ROOM ON 29th JUNE, 2020 AT 10:00AM

#### Members Present

- |                      |                                    |
|----------------------|------------------------------------|
| 1. Mukasa Edward     | Head of the family and chairperson |
| 2. Mukasa Jacqueline | Mother                             |
| 3. Ssebyala Alpha    | Secretary                          |
| 4. Nayiga Terissa    |                                    |
| 5. Bukenya Shiloh    |                                    |
| 6. Ahimbisibwe David |                                    |

#### Members Absent with Apology

- Namirimu Irene

#### Members Absent without Apology

- None

#### In Attendance

- Babirye Mary Grandmother and visitor

#### Agenda

- Prayer
- Communication from the chair
- Reactions to item 2 above and way forward
- Distribution of chores and timetable
- AOB
- Closure

#### Min 01/June/2020

#### Opening prayer

The meeting commenced at 10:00am with a prayer led by Babirye Mary, our grandmother and visitor.

#### Min 02/June/2020

#### Communication from the chair

- The chairman welcomed members in their different capacities to the meeting. He asked them to calm down and put aside their grievances.
- He reminded them that they were one united family and they ought to behave like one.
- He expressed his disappointment in those who were unco-operative in doing domestic chores and appreciated those who co-operated for the good of the family.

#### Min 03/June/2020 Reactions and way forward

- One member observed that boys left most of the work for girls which was not fair so it was agreed that work should be distributed equally.
- Others deliberately woke up late to find when work was already done so it was agreed that all children should be out of bed by 9:00am.
- It was agreed that whoever failed to do their duty or did it late should miss some or all the meals.

#### Min 04/June/2020

#### Distribution of Chores and Timetable

Day	Time	Name	Chore
Monday	9:00am+	Alpha	sweeping and mopping
	9:00am+	Terissa	preparing all meals
	9:00am+	Shiloh	washing all utensils
	9:00am+	David	feeding chicken
	9:00am+	Irene	laundry
Tuesday	9:00am+	Alpha	preparing all meals
	9:00am+	Terissa	sweeping and mopping e.t.c.

#### Min 05/June/2020

#### A.O.B

There was breaking news that a neighbour's child had been burnt with hot water so we needed to check on her.

#### Min 06/June/2020

#### Closure

There being no other business, the meeting was adjourned at 12:30pm. Meetings would be weekly to evaluate the effectiveness of the resolutions made. The closing prayer was led by Mrs Jacqueline Mukasa (mother).

Signature  
Name in capital letters  
Secretary  
Date of Approval

Signature  
Name in capital letters  
Chairperson  
Date of Approval





From page III

## SECTION B: SAMPLE NARRATIVE COMPOSITION

**Question 4:** Narrate an incident when you were given something for free but with strings attached.

### A CLOSE SHAVE

"Alex, Jemimah, Bashir, Edgar and Connie, this is your auspicious lucky hour. You have messages at the secretary's," relayed the information minister. I was definitely blithe and merry and as ambitious as the devil, I kept checking on the secretary but she told me to hold on till evening since she had her hands full. Finally, I received my message in the evening, a box meticulously wrapped in a fine, sleek shining wrapping paper. I joined my colleagues and we were homebound, having decided to open my gift at home.

The day had drawn to its close and the goats were bleating, roosters were crowing and our neighbour's bull was bellowing. The chicken were clucking and slothfully entering their coop. Tired and scratched to pieces, I reached home and could not wait to open and see what my gift had in store for me. Fastening my bedroom door securely behind me, I unwrapped the box and what I saw almost threw me out of my wits.

"Whaa-a-a-at? A brandy new Samsung Galaxy? Who on earth could give me a gift that cost an arm and a leg?" I asked myself a myriad of questions. It bore no name of the sender so I at first developed cold feet about using the phone but later whistled in the dark and convinced myself that fortune knocks once at every man's door and besides, my family lived from hand to mouth so in no way could I dream of my parents buying me such a spectacular item.

I was astoundingly gorgeous and eminent that both teachers and fellow students worshipped the ground that I walked on. Male teachers unconsciously did me favours and this threw other students into fits of jealousy. They were undeniably green with envy because teachers had a strong affinity for me and, fortunately, I disapproved the stereotyping that beauty and brains rarely reside in the same body. I had both. Due to those two attributes, I was appointed class captain, which duty I performed up to the mark.

It was time for the history lesson but the pedagogue, Mr. Okot, was still attending to some parents in his office. Usually as class captain, I was compelled to pick notes from him and read them to the class whenever he was held up by administrative obligations.

"Thud, thud, thud", I hurried to his office and knocked tenderly. "Come in, Connie," he said, making me wonder how he knew I was the one. There was no one else.

"Were you expecting me, sir?" I enquired, forcing a smile. When I saw the sensual glances he was throwing at me, I knew he had something up his sleeve.

"Can I take the notes and read them to the class, sir?" I posed. Without saying a word, he stood and came towards me.

"Sir?"

"Sh.h.h..", he signaled me to keep quiet.

"Did you like the gift I sent you?" he asked erotically.

I was dumbfounded and tongue-tied! He asked me to calm down as he had no ill intentions of harming me. He briskly closed the door. My heart skipped a beat when my eyes fell on a mattress behind his chair that was not easily visible unless you were so critical.

"You see, Connie, I am head over heels in love with you. You make my mouth water each time I see you," he said, pulling out a punnet of strawberries and putting one in my mouth. He reminded me that one good turn deserves another so I needed to appreciate him too. He warned me not to shout because he would convince everyone that I was the one who had seduced him.

At this point, I knew I was in a quandary. My heart was in my mouth. I had only my ingenuity and quick wit to save myself. I had to act receptive and while he was engrossed in unbuttoning my blouse, with all his five senses seemingly not functioning at that time, a pepper spray in my skirt was my cat's paw. I caught him on the wrong foot and with all my might sprayed his eyes and nose. He threw in the towel because I had cut the ground from under his feet.

"You scoundrel, gutterpiece, nincompoop!" I growled at him. "You need to respect the dignity and integrity of the girl-child. Great oaks from little acorns grow. I want to be one of the world's greatest pathologists and nothing ought to jeopardise my dream," I gave him a piece of my mind.

He writhed in excruciating pain and pleaded with me not to tell anyone.

"That was a close shave," I said to myself as I sorted my hair, buttoned my blouse and marched out.

When I shared the incident with my mother, she was grateful that her wise counsel and life skills had not gone down the drain.

## PAPER TWO

### Solution to summary writing

#### ROUGH COPY

#### THE CAUSES OF CRIME

Crime is caused by integration of people of different origins, peer pressure, poverty and hereditary. Greed and envy plus witchcraft cause crime. In developed countries, the manufacture of firearms, their availability on the world market and their mobility from and to even hostile people have pitched crime rate. Need to revenge also causes crime. The law is unbearably weak and law enforcers are criminals themselves. Ignorance, fabrication, blackmail and influence-peddling have led to crime. Big officers condition the junior officers to execute illegal deals. Prostitution as a vice is acceptable in many Western World countries where due to poverty is the propellant. is the propellant for prostitution. Drug and human trafficking lead to much more crime. Drug abuse, smuggling and prostitution. Alcoholism, domestic violence and juvenile delinquency are crimes that cause more crime. Drug abuse can lead to rape and defilement.

#### FAIR COPY

#### THE CAUSES OF CRIME

Crime is caused by integration ✓<sup>1</sup> of people of different origins, peer pressure ✓<sup>2</sup>, poverty ✓<sup>3</sup> and heredity ✓<sup>4</sup>. Greed ✓<sup>5</sup> and envy plus witchcraft ✓<sup>6</sup> cause crime. In developed countries, the manufacture of firearms ✓<sup>7</sup>, their availability ✓<sup>8</sup> and mobility from and to even hostile people have pitched crime rate. Need to revenge ✓<sup>9</sup> also causes crime. The law is unbearably weak ✓<sup>10</sup> and law enforcers are criminals themselves ✓<sup>11</sup>. Ignorance ✓<sup>12</sup>, fabrication ✓<sup>13</sup>, blackmail ✓<sup>14</sup> and influence-peddling ✓<sup>15</sup> have led to crime. Big officers condition the junior officers to execute illegal deals ✓<sup>16</sup>. Prostitution ✓<sup>17</sup> as a vice is acceptable in many Western World countries where poverty is the propellant. Drug and human trafficking ✓<sup>18</sup> lead to much more crime. Alcoholism ✓<sup>19</sup>, domestic violence ✓<sup>20</sup> and juvenile delinquency ✓<sup>21</sup> cause more crime. Drug abuse ✓<sup>22</sup> can lead to rape and defilement. (120 words)

### 2A Passage

2.1 What mistakes do the British people make about their perception of immigrants?

- ☐ They treat all immigrants of different origins as though



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they are one and the same.

- ☐ They disregard the "small" but crucial differences between people and races.
- ☐ They disregard the background of immigrants and that of the host country.
- ☐ They treat immigrants with prejudice and discrimination based on race.

2.2 Two examples of discrimination in the passage

- They refer and classify other people as coloureds.
- Denial of employment because of one's race.

2.3 The writer stresses that people are different and deserve to be treated differently. He recognises that there is racism and discrimination but that it is not right to qualify any challenge or problem one encounters as prejudice and segregation.

2.4 (i) This is because he had grown up used to a house with small windows that are equally set high and needed no curtains. (ii) The immigrants make a mistake of generalising all challenges/hardships they encounter in foreign lands as colour prejudice which may not always be the case.

- ☐ They also have high expectations of a warm welcome in new places which may not be readily given to them.

2.5 Meanings of words and expressions

- (i) lumping together – uniform classification/indiscriminate categorisation/ grouping
- (ii) swept aside – disregarded/ignored
- (iii) automatically – easily/ habitually
- (iv) anguish – distress/extreme pain/troubles

# ENGLISH LANGUAGE QUESTIONS (OENG008)

## PAPER TWO

Read the passage below and answer the questions that follow.

There are three kinds of education in Africa. There is the old, traditional education; there are the remains of the colonial schooling, which varied according to how the European power saw African requirements; and there is the Post-independent attempt to find an education suitable for the needs of modern Africa.

The old education grew naturally out of the village and tribal ways of life and there was much to commend it. A child had to learn how to deal with the dangers of his surrounding and how to treat his fellow. He knew about weather lore and the skills of a spear, axe and hoe from old men. His mother taught him correct speech, behaviour and respect for his elders. Throughout his childhood, it was impressed on him that he could not live alone – he must "conform", and accept the ways of the tribe. He lived in the world of Kinship: his kin gave him security in sickness and old age. Law and ownership of land, too, were based on kinship. So the child learned the rites which kinship would demand throughout his life from birth to maturity, marriage and death.

Much of this education was informal. The home was the child's school, where he learned traditional legends and proverbs. This social education had a great emphasis on correct conduct and confidence. A traveller in East Africa in the 1930s wrote: "I have seen three children between four years and six quite competently preparing a meal with no supervision". A boy was required to go to a lonely expedition into the forest to kill a leopard with bow. Severe tests of endurance were a more formal part of this education. Chagga

boys in the old days had to sleep in holes in the ground at night for nine months, often in the cold mountain air. Bena girl, aged nine to thirteen, were ducked repeatedly in streams or terrified by women pretending to fall dead at their feet, and by the appearance of monsters.

This traditional form of education had the advantage of preparing a child for life in the community. It did not in general encourage him to be ambitious or independent or teach him to meet the needs of the modern world. So in the colonial years, mission and "European" schools taught the kind of things children in Europe were taught. This produced a small westernised elite in some colonies, but it was severely criticised for having little to do with African needs. Reading books had European birds and snow scenes in them, arithmetic problems dealt with taps and wallpaper rolls. Few of these things had anything to do with many African children's environment.

Colonial education too has been criticised because it was, to quote prudent Nyerere of Tanzania, "Motivated by desire to inculcate the values of the colonial society and to train individuals for the service of the colonial state".

In the post-independent era, African needs are being rethought.

Questions are being asked such as, how many universities should a country have, whilst half of an age group gets no schooling at all?

### Question:

In not more than 100 words, summarise the importance of old education.



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# PASS O'LEVEL

Thursday, June 25, 2020



## 2A Read the passage carefully and answer the questions that follow.

Smile please! Say cheese! Anyone who has ever had a picture taken by a professional photographer swears he will scream if he ever hears those loathsome words again.

When you first entered the photographer's office, the girl at the desk seizes you firmly by the arm, ushers you into the studio and plunks you down or rather up on a high hard stool. The photographer examines you critically through narrowed eyes and tells you to look pleasant. This is just what you thought you were doing. You sit there for what seems like hours, displaying your best Pepsodent or Colgate smile and lighting up the studio with the glow of your dazzling white teeth while he proceeds to fiddle with the camera, twisting this, turning that, and all but scratching your nose or putting out an eye when suddenly thrusts light and distance meters into your face. Is it worth it, you wonder? You are almost overcome by an impulse to bolt and let posterity struggle through its disappointed centuries with no portrait of you.

Finally, everything is in order and the endless instructions begin. Instructors calculated to add to your already painful self-consciousness. "Head up, chin down, head right, shoulders to the left! Remove the look of agony from your face. Smile please, pul-eeze! No, you look as if you are snarling at me. No, no, not that either; that makes you look like a half-wit. Say cheese. Now, again. That's it! Hold it!"

The photographer, however, doesn't seem to realise that his military order to hold it is easier said than done. Several days seem to pass between his command and the actual taking of the picture. Once again he goes through the mysterious ritual with the smile freezes upon your face and you fell as if you were cast in bronze. Finally, the blinding flash, the dancing blue spots before the eyes, and there is the photographer smiling genially, grasping you by the hand to pull you from the stool, from which position you end up on your knees. If so, seize the opportunity before you rise to say a prayer of thankfulness that it is all over.

You find yourself at the door being told that the picture will be best ever. You contort your face into various expressions to the wondering gaze of the passers-by to see if the skin is still movable. Then, with an airy feeling of release, as if a dentist has said, "That's all, I'll send the bill to your father," you walk away hating the word 'cheese' and especially 'smile'.

(Adapted from "Learning to write" by E.H. Winter Reed Smith)

### Questions:

- Give two expressions which show that the writer does not like the actions of the girl at the desk.
- Why does the writer say that you have to say a prayer of thankfulness when the photographing session is over?
- In your own words, say what the story teller thinks of the photographer.
- Briefly explain what the following expressions means as they are used in the passage.
  - "through narrowed eyes"
  - "displaying your Pepsodent or Colgate smile"
  - "snarling at me"
  - "his military order"
  - "the mysterious ritual"
- Why does the writer hate the words 'cheese' and 'smile' so much?

## 2B Read the following passage and answer the questions that follow. Put a circle to the letter of your best choice.

For me it was a return, rather than a 'coming to England', for I was born here. Everything was familiar, recognised and everything was utterly alien.

I had left four years before, eight years old, to go to Nigeria for the independence celebrations, to see my father's country – my mother, found Nigeria too hot and noisy; my father, a Yoruba, found England too cold and unfriendly; and so they separated.

It was a small town, Akure, where my family lived. We owned a hotel, 'the Flamingo', a popular place, also frequented by many whites, busy – in between drinking whisky and Star lager – in travelling around making money and despising the country. Our family compound was a long single-storey building divided into many rooms, spacious, dark, cool, with beaten earth floors always kept immaculately clean, adjoined the hotel. The yard was an enormous area, with storage huts, a roofed enclosure for cooking, a well, all kinds of fruit trees, vegetable plots, chickens, dogs, a dirty stream with frighteningly loud frogs... a child's paradise. As aunts, uncles, grandmothers and fathers and cousins live together in the compound children were always cared for and never lonely in this close – knit family structure.

Perhaps now, in England, where people live close

together, yet so privately, so isolated, this seems a claustrophobic situation, but it was a way that shared so much – responsibility, problems, joy and grief.

I remember a feast in my 'honour', 'missionary' pots filled with rice, goat, palm wine... tastes and sounds and smells, that even now, so many years, I remember and long for.

Going to the community water supply (not all houses had wells) to watch people fetching water, balancing pails on their heads with ease, poking at great, indestructible soldier ants marching across the path, buying roast corn, baked plantain with my precious pennies; my father buying crabs for dinner – I was allowed to 'walk' them home, a piece of string tied to a claw, 'pets' between the marketplace and the pot. A stream of memories, events, tropical storms and running out to bathe in the heavy warm downpour.... A stream of memories.

After four years, a lifetime, my mother, tired of asking my father to send me 'home' came to take me. Angry voices, strange faced, white faces, a plane, and suddenly England.

Familiar, yet unutterably alien. Cold, damp, Nobody, except one or two relatives, spoke Yoruba or pidgin English. Cornflakes and fish and chips.

Children are never asked where they want to be; they're told, taken and have to accept and make their lives accordingly. I know only that from the day I 'came' to England I've always been longing to go back, to a land where to be black was natural, not a disgrace, a land blessed by the warm of the sun.

### Questions

- At the beginning of the passage, the author talks of 'a return' to
  - Yoruba land
  - Nigeria
  - Ireland
  - England
- According to the author, his father and mother
  - Are foreigners
  - Separated
  - Live in Nigeria and Ireland
  - Are unfriendly to each other
- How many years does the author spend in Nigeria?
  - Four years
  - A life time
  - We are not told
  - More than four years
- According to the author's mother, 'Home' is
  - Near his father
  - Near his mother
  - England
  - Nigeria
- The author compares England to Nigeria and he feels,
  - England is better than Nigeria.
  - Nigeria is more full of 'village' activities than England.
  - England is more full of 'angry voices' than Nigeria.
  - Nigeria is 'warmer' than England.

### 3A Rewrite the following as instructed in the brackets.

- "You have to do it here and now," said the teacher. (Rewrite without quotation marks)
- He did not come early enough. His home is not far from here. (Join using ....despite.....)
- There were few spectators at the playground. ( Re-write using 'any')
- The teachers are not responsible for pupil's poor performance in any way. (Begin: In...)
- We completed the work the teacher had given us. The books were handed in. (Begin: Having....)
- My brother asked me why I had left the meeting early. (Re-write in direct speech)
- The teachers on duty would have punished him if he had not given a sound explanation. (Begin: But for)
- My father has never been to school. He can read and write. (Join using "who")
- The bird was flying in the air. Tom shot it with catapult. (Begin: Flying....)
- They were relieved to hear that their children had arrived safely. (Begin: To their....)

### 3B For items 3.11-3.20, choose the best alternative and put a circle around it.

- Neither Lugolobi nor his brother.....Kiswahili.  
A: speaks

- speak
- have spoken
- have been speaking
- We are poor and have.....to offer to our guests.

- little
  - a little
  - few
  - a few
- themselves
  - each of the other
  - one another
  - each of them
- for
  - on
  - at
  - about
- She has not been recognised by the employer..... her hard work.
  - despite of
  - for all
  - in spite
  - although
- At the Olympic Games, .....athletes were from East Africa.
  - some of the most strongest
  - some of the strongest
  - the most strongest
  - some most strongest
- When the disciplinary committee accused him of theft, he.....
  - rejected
  - refused
  - denied
  - avoided
- ..... Is prohibited in this school.
  - Bulling
  - Bulying
  - Bullyng
  - Booling
- ..... that report, I have another one to present
  - Beside
  - Besides
  - Near
  - Last to
- I wish you..... "Julius Caesar" at the National Theatre, it is a marvelous production.
  - will see
  - would see
  - see
  - have see

## PAPER ONE

### SECTION A

This question is compulsory. (Use 180 to 200 words)

- Assuming you are in your senior four vacation and you are applying for a part-time job at a supermarket in town. Write a curriculum vitae to accompany your application.

### SECTION B



Choose one of the following topics and write a composition of 500 to 600 words.

- Write a story ending: "...at the end of it all, I was able to learn my lesson the hard way."
- Narrate an incident when you refused to listen to good advice and landed into trouble.
- Should parents regulate what children watch on television and social media? Give reasons for your answer.
- Write a composition with the title A GREEN SNAKE IN THE GREEN GRASS.
- "The lockdown should be extended for our own safety". Do you agree? Give reasons for your answer.
- Discuss the importance of writing a will before one dies.




## PHYSICS PAPER ONE SOLUTIONS (OPHY007)

### SECTION A

- D.**  
You have to change the quantities to S.I units.  
ie  $1g = 10^{-3}kg$  and  $1cm^3 = 10^{-6}m^3$   
Density =  $\frac{mass}{volume} = \frac{m \times 10^{-3}}{10^{-6}} = m \times 10^{-3+6} = m \times 10^3 kgm^{-3}$
- A.**  
 Pipette is used to deliver a definite volume of a liquid. The other devices can also deliver volumes of liquids, but their quantities can vary depending on the need.
- A.** The order of *increasing frequency* of the colours of white light is; Red, Orange, Yellow, Green, Blue, Indigo and Violet. This order can also be described as an order of reducing wavelength. *Red, Green, Blue is the correct answer.*
- D.**  
Lodestone is a natural magnet. 


- B.**  
Quantity of heat,  $Q = mass \times shc \times \text{change in temp}$   
 $Q = 0.1 \times 4200 \times 1$   
 $Q = 420 J$
- A.**  
From, Quantity of charge,  $Q = \text{current} \times \text{time}$   
Currency =  $\frac{Q(C)}{T(s)}$   
So the units are  $Cs^{-1}$
- C.**  
Frequency is defined as the number of cycles made in one second.  
Frequency =  $\frac{\text{number of cycles}}{\text{time taken}} = \frac{960}{2 \times 60} = \frac{960}{120} = 80Hz$
- B.**  
Potential energy = kinetic energy  
 $mgh = \frac{1}{2}mv^2$   
 $5 \times 10 \times h = \frac{1}{2} \times 15 \times 10^2$   
 $h = 15m$

- D.**  
  
Quantity of heat,  $Q = ml_f + mc(\theta_2 - \theta_1) + ml_v$   
 $Q = \frac{20}{100} \times 3.4 \times 10^5 + \frac{20}{100} \times 4200 \times (100 - 0) + \frac{20}{100} \times 2.3 \times 10^6$   
 $Q = 68000 + 84000 + 460000$   
 $Q = 612000J$

- C.**  
The frequency of a vibrating string;  
(i) increases with increase in tension,  
(ii) decreases with increase in it's length.  
(iii) decreases with increase in mass so long as tension and length are kept constant..
- D.**  
Rectilinear propagation of light is the phenomenon that light travels in a straight line.  
It can be demonstrated in the;  
• formation of shadow.  
• occurrence of an eclipse.  
• working of a pin hole camera.

- D.**  
 $Q = \text{current} \times \text{time}$   
 $Q = 2 \times 10^{-3} \times 1 \times 3600$   
 $Q = 7.2 C$

- C.**  
X rays are electromagnetic radiations. However, this is not the reason why its used to detect bone fractures. Reasons why soft X-rays are used to detect bone fractures include the following;  
• they are not very highly penetrative.  
• they affect photographic plates.  
• they travel in straight lines.

- B.**  
The bulb in a projector is placed at the centre of curvature of the reflector. This is done to have all the light get reflected back which would otherwise be wasted by being reflected away from the film. 

### THE TEACHERS

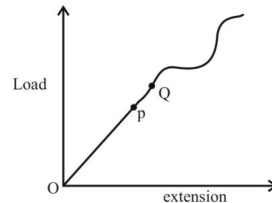


**IBRAHIM SSENDAWULA**  
NABISUNSA GIRLS' SCHOOL



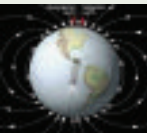
**TONNY SSEMWANGA**  
MT ST HENRY'S HIGH SCHOOL  
- MUKONO

- A.**

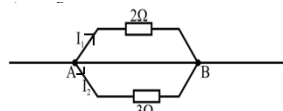


In the region  $OP$ , the material is elastic and obeys Hooke's law.  
**Note:** In  $PQ$ , the material is elastic but does not obey Hooke's law.

- B.**  
A hot air balloon rises in air because weight of balloon is less than weight of displaced air (upthrust).  
**Note:** If the weight of balloon equals to weight of displaced air, the balloon floats in air.  
If the weight of balloon is greater than weight of displaced air, then the balloon will move downwards.

- A.**  
The earth behaves as if it contains a short but a powerful bar magnet with it's north pole in the southern hemisphere. 

- A.**  
Given current  $I$ , through the  $2\Omega$  resistor =  $7.5A$ .



p .d across  $2\Omega =$  p.d across  $3\Omega$  (Resistors in parallel)  
 $I_1 R_1 = I_2 R_2$

$$I_2 = \frac{I_1 R_1}{R_2} = \frac{7.5 \times 2}{3} A$$

- D.**

**An object colour depends on:**

- Colour it transmits or reflects i.e. red light appears red because it absorbs all other colours of white light and reflects red.
- An object appears black because it absorbs all the colours incident on it (reflects none).
- An object appears white if it reflects all the colours incident on it (absorbs none).

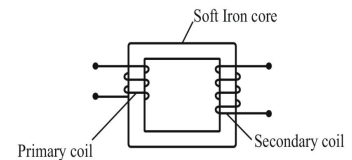
Therefore, the red skirt with a blue blouse has no common colour with green, so her dress will appear black.

- D.**  
Radio waves are transverse in nature.

**Transverse waves** are waves in which the particles of the medium through which they travel vibrate perpendicularly to the direction of the waves.

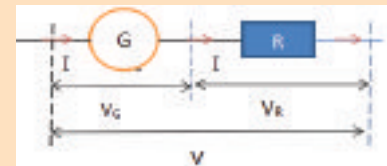
**Read about** longitudinal waves.

- C.**  
To test whether a piece of metal is a magnet or not, one would see if it repels a known magnet. Repulsion is the only sure test for a magnet.
- A.**  
The image in a plane mirror is upright, virtual with a magnification of 1.
- A.**



The p.d across the secondary will increase if the secondary coil has more turns than the primary coil.

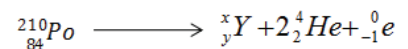
- A.**  
To convert a galvanometer into a voltmeter, we connect a resistor of high resistance in series with it.



$$\begin{aligned} V_G + V_R &= V \\ I R_G + I R &= V \\ I (R_G + R) &= V \\ 0.05 (1.0 + R) &= 3 \\ R &= \frac{3 - 0.05}{0.05} = 59\Omega \end{aligned}$$


- B.**  
 $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$   
 $T_1 = 27 + 273 = 300 K$   
 $T_2 = 10 + 273 = 283 K$   
 $P_2 = \frac{P_1 V_1 T_2}{T_1 V_2} = \frac{2 \times 3 \times 283}{300 \times 2} = 2.83 Pa$

- B.**



$210 = x + 8 + 0$ $x = 210 - 8$ $= 202$	$84 = y + 4 - 1$ $y = 84 - 3$ $= 81$
---	--

So the final product formed is  ${}_{81}^{202}Y$

- B.**  
In a simple cell, the effect of local action on the cell is to waste the zinc even when the cell is not in action.
- B.** A dynamo is a device that converts kinetic energy to electrical energy. 

- A.**  
A see breeze occurs when cool air blows towards the land.
- A.**  
A wedge is a simple machine where a very small force is required to lift a big load.
- B.**  
At maximum height, final velocity  $v = 0 ms^{-1}$ .



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# PASS O'LEVEL

Thursday, June 25, 2020



$$v^2 = u^2 + 2gh$$

$$0^2 = 12^2 - 2 \times 10 \times h \quad (\text{Since the particle is moving upwards, then } g = -10\text{ms}^{-2})$$

$$h = \frac{144}{20} = 7.2\text{m}$$

32. C.

$$\theta = \frac{I_\theta - I_0}{I_{100} - I_0} \times 100^\circ \text{C},$$

$$(I_\theta - I_0) = 25 - 5 = 20^\circ \text{C}$$

$$\theta = \frac{20}{25} \times 100^\circ \text{C}$$

$$\theta = 80^\circ \text{C}$$

33. B.

$$\text{Efficiency} = \frac{M.A}{V.R} \times 100$$

$$\frac{80}{100} = \frac{M.A}{5}$$

$$M.A = \frac{80 \times 5}{100} = 4$$

$$\text{But } M.A = \frac{L}{E} = 4 \Rightarrow E = \frac{72}{4} = 18\text{N}$$

34. C.

A needle floats on the surface of water even when its density is greater than that of water because of surface tension.

35. C.

$$\text{Number of images formed} = \frac{360}{\theta} - 1$$

$$8 = \frac{360}{\theta} - 1$$

$$90 = 360$$

$$\theta = 40^\circ$$

36. B.

Radiation is the mode of heat transfer from fire to a person seated beside it. This mode of heat transfer does not need a material medium for transmission.

37. A.

$$\frac{N_1}{N_2} = \frac{V_1}{V_2} \Rightarrow N_2 = \frac{N_1 V_2}{V_1}$$

38. D.

- Pressure in fluids is affected by;
  - ✓ Depth of the fluid
  - ✓ Density of the fluid.

**Note:** Pressure in fluids is not affected by the surface area of the liquid. This only affects pressure in solids.

39. B.

A thermometer is said to be sensitive when it can record small changes in temperature.

40. D.

Cathode rays consist of beams of fast moving electrons.

## SECTION B

41. (a) **Electric potential difference** is the total work done when one coulomb of charge moves from one point to another.

**Read about** the definitions of current and resistance and also how to state Ohm's law.

$$(b) \text{ Given: } I = 10\text{A},$$

$$t = 1\text{hr} = 1 \times 3600 = 3600\text{s} \quad (1\text{ hr} = 3600\text{s})$$

$$\text{Work done (Energy), } W = 8.64 \times 10^6 \text{ J} \quad (1\text{ MJ} = 10^6 \text{ J})$$

$$\text{From } Q = It$$

$$= 10 \times 3600$$

$$= 36000\text{C}$$

$$\text{ii) } W = VQ \Rightarrow V = \frac{W}{Q}$$

$$V = \frac{8.64 \times 10^6}{36000}$$

$$= 240\text{V}$$

42. (a)

A **stationary wave** is a wave formed when two progressive waves of equal amplitude, speed and frequency travelling in opposite directions combine together, **while a progressive wave** is one which moves away from its source through a medium and spreads out continuously without the movement of the particles of the medium.

$$(b) \text{ Given: } t = 2.0 \times 10^{-4}\text{s}$$

In this solution, we use the knowledge of echos. An **echo** is a reflected sound.

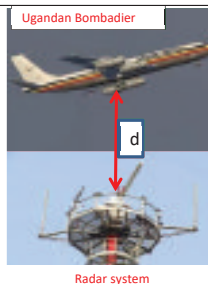
$$\text{Using: Speed} = \frac{\text{total distance}}{\text{time taken}}$$

$$V = \frac{2d}{t}$$

$$3.0 \times 10^8 = \frac{2d}{2.0 \times 10^{-4}}$$

$$d = \frac{3.0 \times 10^8 \times 2 \times 10^{-4}}{2}$$

$$= 3.0 \times 10^4\text{m}$$



**Read about:** Ultra sonic sound waves; Subsonic sound waves; Audible sound waves and the echo sounder.

**Note:** The total distance an echo covers is twice the distance between the source of the waves and the reflecting surface.

43.

$$(a) \text{ Efficiency} = \frac{M.A}{V.R} \times 100$$

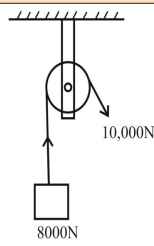
$$\text{But } M.A = \frac{8000}{10000} \text{ and } V.R = 1$$

$$\therefore \text{Efficiency} = \frac{8000}{1000 \times 1} \times 100$$

$$= 80\%$$

(b)

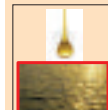
- Raising flags
- Lifting heavy loads.



44. (a)

**Diffusion** is the movement of particles of matter from a region of high concentration to a region of low concentration.

(b)



$$\text{Given: Volume of acid drop, } V = 0.005 \text{ cm}^3$$

$$(\text{changing cm}^3 \text{ to m}^3)$$

$$V = 0.005 \times 10^{-6} \text{ m}^3$$

$$\text{diameter} = 5\text{cm}; \text{ radius, } r = \frac{d}{2} = \frac{5}{2} = 2.5\text{cm}$$

$$(\text{Changing cm to m})$$

$$r = 2.5 \times 10^{-2} \text{ m}$$

$$\text{Area} = \pi r^2 = 3.142 \times (2.5 \times 10^{-2})^2$$

$$\text{Using: Volume of drop} = \text{Volume of film}$$

$$V = \pi r^2 h$$

$$0.005 \times 10^{-6} = 3.142 \times (2.5 \times 10^{-2})^2 h$$

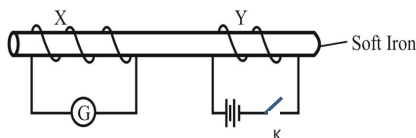
$$h = \frac{0.005 \times 10^{-6}}{3.142 \times 6.25 \times 10^{-4}}$$

$$= 2.546 \times 10^{-6} \text{ m}.$$

(c) **Factors affecting diffusion.**

- Temperature.
- Size of particles.
- Pressure
- Density
- Concentration

45.



- (a) When the key is closed, the galvanometer momentarily deflects in one direction and no more deflection there after as the switch remains closed. When it is opened, the galvanometer momentarily deflects in the opposite direction.

**Explanation.**

When switch K is closed, current flows in the coil Y. The flow of current in Y causes the magnetic flux (field) linking coil X to change (from zero to maximum). The change in the magnetic flux induces an emf in coil X that causes a current to flow through it. This results in the deflection of the galvanometer.

This is referred to as **mutual induction**.

When the switch is opened, there is another change in the magnetic flux (from maximum to zero) linking coil X. This similarly results into induction of an emf that causes a current to flow through coil X in an opposite direction to the initial.

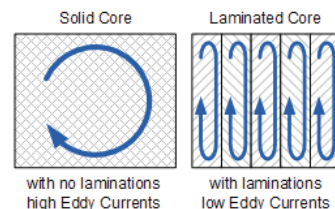
**Read about:** electromagnetic induction; mutual and self induction; Faraday and Lenz's laws of electromagnetic induction.

- ii) - Increasing number of turns in the coils X and Y.
- Increasing area of X and Y coils.
- Reducing the distance between the coils.

(b)

Cause of power loss	Method of minimisation
Resistance of the windings.	Using thick copper wires of low resistance.
Eddy currents	Using a laminated core.
Hysteresis / magnetic reversal	Using soft iron core which is easily magnetised and demagnetised.
Magnetic flux linkage.	Winding one coil on top of the other. Or Using E-shaped cores.

## Understanding Lamination of a core.



with no laminations

high Eddy Currents

with laminations

low Eddy Currents

Eddy current losses within a transformer core can not be eliminated completely, but they can be greatly reduced and controlled by reducing the thickness of the steel core. Instead of having one big solid iron core as the

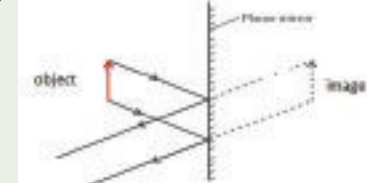
magnetic core material of the transformer or coil, the magnetic path is split up into many thin pressed iron shapes called "laminations".

**Read about** the structure and mode of operation of a transformer and also differentiate between step-up and step-down transformers.

46. (a) A **real image** is an image formed by actual intersection of rays and can be formed on the screen, while a **virtual image** is one formed by an apparent intersection of rays and cannot be formed on the screen.

**Note.** Real images are images we see in the devices such as the television, projector screen, photographic films, concave mirrors (at specific object distances) etc while virtual images are the ones formed in plane mirrors and curved mirrors (at specific object distances).

(b)



**Read about** characteristics of images formed in plane mirrors.

47.



- (a) Given Frequency,  $f = 2.5\text{Hz}$

$$T = \frac{1}{f}$$

$$\frac{1}{2.5}$$

$$= 0.04\text{s}$$

- (b) Using velocity =  $\frac{\text{distance}}{\text{time}}$

$$\text{time} = \frac{1}{f} \times \text{number of spaces}$$

$$= 0.04 \times 1$$

$$= 0.04\text{s}$$

$$\therefore \text{Distance} = \text{velocity} \times \text{time}$$



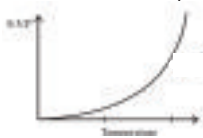
## From page VII

$$= 10 \times 0.04 = 0.4$$

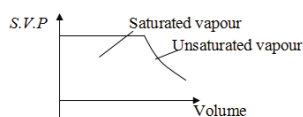
48. (a) A **saturated vapour** is a vapour which is in a dynamic equilibrium with its own liquid.

**Note:** An **unsaturated vapour** is a vapour which is not in dynamic equilibrium with its own liquid.

- (b)(i) Variation of S.V.P with temperature.



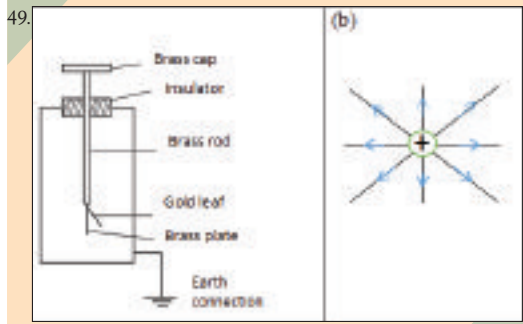
- ii) Variation of S.V.P with volume



- (c) - adding impurities to the liquid.

- increasing the pressure surrounding the liquid.

**Read about** why food takes long to get ready at higher altitudes such as mountains than it takes at sea levels or at the bottom of a mountain.



**Read about** the uses of a gold leaf electroscope.

50. (a) **Half life** is the time taken for a radioactive substance to decay to half its original mass.  
(b) Percentage remaining =  $100 - 93.75 = 6.25\%$

Percentage left	Number of half lives
100	0
50	1
25	2
12.5	3
6.25	4

Let  $T_{1/2}$  be the half-life of the material

$$4T_{1/2} = 50$$

$$T_{1/2} = 12.5 \text{ hours}$$

**Read about** the uses of radioactivity.



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## PHYSICS PAPER TWO QUESTIONS (OPHY008)

These values of physical quantities may be useful to you.

Acceleration due to gravity, $g$	$= 10 \text{ ms}^{-2}$
Speed of sound in air	$= 340 \text{ ms}^{-1}$
Specific heat capacity of ice	$= 2100 \text{ Jkg}^{-1} \text{ K}^{-1}$
Specific latent heat of ice	$= 3.36 \times 10^5 \text{ Jkg}^{-1}$
Specific heat capacity of water	$= 4.2 \times 10^3 \text{ Jkg}^{-1} \text{ K}^{-1}$
Speed of light	$= 3.0 \times 10^8 \text{ ms}^{-1}$

- (a)(i) State the energy changes which take place when a dry cell is connected to a torch bulb using connecting wires.  
ii) A girl of mass 50 kg runs up a flight of 60 steps in 10 seconds. Given that each step is 30cm high, determine the power developed by the girl.

(b) Define efficiency as applied to machines.

(c) A block and tackle pulley system has 3 pulley wheels in the upper fixed block and 2 pulley wheels in the lower movable block. Determine the load which can be lifted by an effort of 350 N if the efficiency of the system is 80%.

(d) Describe an experiment to determine the centre of gravity of an irregular cardboard.
- (a) Give two examples of a physical change.

(b) A fixed mass of gas of volume  $25 \text{ cm}^3$  at  $17^\circ\text{C}$  is heated at constant pressure to a temperature of  $60^\circ\text{C}$ . Find the resulting volume of the gas.

(c) i) Define specific latent heat of fusion.  
ii) With the aid of a labeled diagram, describe an experiment to determine the specific latent heat of fusion of ice.

(d) 50 g of ice at  $-20^\circ\text{C}$  is placed in a calorimeter of negligible heat capacity and heated to  $80^\circ\text{C}$ . Determine the amount of heat supplied.

(e) Distinguish between boiling and evaporation.
- (a) Define the following as applied to magnetism:  
(i) Poles of a magnet.  
(ii) Magnetic axis.

(b)(i) With the aid of a labeled diagram, describe how a d.c. motor works.  
ii) State two energy losses in a d.c. motor and how they are each minimised.

(c) i) What is **concrete**?  
ii) State two characteristics of concrete which makes it a desirable building material.

(d) State any two advantages of using hollow metal pipes in making bicycle frames other than solid metal bars.
- (a) i) What is a **primary colour**?  
ii) Give two examples of primary colours.  
iii) State the appearance of a blue dress in magenta light.

(b) Define the terms;  
i) **principal focus of a converging lens**.

- ii) **virtual image**.

- (c) You are provided with the following apparatus; a convex lens in a lens holder, and a screen. With the aid of a ray diagram, describe an experiment to determine the focal length of the lens.
- (d) A concave mirror of focal length 15 cm forms a real image 6 cm high at a distance of 60 cm from the mirror. By graphical construction, find;  
i) the position of the image.  
ii) the magnification.
- (e) Give one use of converging lenses.

5. (a) Define the following terms as applied to waves:

- i) Amplitude.  
ii) Frequency.

- (b) Describe an experiment to determine the speed of sound in air by the resonance method.
- (c) A student standing 540 m in front of a high wall in clear space makes a loud sound and hears an echo after 3 seconds.  
i) Determine the speed of sound in air.  
ii) State two factors which affect the speed of sound in air.
- (d) A radio wave transmits at 5 MHz. Find its wavelength.
- (e) Draw a sketch diagram to show how circular waves are reflected from a plane reflector.

6. (a) i) Distinguish between primary cells and secondary cells. State one example of each.  
ii) State any one defect in a simple cell and how it can be minimised.
- (b) Define the terms internal resistance and emf of a cell.

- (c) i) Define a **kilowatt hour**.

- ii) A lady uses a 750W electric iron to iron his clothes for 5 hours a week.  
What is the cost of electricity in 4 weeks if electrical energy costs sh. 620 per kWh?

- (d) A 1.5V cell is connected to resistors as shown in figure 1 below.

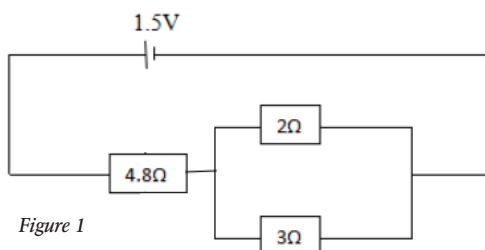


Figure 1

Calculate the;

- i) effective resistance of the circuit.  
ii) current through the  $3\Omega$  resistor.

7. (a) i) Define the term **uniform velocity**.  
ii) Draw velocity - time graph for a stone thrown vertically upwards.
- (b) The figure 2 below shows a velocity time graph for a cyclist.

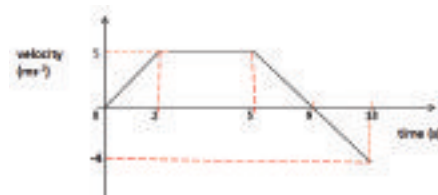


Figure 2

- i) Describe the motion of the cyclist.  
ii) Calculate the total distance covered.
- (c) If the ball of mass 0.03kg is raised 1.5 m above the surface and then released, what is its kinetic energy just before hitting the surface?
- (d) A body of mass 3kg moving with a velocity of  $10 \text{ ms}^{-1}$  collides with a stationary body of mass 5kg. If the two bodies stick together after collision, calculate their common velocity after collision.

8. (a) i) What are cathode rays?  
ii) State any two properties of cathode rays.
- (b) i) Draw a well labelled diagram of a cathode ray oscilloscope (CRO) and explain how it works.  
ii) State any two uses of a cathode ray oscilloscope.
- (c) State the use of the following in the CRO tube;  
i) the vacuum  
ii) the graphite coating
- (d)(i) Define the term thermionic emission.  
ii) A CRO has its Y-sensitivity input set to  $10 \text{ Vcm}^{-1}$ . With the time base off a vertical trace 4.0cm long is obtained on the screen for an input signal as shown in figure 3 below. Calculate the **peak voltage**.



Figure 3