VISION GROUP

NATIONAL PRIDE • GLOBAL EXCELLENCE

HOME SCHOOLING MATERIAL

PASS O LEVEL

BIOLOGY, PHYSCIS, ENGLISH

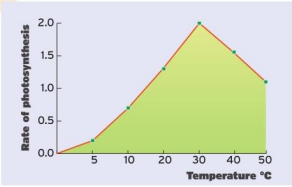
Thursday, July 2, 2020

PASS O'LEVEL

BIOLOGY PAPER ONE QUESTIONS (0BIO009)

SECTION A

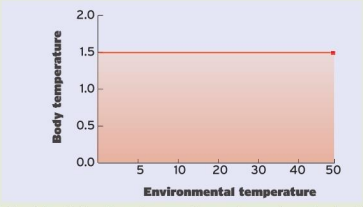
1. Which of the following classes of phylum arthropoda consists of organisms that have three thoracic segments?
   A. Archnida. B. Insecta.
   C. Crustacea D. Diplopoda.
2. The figure below shows the effect of temperature on the rate of photosynthesis.



Which of the following explains the shape of the graph from 30°C to 50°C?
   A. There was no more water on the plant.
   B. Sunlight intensity was too high.
   C. Enzymes for photosynthesis were denatured.
   D. All required starch was already formed
3. A man heterozygous for blood group A married a woman of heterozygous for blood group B. Which of the following is not a possible genotype for the blood group of their children.
   A. AB. B. OO.
   C. AO. D. BO .
4. The type of nitrogenous waste excreted by organisms in fresh water body is
   A. Urea. B. Uric acid.
   C. Ammonia. D. Trimethylamine
5. Which of the following monosaccharides is found in sucrose, lactose and maltose?
   A. Glucose. B. Galactose.
   C. Fructose. D. Ribulose.
6. Primary growth in plants causes an increase in the;
   A. girth B. height
   C. shape D. width
7. A seed that failed to germinate due to hard and impermeable testa can be caused to germinate by
   A. allowing it undergo after ripening
   B. pricking the testa
   C. treating it with growth promoters
   D. exposing the seed to high temperature
8. Some bacteria in the human alimentary canal digests cellulose for humans but obtain simple nutrients digested by man. Which of the following describes the relationship between humans and the bacteria?
   A. Commensalism. B. Symbiosis.
   C. Parasitism. D. Mutualism.
9. Which of the following structures are used by amoeba in both locomotion and feeding?
   A. Flagella B. Limbs.
   C. Pseudopodia. D. Cilia.
10. The neural spine in vertebrae function for:
   A. Articulation with adjacent vertebrae
   B. Attachment of muscles
   C. Passage of vertebrae blood vessels
   D. Articulation with ribs
11. The cusps and ridges on the crown of molar teeth enable them to effectively
   A. Grind food materials B. Masticate food materials
   C. Cut food materials D. Bite food materials
12. The growth response of pollen tube to chemicals secreted by the ovary shows that pollen tubes is
   A. Negatively chemotropic
   B. Positively chemotactic
   C. Positively chemotropic
   D. Negatively chemonastic
13. Which component of the ecosystem releases energy locked up in bodies of dead organisms for use by majorly plants?
   A. Primary consumers. B. Decomposers.
   C. Abiotic components. D. Producers.
14. In which part of the human female reproductive system does fertilisation occur?
   A. Ovary. B. Fallopian tube.
   C. Uterus D. Cervix
15. Which fin on a fish beats repeatedly, causing the tendency of the head of the fish to deflect sideways during movement?
   A. Caudal fin B. Dorsal fin
   C. Pelvic fin D. Pectoral fin
16. Which of the following pairs has both the highest level classification and organisation of an organism?
   A. Phylum and system. B. Kingdom and organism.
   C. Species and cell. D. Genus and tissue.
17. A plant has leaves with the following characteristics: Lamina divided into five lobes, network venation and presence of a leaf stalk. Which of the following is the type of leaves found in the plant?
   A. Compound leaf. B. Compound digitate.
   C. Simple leaf. D. Compound trifoliate
18. Which of the following is the gland and the hormone it secretes that affects permeability of the kidney tubules for reabsorption of water from glomerular filtrate?

	Gland	Hormone
A	Anterior pituitary	Luteinising
B	Adrenal gland	Adrenaline
C	Posterior pituitary	Antidiuretic
D	Hypothalamus	Gonadotropin releasing

19. Which part of the inner ear functions to cause hearing?
   A. Semi-circular canals. B. Cochlea.
   C. Oval window. D. Round window.
20. Which of the following mixtures of soil of different types would have the highest water retention capacity?
   A. Clay and sand soils. B. Sand and loam soils.
   C. Silt and sand soils. D. Clay and loam soils.
21. The part of a flower that withers and falls off after fertilisation is the:
   A. Petals B. Ovary
   C. Ovules D. Integument
22. The following are characteristics of an insect:
   I. Undergoes incomplete metamorphosis.
   Il. Has a pair of long antennae.
   III. Has two pairs of wings.
   IV. Has mandibles.
   Which of the following insects show the above characteristics?
   A. Housefly. B. Butterfly.
   C. Cockroach. D. Bee.
23. Which gland releases its secretions in a duct to the target organ while releasing some directly into blood?
   A. Pancreas. B. Thyroid.
   C. Ovary. D. Salivary.
24. In which part in a human male does meiosis occur?
   A. Stomach wall. B. Brain.
   C. Heart. D. Testis.
25. The cells found in between epidermal layers of a leaf are;
   A. mesophyll cells B. palisade mesophyll cells
   C. guard cells. D. spongy mesophyll cells
26. The figure 2 below shows the relationship between the temperature of an organism with the temperature of its surrounding.



Which of the following classes of organisms does the body and environmental temperature show the relationship above?
   A. Reptilia. B. Amphibia.
   C. Pisces. D. Mammalia.
27. Which of the following types of fruits are mangoes and tomatoes, respectively?
   A. Achene and follicle. B. Caryopsis and legume.
   C. Drupe and Berry. D. Nut and Cypsela.
28. During succession on bare rocks, the first group of organisms to grow are:
   A. Mosses B. Lichens
   C. Ferns D. Shrubs
29. An organism in association that derives benefits but without the other member of the association benefiting or being harmed is a...
   A. Host B. Parasite
   C. Predator D. Commensal
30. Which of the following is correct about the roots and not stems?
   A. Possession of internodes
   B. Possession of lenticels
   C. Possession of scale leaves
   D. Possession of root hairs

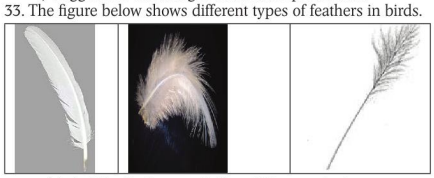
SECTION B

31. The figure below shows the rate of blood flow to different organs in a human at rest and during physical activity as well as the pressure of blood flow in two blood vessels in a minute.

Part of the body	At rest	During physical activity
Heart muscle	0.2	0.9
Skeletal muscle	1.4	15.0
Skin	0.5	0.5
Kidney	1.1	0.4

Time	Blood vessel A	Blood vessel B
0	160	320
20	165	320
40	172	360
60	160	360

   a) Explain the difference in the rate of blood flow to each organ.
   (i) Heart muscle. (ii) Skeletal muscles.
   (iii) Kidney. (iv) Skin.
   b) Plot a graph of the relationship between blood pressure in blood vessel A and time.
   c) With reason identify the blood vessels A and B.
   d) Describe the functioning of the mammalian heart that ensures that blood is pumped to all parts of the body.
32. a) Differentiate between the following:
   (i) Asexual and sexual reproduction.
   (ii) Binary fission and fragmentation.
   b) Describe conjugation in a mucor.
   c) Suggest the advantages of sexual reproduction.
33. The figure below shows different types of feathers in birds.



   a) Label the feathers as A, B and C respectively
   b) With reasons, identify each type of feather shown above.
   c) State adaptations of feather type A to its functions.
   d) Construct a dichotomous key to identify the types of feathers A, B and C above.

SECTION C

34. a) Suggest the;
   (i) role of Gregor Mendel in understanding of genetics.
   (ii) importance of knowledge of genetics in improvement of agricultural production.
   b) A red flowered plant was crossed with a white flowered plant and all F1 offspring were pink flowered plants.
   (i) Explain the phenotypes of the F1 offspring.
   (ii) Carry out a genetic cross to show the inheritance of flower colour in the plants.
35. a) Describe the main features of nutrition in mammals.
   b)(i) State the difference between physical and chemical digestion.
   (ii) Describe the chemical digestion that occurs in human ileum.
   c) State adaptations of the ileum to its functions.
36. a)(i) Suggest the meaning and examples of reflex action.
   (ii) Explain the difference between simple and conditioned reflexes.
   b)(i) Describe Pavlov's experiment on conditioned reflex.
   (ii) Suggest the relevance of the conclusion of Pavlov's experiment.
37. a) Suggest the difference between breathing and gaseous exchange.
   b)(i) Explain the need for gaseous exchange systems in large size animals.
   (ii) Describe the features of an efficient respiratory surface.
   c) Describe an experiment to show that exhaled air contains carbon dioxide.

THE TEACHERS

EDGAR MUTARYEBWA, AUTHOR AND TEACHER

SARAH TUMWEBAZE, ST MARY'S COLLEGE, KISUBI

PAPER ONE

WRITING A CURRICULUM VITAE

A curriculum vitae (CV) is a brief account of one's career and qualifications. It usually accompanies the application letter when one is seeking a job.

A CV should have the following qualities:

1. The format should be acceptable.
2. It should follow the proper order.
3. It should have a record of personal data i.e. name, current address, e-mail address, telephone contact, etc.
4. It should have a detailed educational background and work experience of the applicant.
5. It should bear all past and present achievements.
6. It should have personal interests, skills etc, especially those relevant to the job.
7. Your profile should capture or reflect some of the requirements of the job you are applying for.
8. It should indicate the language proficiency and hobbies of the applicant, especially those that may be relevant.
9. Keep hobbies and interests short, include a sport, a creative and a community activity, if you can. Avoid vague subjects like, reading or travel.
10. It should have at least two referees to be contacted in case more information about the applicant is needed.
11. It should be written in standard English with perfect grammar and any other rules of the language.
12. It should not be too long/detailed. Not more than two pages.

N.B

1. Only reflect those qualifications that are relevant to the job and leave out the many others that you may have.
2. You are encouraged to use the British style since British English is our official language in Uganda.
3. Use small letters for titles, but capitalise the initials and underline. In English writing, we do not underline capital-lettered titles.
4. We begin with the most recent achievements and end with the oldest.

ENGLISH LANGUAGE SOLUTIONS (OENG008)

SAMPLE OF A CURRICULUM VITAE (CV)

Question: You are in your Senior Four vacation and you have applied for a part-time job at a supermarket in town. Write a curriculum vitae to accompany your application.

CURRICULUM VITAE

Biodata

1. Name: Rwezahura Keith
2. Physical address: Kawuku, Wakiso
3. Telephone contact: 0703916732

E-mail address: keithrwezahura@gmail.com

Profile: Keith is an outgoing, sociable and hardworking young man with a background in sales, balancing of records and treasury.

Education Background

2017 – 2020	St. Christine S.S.	Uganda Certificate of Education (UCE)
2010 – 2016	Mt. St. George P/S	Primary Leaving Examinations (PLE)

Work Experience

2018 – 2020	Chairperson Investor's Club • Supervising club activities • Keeping records • Balancing club funds	St. Christine S.S.
2017 – 2018	Founder Investor's Club Canteen • Sales assistant during free hours • Supervising/ overseeing canteen activities • Treasure of club funds	St. Christine S.S.
2014 – 2016	Treasurer, Writer's Club • Keeping club funds • Soliciting for funds internally and externally • Sourcing for donors	Mt. St. George P/S
2013 – 2015	Class captain • Supervising class hygiene • Drawing the duty rota • Punishing unco-operative members	Mt. St. George P/S

Key skills

1. Computer literacy
2. Research
3. Interpersonal skills
4. Public relations and excellent communication

Personal attributes

1. High level of confidentiality and honesty
2. Reliability
3. Quick at learning new things
4. Sociable

Language proficiency

Language	Speaking	Listening	Reading	Writing
English	Very good	Very good	Very good	Very good
Luganda	Good	Good	Good	Fair
Runyakitara	Very good	Good	Very good	Good
Luo	Good	Good	Very good	Fair
French	Fair	Fair	Fair	Good

Hobbies and Interests

1. Reading business books and articles
2. Swimming
3. Voluntary work and writing proposals

References

1. Mr Mutaryebwa Edgar,
Headteacher, St. Christine S.S.,
P.O. Box 2323, Mbale.
Telephone Contact: 0781328756
Email: emutaryebwanv@gmail.com

2. Ms. Tumwebaze Sarah,
Patroness, Investor's Club, St. Christine S.S.,
P.O. Box 2323, Mbale.
Telephone Contact: 0782342221
Email: saratumwebaze@gmail.com

N.B You are advised (student) not to skip lines for purposes of examinations as it leads to loss of marks.

INFORMATIVE ESSAY/COMPOSITION

- For an informative essay, you can use idioms, vocabulary and other items of merit, where applicable. However, such a question may not give you a lot of chances to use a wide range of vocabulary and idioms.
- Each point should be discussed in its own paragraph.
- You need a sound introduction and conclusion.
- Avoid skipping lines as well as block paragraphs.
- Use connectors or transitional phrases to start different paragraphs to avoid monotony.

SAMPLE INFORMATIVE COMPOSITION

Question: Discuss the steps that should be taken to avoid contagious diseases in our community.

This question requires you to write an informative essay. You are expected to discuss the various remedies to the problem of contagious diseases.

THE STEPS THAT SHOULD BE TAKEN TO AVOID CONTAGIOUS DISEASES IN OUR COMMUNITY:

The issue of contagious diseases has been a long standing thorn in the flesh of developing countries also known as third world countries. These are diseases acquired through contact with an infected person. Most of these stem from poor hygiene, especially in poverty-stricken homesteads and notorious slums found in city suburbs. It is only of recent when COVID-19 took the world by storm and wreaked havoc in developed countries like China, U.S.A and Italy, leading millions to their graves and leaving great economies devastated. Other examples of contagious diseases are; cholera, Ebola and so much more. How then should people keep themselves out of harm's way?

To begin with, it is a proven fact that proper handwashing with disinfectants like soap and using sanitisers is considered one of the most effective control measures to kill pathogens. Since hands are the most important tool that reaches every part of the body, it is paramount that people keep them clean as they seem to be the major means of transport by which germs enter our bodies, causing contagious diseases.

In relation to the above, although it is almost a reflex action for one to scratch themselves, experts highly advise us to desist from the temptation of touching the mouth, nose and eyes, especially with unwashed hands. This is because those parts are the highway portal of entrance for the disease-causing germs. In so doing, one shall remain safe from contagious diseases.

Turn to page IV

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From page III

As a matter of fact, some of these contagious maladies are airborne. In case of a pandemic outbreak like COVID-19, one is advised to wear a face mask to deter the lethal virus from accessing the vulnerable respiratory system. This mask is also vital in case one is already a victim as it would prevent them from spreading the virus to those not yet infected.

More so, people are advised to keep each other at arm's length. Keeping social distance is one of the most expedient regulations one should observe to keep away from contagious ailments. Also, shaking hands as a hearty and affectionate form of greeting should be avoided. This is very important as one would not be in close contact with anybody, especially those already infected.

Equally important, it cannot be forgotten that proper feeding boosts one's immunity. This makes the body insusceptible to diseases. Strong immunity is equivalent to a soldier ready to extinguish life out of the enemy should they come close. People should therefore eat a balanced diet rich in all nutrients. Sufficient fruits and vegetables should be part and parcel of everybody's daily menu. In the event of one acquiring any disease, they may not be adversely affected and chances or recovering are very high.

You will agree with me that water is life. For that matter therefore, we cannot leave out one of the most crucial measures of boiling water for drinking, as well as keeping our water sources immaculately clean. This is because some contagious diseases like cholera and polio are acquired through contaminated water. There are also other means of purifying water with chemicals like chlorine.

By and large, the battle against contagious diseases is not a child's play. People should continue paying heed to the instructions given by the Ministry of Health and in so doing, the nightmare of contagious diseases shall be stamped upon.

NOTE: *There is no specific number of points but 8 to 9 are enough if well discussed with proper language and expressions. The essay above has few points because it was just a sample.*

PAPER TWO

Summary writing

ROUGH COPY

THE IMPORTANCE OF OLD EDUCATION

Old education grew naturally out of the village and tribal ways of life. Children learnt how to deal with the dangers of their surrounding, how to treat their fellow folklore weatherlore and the skills of a spear, axe and hoe ~~from old men~~. Mothers taught them ~~hoe to~~ correct speech, behaviour and respect for ~~their~~ elders. They lived in the world of kinship for security in sickness and old age, law and ownership of land, marriage and death. Home was the school where ~~they~~ children learnt legends and proverbs for correct conduct and confidence. Children learnt how to cook without supervision. They were given severe tests of endurance ~~like killing a leopard and sleeping in holes~~.

FAIR COPY

THE IMPORTANCE OF OLD EDUCATION

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(100 words)

2A

2.1. - She seizes you firmly by the arm.
- She plunks you down or rather up on a high hard stool.

2.2. You have to say a prayer of thankfulness because the session is so demanding in form of taking military orders/endless instructions, forcing smiles, different poses and others.

2.3. The story teller thinks the photographer is;
- unfriendly and inconsiderate (gives military orders).
- takes people through unnecessary preparations (is it worth it? You wonder.)

2.4. Meaning of words and expressions
(i) through narrowed eyes – using half-shut eyes for scrutiny
(ii) Pepsodent or Colgate smile – showing/ displaying one's beautiful smile/white teeth
(iii) snarling at me – growling at the narrator.
(iv) his military order – the photographer's unfriendly/tough commands
(v) mysterious ritual – incomprehensible/difficult repeated set of actions

2.5. The writer hates those two words because they are tiresome, difficult to satisfy, sickening.

2.B

2.6. D
2.7. B
2.8. A
2.9. C
2.10. D

3A

3.1. The teacher said that I/we/they etc had to do it there and then.
3.2. He did not come early enough despite his home not being far from here.
- He did not come early enough despite the fact that his home is not far from here.

3.3. There were hardly any spectators at the playground.
3.4. In no way are the teachers responsible for pupils' poor performance.
3.5. Having completed the work the teacher had given us, we handed in the books. (*After the comma, the doer of the action must follow immediately. Therefore, "the books were handed in" is wrong*)
3.6. "Why have you left the meeting early?" my brother asked me.
3.7. But for his sound explanation, the teachers on duty would have punished him.
3.8. My father, who has never been to school, can read and write.
3.9. Flying in the air, the bird was shot by Tom with a catapult.
3.10. To their relief, they heard that their children had arrived safely.

3B

3.11 A
3.12 A
3.13 C
3.14 B
3.15 B
3.16 B
3.17 C
3.18 C
3.19 B
3.20 B

ENGLISH LANGUAGE QUESTIONS (OENG009)

PAPER ONE

SECTION A

This is compulsory. Use 250-300 words

1. Assume you are the Head Prefect of your school. You have been asked to write a report to the Head teacher on the state of natural environment at your school. In your report, you may include:
   - Pollution
   - Care of trees, flowers and compound
   - Litter disposal
   - General cleanliness (bathrooms/toilets, kitchen/dining hall)
   - Any other environmental issues
   - Make recommendations on how the natural environment can be improved.

SECTION B

Choose one of the following questions and write a composition of 500-600 words.

2. Write a composition beginning: "Open the door, now! ..."
3. Describe an election campaign for the prefects that took place at your school.
4. Describe how you would improve the conditions in your home area if you were a member of parliament.
5. "Starvation has killed people instead of the coronavirus in Uganda". Do you agree? Give reasons for your answer.
6. How should Ugandans spend their money during the COVID-19 lockdown?
7. Write a story based on the saying "Do not count your chicken before they are hatched".

PAPER TWO

1. Read the passage below and answer the questions that follows.

Population control has become a burning issue in developing countries in general, and in Uganda in particular. Most countries realise that if they allow themselves to be over populated, the repercussions will be great. It is obvious that even within the family set up, many children have become more of a problem than a blessing. In our own country, the government, the Church and individuals have always stressed the need to have a population that the country can easily cope with. It has been the wish of the government that couples should have a maximum of four children.

The negative effects of over-population are far reaching. When there are too many people in a country, jobs become scarce. The country suffers from a high rate of unemployment because of insufficient job opportunities.

In a country that relies on agriculture for its economic growth, the issue of land is crucial. If a country is over-populated, there will not be enough land for the people to cultivate. People will, therefore, start cultivating the marginal lands and this could lead to the spread of deserts. When there is not enough land to cultivate, people do not have enough to eat and this may result in illnesses like kwashiorkor and marasmus. As land becomes scarce, another problem arises. People from the rural areas are forced by circumstances to move into the urban areas in search of jobs. With the migration into towns, the towns become so overcrowded that people are forced to put up slums for shelter. These slums become a health hazard to their dwellers. And when the people from the rural areas do not get jobs in the urban centres, they become frustrated. If they have no other way of making money, they turn to crime, i.e. becoming robbers or pick-pockets.

Lack of education is another result of over-population. When the number of children being born every year continues to grow, the government reaches a stage where it cannot build enough schools to cater for all of them. As a result, some of them end up not going to school though they are supposed to. Such children may in future become juvenile delinquents, or even hardened robbers when adults.

A country that is overpopulated finds it difficult to cope with the health problems of its people. The medical facilities will not be adequate to cater for such a high density population. The people will therefore be sickly, infant mortality rate will be high and life expectancy very low.

The problem of over-population has a great effect on individuals and even at the family level. A family that has many children often finds it difficult to feed, clothe and educate them. The parents of such children may also find it difficult to cope with the situation, spouses blame each other for their financial problems and in the long run, this may lead to family break up!

(Adapted from: Integrated English: Kenya Institute of Education)

Question:
In not more than 120 words, summarise the consequences of overpopulation as shown in the passage

2A Read the following passage and answer the questions that follow:

The gatekeeper was helpful. 'The Personnel Manager? Ask in that block.' He pointed out the brown and black prefabricated building. Beside it another one was being erected and men were working on steel girders.

Dona stepped into the large anteroom. Inside were two desks, one occupied by two girls. They were talking in low voices to a smartly dressed young man. Dona chose to ask at the second desk where a kindly-looking middle-aged woman sat typing at a machine.

'I'm looking for the Personnel Officer.'

The woman smiled and did interrupt her work. 'We don't have one.' Dona's carefully rehearsed opening line was meant for a personnel man, but he wasn't daunted.

'Well, I'm looking for a job.' He said.

'What kind?'

'Anything you have going.'

The woman studied Dona for a moment. It was probably his physique that decided her. Dona was tall and athletic-looking.

'All the jobs are filled,' she said with some regret, 'but we still need two watchmen.'

Dona's hope plummeted. 'What sort of watchman – day or night?' he asked just to be polite to this kind woman, but his decision was already made.

'Night watchmen.'

'No, I see. I don't think so, thanks.' Dona raised his eyebrows self-consciously at the woman and she responded with a smile. Then he strode out of the factory block, the important buff envelope clasped firmly to his side.

Outside he paused and watched the men erecting the second block of steel. It occurred to him that his friend's part-time employment had been with the builders. Why wasn't he as versatile himself?

His next stop was a company that manufactured steel products. The gatekeeper there was helpful too. He came up with a few useful suggestions.

'The jobs here were advertised and people applied. The interviews are in two weeks' time. Why don't you come back around then? Somebody might miss the interviews or something. You never know.'

'Sure, you never know.'

The gatekeeper laughed at the skepticism in Dona's voice. 'You don't believe me, eh? He was a short, merry old soul in overalls and he offered Dona a stub of cigarette.

'No, thanks.'

'There's always the army,' the gatekeeper continued, 'or the police. You have the build for it.' He looked Dona up and down in quick appraisal, eyes blinking. 'And if you're lucky and wind up on the traffic section you even get to grow a fat stomach,' the old man joked, giving Dona's flat stomach a friendly pat.

So now gatekeepers try to cheer me up, Dona thought despondently as he left. The soft-drinks factory was sure to be a hot trail for the job hounds but Dona decided to try it anyway. The receptionist's cubbyhole was tucked next to the stairs on the factory floor, which also made him the bouncer. The management and personnel offices were upstairs above the factory.

Dona sat down on a bench beside another man waiting for the receptionist who was chatting away to a workmate. Dona had learnt to seize up receptionists at a glance and this one looked mean and formidable, a porcupine of a man.

At last the receptionist picked up the phone and spoke into it. Then he beckoned to the man beside Dona to go on up the stairs.

'And you?' the receptionist glared at Dona.

'Where can I see the Personnel Officer?'

Dona forgot his job-hunting manner in automatic response to the other's ill-concealed hostility.

'Do you have an appointment?' the receptionist asked darkly.

'No.'

'What do you want?'

Dona could have stopped the torture then but he shrugged and continued with the whole nasty business. There was always that chance in a thousand.

'I'm looking for a job.'

'A job.' The man scoffed and turned to glance at his companion. 'How do you like the idea of a job at this factory at noon on this hot day?' Then he turned to Dona as they laughed. 'What are your qualifications?' Dona felt like getting up and leaving. But he didn't.

'I have a university degree. Bachelor of Science.'

The receptionist guffawed. 'Ah, you university types!' He turned and spread his hands out for his comrade in comic despair. 'This one is the twentieth since this morning.' He turned to Dona.

'When we have jobs, my man, we advertise in the papers and people apply. It's the civilised way we do things around here. You don't just barge in here and …'

But Dona, ears burning with rage, didn't wait to hear any more. He sprang to his feet and marched out of the cubbyhole.

(from *Vanishing Shadows* by N Kayondo)

Questions

2.1. Name the places that Dona went to in search of a job.

2.2. Why do you think the typist at Dona's first stopping point told him that there was need for two watchmen?

2.3. "If you……wind up in the traffic section you can even get to grow a fat stomach." What did the gatekeeper imply by such a statement?

2.4. The receptionist at the soft-drinks factory looked 'mean and formidable' to Dona. With an example from the passage show that Dona was correct in his assessment of the reception.

2.5. Explain the following expressions as used in the passage:

(i) ……..Dona's hope plummeted.

(ii) ……hot trail

(iii) ..... job hounds

(iv) …….concealed hostility

2B. Read the following passage carefully and answer all the questions that follow.

Before setting off from Nsambya Police Barracks, Nyero had told me to be very careful when crossing streets. But how could one take care? In battles, you can protect yourself against your enemies, using a shield and spears. How could one protect oneself against these numerous wheeled killers? If you did not want to die, you must not cross any street.

Nyero was a Kampala child-born and raised there. Perhaps he even knew some of the motorists and cyclists. Perhaps some of them knew his father, Corporal Okello, perhaps a few of them knew his mother. He slipped across the street, and it was as if vehicles had slowed down for him to pass, and he was on the other side in no time. I saw him raising his hand in greeting to one of the drivers. He stood there under a lamp post, waiting for me to cross the street and join him. Some fire began to burn inside me. A bus rumbled past, shaking the ground where I stood like an earthquake, and for a moment I could not see the boy. I must not lose sight of Nyero for how would I find my way back to Nsambya Police Barracks through the stupid milling crowds? And I must stop looking frightened, because Nyero would narrate it to the women at home, and where would I go to escape their cruel laughter?

Each time I made to cross the street, vehicles would come towards me with an intention to kill! I felt confused and helpless like a woman whose hut was engulfed in flames. I waited until the flow of vehicles had momentarily become a trickle, then I shot myself across the street; the kind of running you might see when a hunter is chasing a wounded edible rat. An old bus came at me as if I had killed the driver's twin brother! I braked in the middle of the street and jumped back like a waterbuck breaking through the net: I crashed into a giant of an Asian who was standing on the pavement. The white man fell on his back, and the buttons of his trousers broke, and his head-gear flew some distance away. My loin-cloth came apart and the three thousand shillings in notes I had tied on my loin-cloth scattered and I immediately bent down to gather them …

The policemen swooped down on me like waiting vultures after seeing the animal had dropped dead. One held my left hand, greatly interfering with my efforts to wear my loin-cloth. They said foolish things in some crazy language, and Nyero appeared to be translating to me what they were saying but I could not hear a word. A large crowd quickly gathered and they were shouting their heads off. What makes men in a crowd so stupid, so childish? There were men dressed in respectable-looking suits, carrying small leather boxes in their hands. They stood there looking at me as if they had nothing else better to do than to stand there making so much noise in broad daylight! There was an old man straining his skinny neck to catch a glimpse of a young man from the village. When our eyes met, he emitted a shrill cry! A white woman stood there trembling all over, she was so excited and really enjoying the policeman's interference with my dressing up. I could not hear anything not only because of the noises produced by that silly crowd; there was also a drum pounding in my head.

The white man stood there spitting blood. He held his trousers with his left hand, and brushed the blood from his bushy face with the back of his right hand. His moustache was full of blood and he looked like a lion shot dead before it had licked the blood of its kill from around its mouth. I faintly heard Nyero say that we were supposed to go to the police station.

(From *White Teeth*, by Okot P'Bitek with minor changes)

Answer the questions below by selecting the best of the four choices given. Show the letter of your choice by putting a ring around it.

1. "If you did not want to die, you must not cross any street" means;
   A. if you don't cross the street you will never die.
   B. you should cross the street when you want to die.
   C. crossing the street is extremely dangerous and can cause your death.
   D. you should not come anywhere near any street.
2. "It was as if vehicles had slowed down for him to pass" implies that Nyero seemed to be;
   A. well known and respected
   B. familiar with crossing streets
   C. the son of a policeman
   D. a fast runner
3. The story teller knocked the Asian down because he;
   A. was confused by too much noise.
   B. feared being knocked down by a bus.
   C. was being chased by a wounded edible rat.
   D. wanted to reach his friend quickly.
4. The writer thought the woman was trembling with excitement because;
   A. the policeman had interfered with the story teller's dressing up.
   B. the old man had emitted a shrill cry.
   C. the buttons on the trousers of the Asian had fallen off.
   D. the story teller had knocked down the Asian.
5. The most possible reason why the story teller is taken to the police station is that;
   A. he had stolen the Asian's money.
   B. he was seen knocking the Asian and picking money that was suspected to be the Asian's.
   C. his loin-cloth came apart and scattered on the ground.
   D. he was disorderly.

3A. Re-write each item 3.1 to 3.10 according to the instructions. Do not change the original meaning of the sentence.

3.1. When the choir master raised his hands, the children shouted. (Begin: Scarcely ……..)

3.2. In spite of all his confidence, he failed to win many votes. (Rewrite beginning: Despite……..)

3.3. He was clever, but he failed to answer the third riddle. (Use……..as……..)

3.4. If anybody comes, they may wonder what is going on. (Use: might……..)

3.5. It was there. (Begin: There……)

3.6. Which door would I open? My enemies would be watching. (Begin: Whichever……)

3.7. She is living a lonely life. (Begin: What……)

3.8. We appreciate your presence at our wedding. (Rewrite ending ……appreciated)

3.9. Nobody will ever step here, ……? (Complete with the right question tag)

3.10. I managed to control my anger. (Rewrite using 'succeeded')

3.B. Complete the sentences 3.11 to 3.20 with the most suitable answer among the given alternatives. Put a ring O around your best choices.

3.11. She is nearly the ……..…….. in the class.
   A. smart
   B. smartest
   C. more smart
   D. smarter

3.12. I do not remember ……we last ate chicken.
   A. since B. when
   C. as D. before

3.13. It is difficult to ……such problems.
   A. cope up with
   B. cope with
   C. cope up in
   D. cope in

3.14. Ssenoga was standing ……..the twins.
   A. among
   B. around
   C. besides
   D. between

3.15. Somebody suggested …… the police about the theft.
   A. to tell
   B. telling
   C. he told
   D. telling to

3.16. My application was turned down. The underlined expression means ……..
   A. turning
   B. reversed
   C. rejected
   D. wound

3.17. Little ……know what would befall us.
   A. did we
   B. we did
   C. we didn't
   D. didn't

3.18. I need to go to town, ……?
   A. do I?
   B. need I?
   C. did I?
   D. don't I?

3.19 ……..you work hard, you will not succeed.
   A. If
   B. Had
   C. Unless
   D. For

3.20 I was lonely……. I was never unhappy.
   A. but B. and
   C. so D. as

VI NN Thursday, July 2, 2020

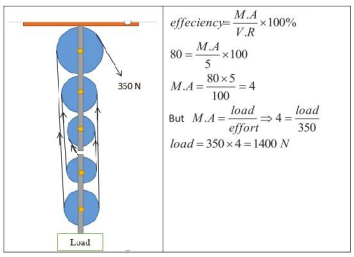
PASS O'LEVEL

PHYSICS PAPER ONE SOLUTIONS (OPHY007)

1. (a) (i) Chemical energy to electrical energy.
When the positive and negative terminals are connected so that electrons (electricity) can flow between them (usually by a wire), chemical reactions occur at the electrodes.
These reactions release excess electrons at the anode, which flow to the cathode.
(ii) Given:
mass, m = 50 kg
distance, d = 60 steps × $\frac{30}{100}$ = 18m
power = $\frac{\text{work done}}{\text{time taken}}$ = $\frac{\text{force} \times \text{distance}}{\text{time taken}}$ = $\frac{mg \times d}{t}$
= $\frac{50 \times 10 \times 18}{10}$ = 900W

(b) **Efficiency** is defined as the ratio of the work output to work input expressed as a percentage.

(c)



$effeciency = \frac{M.A}{V.R} \times 100\%$

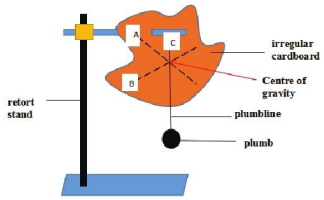
$80 = \frac{M.A}{5} \times 100$

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

But $M.A = \frac{load}{effort} \Rightarrow 4 = \frac{load}{350}$

$load = 350 \times 4 = 1400\ N$

(d) Experiment to determine the centre of gravity of an irregular cardboard.



- ✓ Make three holes A, B and C at the edges of the irregular object, far away from each other.
- ✓ Suspend the object on a retort stand from one of the holes, say A.
- ✓ Suspend the plumbline through the same hole.
- ✓ After the pumbline settles, trace the path of the plumbline by marking a line on the object.
- ✓ Repeat the experiment with the object hung at B and C.
- ✓ The point at which all the lines cross is the centre of gravity of the irregular body.

2. (a) **Examples of a physical change.**
Physical changes involve states of matter and energy.
No new substance is created during a physical change, although the matter takes a different form. The size, shape, and color of matter may change. Physical changes occur when substances are mixed but don't chemically react.
Examples include:
- ➢ Melting of a substance
- ➢ Boiling of a liquid such as water
- ➢ Sublimation of dry ice
- ➢ Crushing a can
- ➢ Mixing sand and water
- ➢ Dissolving sugar and water, etc (b)

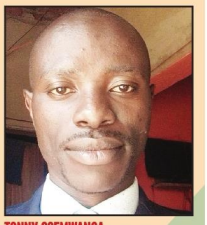
Given:
Volume $V_1 = 25\ cm^3$, $V_2 = ?$
Temperature. $T_1 = 273 + 17\ ^oC = 290K$
$T_2 = 273 + 60^0C = 333\ K$
Using $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

$V_2 = \frac{V_1 \times T_2}{T_1} = \frac{55 \times 333}{290} = 28.7cm^3$

(c) (i) **Specific latent heat of fusion** is the quantity of heat required to change the state of a substance from liquid to solid (or solid to liquid) at **constant temperature.**

THE TEACHERS

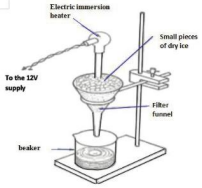
IBRAHIM SSENDAWULA
NABISUNSA GIRLS' SCHOOL



TONNY SSEMWANGA
MT ST HENRY'S HIGH SCHOOL - MUKONO

(ii) Experiment to determine the specific latent heat of fusion of ice.
Specific latent heat of fusion of ice can be determined by two methods. These include;
- the method of mixtures and
- the electrical method.

We are going to discus the electrical method and you will be required to read about the method of mixtures.



Steps to be followed.
- ✓ Place an electric heater of known power, P in the filter funnel.
- ✓ Pack small pieces of dry ice around the electric heater.
- ✓ Switch on the heater for a known time, t.
- ✓ Determine the mass, m of the water collected in the beaker from the formula below;

Mass of melted ice = (Mass of empty beaker + water) – (Mass of beaker)
- ✓ The specific latent heat of fusion of ice, is calculated from the formula; $Pt = ml_f$
- ✓ Heat supplied from the heater = heat used to melt the ice.

$Pt = ml_f$, l_f is the specific latent heat of fusion of ice.
Note: *Assumption taken while carrying out the experiment;*
- ✓ *No heat is absorbed from the surrounding.*
- ✓ *All heat supplied by the heater has been absorbed by the ice only.*

(d) Given;
Mass of ice, mi = $\frac{50}{1000}$ = 0.05kg
initial temp. θ = -20°C
Final temp. θ = 80° C

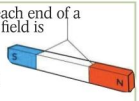
Heat supplied = $\left(\begin{matrix}\text{heat gained by} \\ \text{ice to change} \\ \text{from -20°C - 0°C}\end{matrix}\right) + \left(\begin{matrix}\text{heat used} \\ \text{to melt ice} \\ \text{at 0°C}\end{matrix}\right) + \left(\begin{matrix}\text{heat gained} \\ \text{by water from} \\ \text{0°C - 80°C}\end{matrix}\right)$

$= m_i c_i(0 - -20)\ m_i l_f + m_i c_w\ (80 - 0)$
$= (0.05 \times 2100 \times 20) + (0.05 \times 336000) + (0.05 \times 4200 \times 80)$
$= 2100 + 16800 + 16800$
$= 35700\ \mathbf{J}$

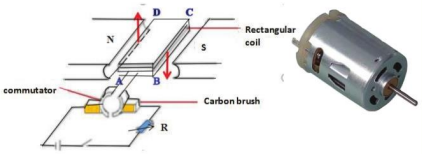
(e) Distinguishing between boiling and evaporation.

Evaporation	Boiling
Occurs at any temperature	Occurs at a fixed or specific temperature called boiling point
Occurs at the surface of the liquid.	Occurs within the liquid.
No bubbles during the process	Bubbles appear during the process
Can occur even when atmospheric pressure is not equal to saturated vapour pressure	Occurs only when atmospheric pressure is equal to saturated vapour pressure
Depends on the surface area	Does not depend on the surface area
Causes cooling	Does not cause cooling

3. (a) (i) **Poles of a magnet** are regions at each end of a magnet, where the external magnetic field is strongest.



(ii) **Magnetic axis** is a straight line joining the two poles of a magnet and passes through its centre.
(b) (i) Structure of a DC motor.
It consists of a rectangular coil which can rotate about a fixed axis in a magnetic field provided by the permanent magnet.
The ends of the coil are soldered to two halves of copper rings **(commutators).**
Two carbon brushes press lightly against the commutators.



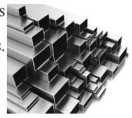
Action
- ✓ When current flows in the coil, side BC experiences a downward force and AD, an upward force. This is determined by the Fleming's left hand rule.
- ✓ The two forces constitute a couple which rotates the coil.
- ✓ When the coil reaches the vertical position, the brushes lose contact with the commutator and current is cut off.
- ✓ However, the coil continues to rotate past this vertical position because of the momentum gained.
- ✓ The current in the coil reverses as the brushes change contact with the commutator, side AD now experiences a downward force and BC, an upward force. Thus, the coil continues to rotate as long as the current is flowing.

(ii) Energy losses in a d.c. motor and how they are each minimised.

Energy loss	Ways of minimising it
Energy losses in the winding of the armature (I^2R)	Using la wire of low resistance such as a copper wire
Losses due to eddy current	Winding the coil on a laminated core.
Energy losses due to friction e.g. between the brushes and the commutator	Lubrication the core

(c) (i) **Concrete** is a stony material which is a mixture of cement, sand, gravel and water. This is left to harden in desired form.
(ii) Characteristics of concrete which makes it a suitable building material;
- ✓ It is resistant to weather
- ✓ It is resistant to compression
- ✓ It is very durable
- ✓ It is resistant to fire

(d) **Pipes for construction** of structures like bicycles and bridges are made hollow for the following advantages.



- ✓ They can ably withstand tensile and compression forces
- ✓ Notches cannot spread easily, hence less risk of breaking.
- ✓ Less material is used for construction
- ✓ The finished structure is lighter
- ✓ Provide room for expansion and contraction.

4. (a)(i) **Primary colours** are colours that cannot be obtained by mixing any other colours.
(ii) Examples include; Red, Green, Blue
Secondary Colours are colours obtained by mixing any two primary colours.
Examples: Yellow, Magenta, Cyan (Peacock Blue)

(iii) The blue dress will appear blue since blue is one of the colours that make up magenta.
Magenta = Red + Blue

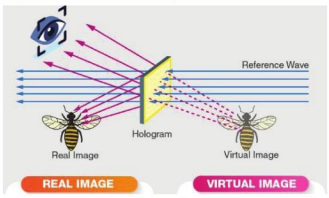
(b) (i) **Principal focus of a converging lens** is the point on the principal axis to which all rays parallel and close to the principal axis meet or converge to after refraction through the lens.

(ii) **Virtual image** is an image that cannot be formed on a screen since it is formed by imaginary intersection of light rays.

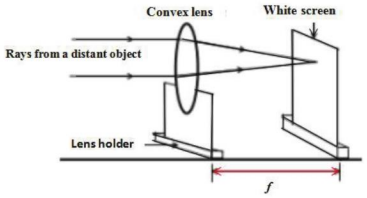
Read about complementary colours.

Differences between a real image and a virtual image.

Real Image	Virtual Image
Light arises from an object and converges to a certain point	Light arising from an object appears to strike a certain point
Can be captured on screen as it is the result of actual intersection of ray of light	It cannot be captured on a screen as it is the imaginary intersection of ray of light
The images are inverted	The images are erect



(c) Experiment to determine the focal length of the lens.



- ✓ Position the lens and a white screen on a table as shown above.
- ✓ Move the lens towards and away from the screen until a sharply focused image of the distant object such as a window is formed on the screen.
- ✓ Measure the distance, f between the lens and the screen.
- ✓ This distance is approximately equal to the focal length of the lens used.

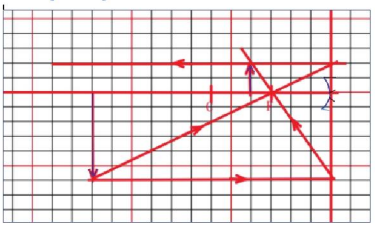
Note:

To improve the accuracy of the results, it is advisable that the experiment is repeated at least three times and the average focal length calculated.

f_1 (cm)	f_2 (cm)	f_3 (cm)	f (cm)
a	b	c	$\frac{a+b+c}{3}$

(d) The graphical construction of a concave mirror of focal length 15 cm forming a real image 6 cm high at a distance of 60 cm from the mirror is shown below;

Note: 1 square represents 5cm.



(i) the position of the object $= 4 \times 5 = 20cm$

(ii) the magnification $= \frac{image\ distance}{object\ distance} = \frac{60}{20} = 3cm$

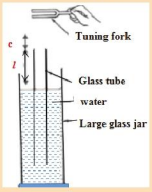
(e) **Uses of converging lenses.**

- ✓ The eye uses it to focus images on the retina
- ✓ In spectacles to correct eye defects.
- ✓ In lens cameras to focus images on the screen or film.
- ✓ In slide projectors to magnify or focus images on the screen.
- ✓ In compound microscopes to magnify/ focus images of tiny near objects.
- ✓ As simple magnifying glasses, to magnify images of smaller objects without inverting them.

5. (a)(i) **Amplitude** is the maximum displacement of a vibrating particle from its equilibrium position.

(ii) **Frequency** is the number of oscillations made in one second.

(b) Experiment to determine the speed of sound in air by the resonance method.



c is the end correction

l = Length of air columns.

Steps:

- ✓ Assemble the apparatus as shown in the figure above.
- ✓ Place a vibrating tuning fork of known frequency, f just above the resonance tube.
- ✓ Gently lower the resonance tube until a loud sound is heard. This is the position of the 1st resonance.
- ✓ Measure the length l_1 of the air column at which this occurs.

  $l_1 + c = \frac{1}{4}\lambda$……(i)
- ✓ Raise the resonance tube until a loud sound is heard. This is the position of the 2nd resonance.
- ✓ Measure the length l_2 at which it occurs.

  $l2 + c = \frac{3}{4}\lambda$……..(ii)
- ✓ Subtract equation (i) from (ii) to eliminate c;

  $l_2 - l_1 = \left(\frac{3}{4}\lambda - \frac{1}{2}\lambda\right)$

  $l_2 - l_1 = \frac{1}{2}\lambda \Rightarrow 2(l_2 - l_1)$
- ✓ Hence the speed of sound in air is determined from the expression below;

  $v = f\lambda$

  $v = f \times 2(l_2 - l_1) = 2f(l_2 - l_1)$ (c) (i)

Determination of the speed of sound in air.

Given;

Distance, d = 540m

Time for echo, t = 3 seconds

$v = 2 \times \frac{distance}{time} = 2 \times \frac{540}{3} = \frac{1080}{3} = 360ms^{-1}$

(ii) The speed of sound in air depends on;

- ✓ **Temperature:** Increase in temperature increases the speed of sound i.e. sound travels faster in hot air than in cold air.
- ✓ **Wind:** Speed of sound is increased if sound travels in the same direction as wind.
- ✓ **Attitude:** Sound travels faster on a low altitude and slower on higher altitude.
- ✓ **Humidity:** The higher the humidity, the higher the speed of sound and velocity.
- ✓ **Density of the medium.** Speed of sound is higher in denser medium than in the less dense medium.

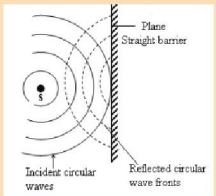
(d) Wavelength of a radio wave that transmits at 5 MHz is?

Given;

Frequency, f = 5 MHz = 5

Speed of radio waves, $v = f\lambda = 5 \times 10^6 \times 3 \times 10^8 = 1.5 \times 10^{15} ms^{-1}$

(e) Draw a sketch diagram to show how circular waves are reflected from a plane reflector.



6. (a) (i)

Primary cells	Secondary cells
Cannot be recharged once it stops working	Can be recharged when they stop working.
Current is produced as a result of irreversible chemical change.	Current is produced as a result of reversible chemical change.
Provide a lower e.m.f	Provide a higher e.m.f
Works for a shorter time	Works for a longer time.
Higher internal resistance	Lower internal resistance

Examples of primary cells include;

- ✓ simple cells,
- ✓ dry cells

Examples of Secondary cells include:

- ✓ Lead acid accumulator
- ✓ Alkaline accumulator (e.g Nickel – cadmium cell; NiCd cell, Nickel – iron cell ; NiFe cell)

(ii) **Defects in a simple cell and how it they can be minimised.**

Polarisation is the formation of hydrogen bubbles on the copper plate. The hydrogen bubbles that are given off insulate the anode from the electrolyte. This reduces the voltage of the cell.

How to minimise the defect.

- ✓ Use of a depolarizing agent like potassium dichromate or manganese dioxide (MnO_4).
- ✓ Regular brushing of the copper plate

Local Action:

This is due to some reactions between the impurities in Zinc and the acid resulting in the formation of hydrogen bubbles on the zinc plate. The hydrogen bubbles insulate zinc from the electrolyte.

How to minimise the defect.

- ✓ Rubbing Zinc with mercury (zinc amalgamation).This prevents contact of the impurities with the electrolyte)
- ✓ Cleaning Zinc with concentrated sulphuric acid.

(b) **Internal resistance of a cell** is the opposition to the flow of current within the cell.

Electromotive force, (e.m.f) is the work done in transferring one coulomb of charge around a complete circuit in which a battery is connected.

It is the p.d across a cell in an open circuit.

(c) (i) **A kilowatt hour** is the electrical energy used by a rate of working of 1000 watts for 1 hour.

OR: It is the quantity of electrical energy converted into other forms of energy by a device of power 1000 watts in one hour.

(ii) Cost of electricity.

Given:

Power = 750W

Time = 5 hours

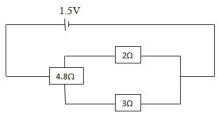
$\text{Power} = \frac{750}{1000} = 0.75\text{kW}$

Total time = 5 hours × 4 = 20 hrs.

Number of units (kWh) = 0.75 × 5 × 4 × 620 = 9300=

The lady pays sh. 9300.

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

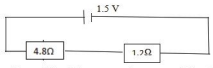


(i) Effective resistance of the circuit.

Considering the parallel combination first, we get;

$R_1 = \frac{product}{sum} = \frac{2 \times 3}{2+3} = \frac{6}{5}\Omega = 1.2\Omega$

You can now draw an equivalent circuit like the one shown below.



The circuit has simplified to a series combination.

So effective resistance, R = 4.8Ω + 1.2Ω = 6.0Ω

(ii) current through the 3Ω resistor.

V = R

$I = \frac{V}{R} = \frac{0.5}{6.0} = 0.25A$

p.d across the parallel combination is V_2 is;

$V_2 = IR = 0.25 \times 1.2 = 0.3V$

Let the current across 3Ω resistor be I_2 is;

$I = \frac{V}{3} = \frac{0.3}{3} = 0.1A$

Alternatively;

First get the p.d across the parallel combination using the potential divider rule;

$V_2 = \left(\frac{1.2}{1.2+4.8}\right) \times 1.5 = \frac{1.2}{6} \times 1.5 = 0.2 \times 1.5 = 0.3\text{ V}$

$I_2 = \frac{V_2}{3} = \frac{0.3}{3} = 0.1A$

6. (a)(i) **Uniform velocity** is the constant rate of change of displacement.

(ii) Velocity-time graph for a stone thrown vertically upwards.

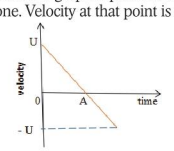
Let U be the initial velocity.

The stone reaches the starting point with the same velocity as the one it was projected with. However, the velocity is in the opposite direction, that is to say 'negative velocity'.

Turn to page VIII

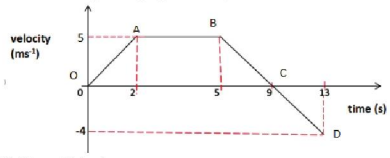
PASS O'LEVEL

Point A on the graph represents the highest point reached by the stone. Velocity at that point is zero.



Read about the speed - time graph for a body thrown vertically upwards.

(b) A velocity time graph for a cyclist.



(i) ***From O to A.***
Cyclist started from rest and accelerated uniformly to a velocity of 5 ms^{-1} in 2 seconds.
A to B
He then maintained this velocity for the 3 seconds.
B to C
He decelerated uniformly to rest in the 4 seconds.
C to D
The cyclist uniformly accelerates again from rest to 4 ms^{-1} in 4 second but in an opposite direction to the initial.

(ii) Total distance covered.

$$\text{total distance} = \left(\frac{1}{2}\times 2\times 5\right)+(3\times 5)+\left(\frac{1}{2}\times 4\times 5\right)+\left(\frac{1}{2}\times 4\times 4\right)$$
$$= 5 + 15 + 10 + 8$$
$$= 38\text{m}$$

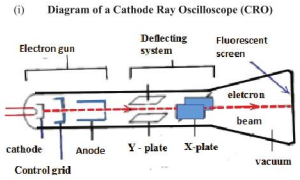
(c) Given:
Mass, m = 0.03 kg
Height, h = 1.5 m
Kinetic energy gained = potential energy lost.
$= mgh$
$= 0.03 \times 10 \times 1.5 = 0.45\text{J}$

(d) Given:
Mass, $m_1 = 3\text{kg}$
Initial velocity, $u_1 = 10\ ms^{-1}$
Mass, $m_2 = 5\text{kg}$
Initial velocity, $u_2 = 0$
Common (final) velocity, V=?
From the principle of conservation of linear momentum,
Total momentum before = total momentum after
collision collision
$m_1u_1+m_2u_2 = (m_1+m_2)\ V$
$(3\times 10) + 5\times 0) = (3 + 5)\ \text{V}$
$30 + 0 = 8\text{V}$
$V = 3.75ms^{-1}$

7. (a) (i) **Cathode rays** are streams of fast moving electrons.
(ii) Properties of cathode rays.
✓ They travel in a straight line.
✓ They carry a negative charge.
✓ They are deflected by an electric field. They are deflected towards the positive plate, since they are negatively charged.
✓ They are deflected by a magnetic field.
✓ They ionise air and gas molecules.
✓ They cause fluorescence to some substance e.g zinc sulphide.
✓ They darken photographic film.
✓ They posses kinetic energy and momentum
✓ They produce X-rays when stopped by matter

Note: *In an electric field, cathode rays are deflected towards the positive plate, but in the magnetic field, the direction of deflection is determined using Fleming's left hand rule. But remember, the direction of flow of current is opposite to that of electrons.*

(b)(i) Diagram of a Cathode Ray Oscilloscope (CRO)



How it works;
✓ The low p.d supply heats the cathode, which in turn emits electrons.
✓ The emitted electrons pass through the control grid which controls the intensity, consequently controlling the brightness of the spot on the screen.
✓ The anode accelerates and focuses the electrons into a fine beam towards the deflecting system.
✓ The deflecting system consists of the X- and Y- plates. They are used to deflect the electron beam horizontally and vertically, respectively.
✓ The X- plates are connected with the C.R.O to a special type of circuit called the time base circuit. **Time base switch:** This is connected to the X – plate and is used to move the bright spot on the screen horizontally.
✓ The electrons are finally focused on to the fluorescent screen where a bright spot is formed.
✓ The coating on the screen converts kinetic energy into light energy and produces a bright spot when the electron beam is focused on it.

(ii) **Uses of a Cathode Ray Oscilloscope**.
✓ Measurement of a.c and d.c voltage
✓ Measurement of frequency
✓ Measurement of phase difference
✓ Displaying pictures in TV sets.
✓ Displaying wave forms

(c)(i) The **vacuum** in the CRO is used to keep the electrons in the beam. That is to say; preventing them from getting scattered by gas molecules which would blur and dim the image on the screen.

(ii) The **graphite coating** on the inner wall of the cathode ray tube traps stray electrons emitted from the screen and makes the potential in that region uniform.

(d)(i) **Thermionic emission** is the process by which electrons are emitted from a metal surface by heating.

(ii) **Peak voltage.**

Given:
Y- Sensitivity = 10 Vcm^{-1}
Length of trace = 4.0 cm
Peak voltage = $\frac{4.0}{2} \times 10 = 20\text{V}$

If you were asked to find the peak to peak voltage, then you will have;
Peak voltage = $4cm \times 10 = 40V$

PHYSICS PAPER ONE QUESTIONS (0PHY009)

Use the following constants where necessary
✓ *Acceleration due to gravity, g* = $10ms^{-2}$
✓ *Specific heat capacity of copper* = $400Jkg^{-1}k^{-1}$
✓ *Specific heat capacity of water* = $4200Jkg^{-1}k^{-1}$
✓ *Specific latent heat of fusion of water* = $340000Jkg^{-1}K^{1}$
✓ *Speed of sound in air* = $320ms^{-1}$
✓ *Velocity of electromagnetic waves* = $3.0 \times 10^{8}\ ms^{-1}$
✓ *Take density of mercury* = $13600kgm^{-3}$

SECTION A

1. Which of the following is a derived quantity?
A. Momentum B. Length
C. Mass D. Temperature

2. Which of the following is an S.I unit of electromotive force?
A. Ampere B. Volt
C. Ohm D. Newton

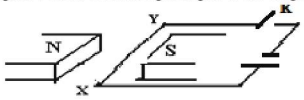
3. Body A of mass 50kg moving at a velocity of 20ms^{-1} collides with stationery body B of mass X kg. After collision the bodies move together with a common velocity of 10ms^{-1}. Determine the value of X.
A. $\frac{50\times 20}{10} - 50$ B. $\frac{50\times 20\times 10}{50}$
C. $\frac{50\times 20\times 50}{10}$ D. $\frac{10-50}{50\times 20}$

4. Which of the following is used to change heat energy to electrical energy?
A. Electric motor. B. Heater.
C. Dynamo D. Thermocouple.

5. When brass spoon is to be silver-plated, the most suitable setup is:

	Electrolyte	Positive electrode	Negative electrode
A	Distilled water	Spoon	Silver
B	Distilled water	Silver	Spoon
C	Silver nitrate	Spoon	Silver
D	Silver nitrate	Silver	Spoon

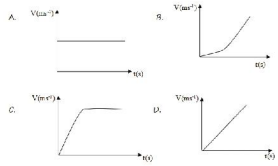
6. In figure 1 below XY is at right angles to the magnetic field.



In what direction will XY move when switch k is closed?
A. Upwards. B. Downwards.
C. Towards N. D. Towards S.

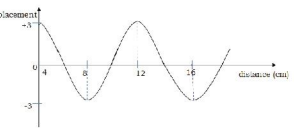
7. Which of the following reactions show(s) the process of fusion?
(i) $^{239}_{92}U \rightarrow {}^{144}_{58}Ce + {}^{91}_{36}Kb + {}^{1}_{0}n$
(ii) $^{238}_{92}U + {}^{1}_{0}n \rightarrow {}^{239}_{93}Np + {}^{0}_{-1}e$
(iii) $^{2}_{1}\text{H} + {}^{3}_{1}\text{H} \rightarrow {}^{4}_{2}\text{He} + {}^{1}_{0}\text{n}$
A. (i), (ii) and (iii) B. (ii) and (iii) only
C. (iii) only D. (i) only

8. Which of the following velocity-time graphs below shows an object moving with constant velocity?



9. Convert 36cm^2 to m^2 putting your answer in scientific notation.
A. $3.6\text{x}10^{-1}$ B. $3.6\text{x}10^{1}$
C. $3.6\text{x}10^{-3}$ D. $3.6\text{x}10^{5}$

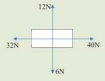
10. The figure 2 below shows a presentation of a transverse wave.



Determine the wave length of the wave.
A. 3cm B. 4cm
C. 6cm D. 8cm

11. For two resistors R_1 and R_2 connected in parallel and whose combination is in series with R_3, the effective resistance, R in the whole circuit is given by;
A $R = \frac{R_1\times R_2}{R_1+R_2} + R_3$ B. $R = \frac{R_1+R_2}{R_1\times R_2} + R_3$
C. $R = \frac{R_1\times R_2\times R_3}{R_1\times R_2\times R_3}$ D. $R = \frac{R_1\times R_2\times R_3}{R_1\times R_2\times R_3}$

12. For forces of 6N, 12N and 40N act on a body as shown in the figure 3 below.



Determine the magnitude of the resultant forces
A. 54N B. 18N
B. 10N D. 2N

13. Determine the amount of heat required to raise the temperature of water of mass 32g by 550C.
A. 176J B. 1760J
C. 7392J D. 73920J

More questions and answers next week

BIOLOGY, PHYSICS AND GENERAL PAPER TOMORROW