VISION GROUP

NATIONAL PRIDE • GLOBAL EXCELLENCE

HOME SCHOOLING MATERIAL

PASS O'LEVEL

BIOLOGY, PHYSICS AND ENGLISH

PASS O'LEVEL

From page I

Conclusion:
Oxygen, water and warmth are necessary for germination.

36. a)
- Abstinence from sexual intercourse.
- Use of condoms and femidoms.
- Avoiding sharing of sharp objects.
- Avoiding mixture of body fluids with that of an infected person.
- By not practicing oral sex.

b)
- Abstinence from sexual intercourse.
- Use of condoms and femidoms that prevent sperm from reaching the eggs.
- Use diaphragms that prevent sperms from reaching the eggs.
- Insertion of intra-vaginal rings that secrete substances that inhibit some activities within the menstrual cycle.
- Coitus interruptus prevents some sperms from being released in the vagina during ejaculation.
- Practising rhythmical method, where sexual intercourse is avoided at times when ovulation is likely to occur.
- Vasectomy, where vas deferens are cut by surgical means, preventing the passage of sperms.
- Tubal ligation, where the fallopian tubes are cut by surgical means, there by preventing passage of the egg.
- Use of oral contraceptives known as pills, these prevent the development of the egg.
- Use of injectable contraceptives that are administered regularly to prevent ovulation.
- Use of intra uterine devices that prevent implantation of embryo.
- Use of morning pills, which are taken 3 days after sexual intercourse.

37. a) This is a feeding relationship between two organisms of different species, where one who either lives in or on the other (parasite) benefits, while the other is harmed.

b)
i) - Identifying and attaching to the host.
- Overcoming body defence activity of the host.

ii)
- Some have lost the alimentally canal, hence absorb simple nutrients from the host by diffusion, reducing on energy expenditure.
- Some have a thick and hard outer surface to overcome body defence mechanisms of the host.
- Some produce substances that inactivate the enzymes of the host.
- They produce large numbers of eggs to ensure their survival.
- They have suckers or hooks for attachment to the host.
- They have resistant stages in their lifecycles with secondary and intermediate hosts to ensure survival during adverse conditions.
- There is loss of unwanted organs like locomotally organs, eyes, etc, to ensure that they occupy as little space as possible within the host.
- Some have the ability to respire anaerobically and can survive in an oxygen free environment inside the body of the host.

BIOLOGY PAPER ONE QUESTIONS (0BI00011)

SECTION A

1. During an experiment to investigate the percentage of water in a soil sample. A student used a fresh soil of 50g that after drying weighed 45g. The dry soil was then heated to red hot and weighed 40g after cooling. What was the percentage of water in the soil sample?
   A. 20%
   B. 10%
   C. 25%
   D. 11%
2. Which part of the mammalian eye regulates the amount of light that reaches the retina?
   A. Cornea.
   B. Lens.
   C. Iris.
   D. Pupil.
3. Which of the following sets of activities occur during very low environmental temperature in mammals?
   A. Shivering, vasoconstriction and skin hairs being erect
   B. Vasoconstriction, shivering and sweating.
   C. Vasodilation, vasoconstriction and shivering.
   D. Hairs lay flat on skin, vasodilation, sweating.
4. After cutting a fruit into two halves, a student observed that the fruit had many seeds, dry pericarp, many longitudinal sutures and two scars. Which type of fruit did the student cut?
   A. Berry.
   B. Follicle.
   C. Nut.
   D. Capsule
5. Which of the following plants are propagated vegetatively using suckers?
   A. Banana.
   B. Cassava.
   C. Irish potato.
   D. Maize.
6. The components of blood absent in glomerular filtrate and urine are;
   A. glucose and urea
   B. mineral salts and glucose
   C. proteins and white blood cells
   D. urea and mineral salts
7. Which of the following is the reason for decrease in dry weight of a seedling in the first 7 days of germination?
   A. Hydrolysis of complex nutrients to simple forms.
   B. Metabolism of nutrients to produce energy.
   C. Delay in the start of photosynthesis.
   D. Nutrients in cotyledons forming parts of embryo.
8. The organisms that benefit when in association with other organisms of different species are;
   A. parasite and commensal
   B. host and parasite
   C. mutual and host
   D. commensal and host
9. The hormone which in low concentration during pregnancy results in a miscarriage is;
   A. luteinising hormone
   B. follicle stimulating hormone
   C. oestrogen
   D. progesterone
10. Which of the following processes causes sudden change in the DNA of organisms?
    A. Mutation.
    B. Variation.
    C. Evolution.
    D. Speciation.
11. The figure below shows treatment to a leaf before and after an experiment on photosynthesis.

Which requirement of photosynthesis was being investigated in the experiment?
   A. Chlorophyll.
   B. Sunlight intensity.
   C. Water.
   D. Carbon dioxide concentration.
12. Which of the following blood groups does not have antigens for blood groups?
    A. AB
    B. A
    C. O
    D. B
12. Which of the organisms below produces alcohol during anaerobic respiration?
    A. Mammals.
    B. Aves.
    C. Reptiles.
    D. Yeast.
13. The main role of bile in digestion in the duodenum is;
    A. catalyse breakdown of lipids to glycerol and fatty acids.
    B. physically breakdown starch to glucose.
    C. breakdown larger droplets of lipids to smaller droplets.
    D. provide a suitable pH for digestion.
14. Which of the following explains the growth of roots into the ground? Roots are;
    A. both positively hydrotropic and geotropic
    B. negatively geotropic and positively phototropic
    C. both positively chemotropic and hydrotropic
    D. positively geotropic and negatively chemotropic
15. In which of the following are the red blood cells of an adult human made?
    A. Ectoskeleton.
    B. Endoskeleton.
    C. Hydroskeleton.
    D. Exoskeleton.
16. To which of the following groups of animals do earthworms belong?
    A. Annelids.
    B. Nematodes
    C. Platyhelminthes
    D. Echinoderms
17. The figure below shows a transverse section of a plant organ.

The plant organ whose transverse section is shown above is
    A. monocotyledonous stem
    B. monocotyledonous root
    C. dicotyledonous root
    D. dicotyledonous stem
18. During which stage of growth and development in humans do changes that make one sexually mature occur?
    A. Adolescence
    B. Puberty.
    C. Childhood.
    D. Adulthood.
19. Which mode of asexual reproduction involves an organism developing an outgrowth that on detaching from parent organism grows into another organism?
    A. Binary fission.
    B. Fragmentation.
    C. Budding.
    D. Sporulation.
20. Which of the following occurs to the organic nutrients as undigested food leaves colon?
    A. Glucose is removed
    B. Bile is added
    C. The nutrients remain unchanged
    D. Some amino acids are absorbed
21. What are the genotypes of parents of an albino child if one parent is as well an albino? One parent is;
    A. a carrier for albinism while the other is homozygous recessive for albinism
    B. heterozygous for albinism while the other is also heterozygous for albinism
    C. homozygous dominant for non-albinism while the other is homozygous for albinism

D heterozygous for albinism while the other is homozygous dominant for albinism.

22. Which of the following secondary sexual changes occurs only in females?
A. Enlargement of reproductive organ.
B. Growth of pubic hair.
C. Growth of hair in armpits.
D. Development of breast.

23. Which one of the following groups of bacteria converts soul nitrates to free nitrogen?
A. Nitrifying bacteria
B. Nitrogen fixing bacteria
C. Denitrifying bacteria
D. Putrefying bacteria

24. To estimate the population of rats in a bush using a capture-recapture method, 120 rats were captured, marked and released. In the second capture, out of 150 rats, 25 had been marked. The estimated population of rats was;
A. 720
B. 20
C. 32
D. 295

25. Which of the following hormones is not produced by gonads?
A. Luteinising hormone
B. Testosterone
C. Thyroxine
D. Oestrogen

26. Which of the following are respiratory organs?
A. Gill and alveoli
B. Lung and cell membrane
C. Gill and lung
D. Alveoli and gill filament

27. Ossicles in the middle ear of mammals function to;
A. transmit sound waves
B. initiate sound vibration
C. receive sound waves
D. equalise pressure in the middle ear

28. Which of the following elements is not found in carbohydrates?
A. Carbon
B. Nitrogen
C. Hydrogen
D. Oxygen

29. Which of the following products of anaerobic respiration accumulate in the body during strenuous physical activity?
A. Alcohol.
B. Carbon dioxide.
C. Lactic acid.
D. Water.

30. Atrioventricular valves in the mammalian heart open when;
A. pressure is higher in ventricles than that of the atria
B. volume of atria is higher than that of the ventricles
C. pressure in ventricles is higher than that in aorta
D. pressure in atria is higher than that in ventricles

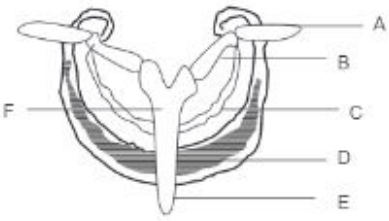
SECTION B

31. During an investigation to understand digestion of starch and absorption of its products in mammals. A group of rats were fed on the same diet for two weeks and, later, samples of contents of different parts of the alimentary canal of the rats and the diet were tested for amounts of starch and glucose. The results obtained in arbitrary units are used in the table.

Food or part of the alimentary canal	Concentration of starch in arbitrary units	Concentration of glucose in arbitrary units
Food	80	05
Mouth	60	15
Stomach	60	15
Duodenum	40	45
Ileum	20	70
Colon	20	10
Rectum	20	10

(a) Represent the above results in a suitable graphical form.
(b) Comment on the changes in the amount of the food nutrients from the mouth to the rectum.
(c) Explain the changes in the amount of nutrients between the;
(i) food sample and mouth
(ii) mouth and stomach
(iii) ileum and colon
(d) Describe the fate of the nutrients in the colon and rectum.
(e) (i) What is meant by diet?
(ii) Suggest the importance of a balanced diet.

32. The figure below shows attachment of muscles used in active flight in birds.



(a) Label parts A, B, C, D, E and F.
(b) Describe how the parts are moved to effect active flight in birds.
(c) From the illustration, state adaptations of a bird for flight.

33. The tables below show the number of organisms in different feeding relationships in an ecosystem.

A

Organisms	Number
Grasses	1000
Cow	1
Ticks on the cow	15

B

Organisms	Number
A plant	1000
Caterpillars on the plant	1
Birds feeding caterpillars	15

C

Organisms	Number
A plant	1000
Grasshoppers on the plant	1
Chickens that feed on grasshoppers	15

(a) Draw an illustration of ecological pyramid of numbers of the feeding relationships in A, B and C.
(b) Explain any difference in the shapes of the pyramids.
(c) Suggest challenges in using pyramid of numbers.
(d) State the other two ecological pyramids.

SECTION C

34. a) Distinguish between wilting and flaccid.
b) Describe;
(i) absorption of water and mineral salts by plants.
(ii) water movement from the roots through the plant to the atmosphere.

35. a) Describe causes of variation.
b) Explain the various forms of variation among organisms.

36. a) Describe the adaptations exhibited by aquatic plants and animals for gaseous exchange.
b) Describe an experiment to demonstrate anaerobic respiration in yeasts.

37. a) Describe how you would use a light microscope to observe a previously prepared slide of plant cells.
b) Compare typical plant and animal cells.
c) Explain the need for specialised cells in multicellular organisms.

ENGLISH SOLUTIONS (OENG0010)

PAPER ONE

LETTER WRITING (LETTER OF COMPLAINT)

A letter of complaint is written usually when there is dissatisfaction about conditions, services, purchases, food, misconduct, etc. It is written to the authorities to take action to solve a prevailing problem.

A letter of complaint should have the following:
1. Two addresses (sender's and receiver's).
2. The date
3. Salutationd
4. Reference/subject
5. Introduction, body and conclusion with polite but firm language
6. Signing off on the right with "Yours faithfully, signature and names in capital letters

You can use some of the expressions below;

1. Introductory remarks
- I seek to express my disappointment…
- I am writing to express my dissatisfaction with…
- I write to bring to your attention the ….etc.

2. Body
- I am sure you will agree with me that the quality of food, level of service, students' behaviour .... is unacceptable.
- What made matters worse…
- As if that is not enough…
- Consequently, etc.

3. Conclusive remarks
- I hope something is going to be done about…
- I expect to find better services next time…
- I look forward to prompt action…
- Your prompt response will be appreciated, etc.

SAMPLE OF A LETTER OF COMPLAINT

XYZ Secondary School,
P.O. Box 39,
Mabanda.
14th June, 2020.

The Headteacher,
XYZ Secondary School,
P.O. Box 39,
Mabanda.

Dear Sir,

Re: Students' Complaints

I seek to bring to your attention a couple of grievances from the students' community.

First of all, we would like to appreciate you for the food you provide to us. However, you will agree with me that the quality of posho is only suitable for pig mash. The beans are infested with weevils that float on the watery soup, which is quite nauseating and sickening! To make matters worse, we are served a small portion enough to sustain a three-year-old.

Putting meals aside, congestion in the classrooms and dormitories is unbearable. Students are packed like sardines on the triple deckers, which can lead to fires and ill health.

As if that is not enough, bullying has become a norm in this school. Bigger boys and girls have gone to the extent of extorting money from the new arrivals, hamering them ruthlessly and sometimes stopping them from having some meals. Most saddening, however, is that the culprits always go scot-free even when they are reported.

Worse still, the places of convenience are an ugly sight. They are not only overflowing but also have little space, hence students misusing them. I am afraid there may be an impending cholera outbreak.

I suggest an urgent meeting to look into these issues and look forward to your prompt action to avoid strikes and other shortcomings.

Your faithfully,
Signature
SSEBYALA ALPHA
Headprefect

Turn to page IV

PASS O'LEVEL

Write to us: send email to learners@newvision.co.ug

THE TEACHERS

EDGAR MUTARYEBWA, AUTHOR AND TEACHER

SARAH TUMWEBAZE, ST MARY'S COLLEGE, KISUBI

From page III

SECTION B: (SAMPLE NARRATIVE)

Question 2: Write a composition about an incident when you proved that a parent's love is like no other.

LEARNING THE HARD WAY

You must agree with me that a forbidden fruit tastes sweetest and that hasty climbers have sudden falls. When life is at its zenith, young people tend to throw their parents' cautionary tales to the dogs. Some of their actions are quite abysmal.

"How long will you spend there?" my amiable father inquired. He was quite agnostic because I had successfully thrown dust in his eyes that I was going for a fellowship at church. He was already fed up with my mischievous behaviours and, more so, I was a prodigal daughter that had just returned from a nasty and futile elopement.

"A couple of hours, dad," I relayed, brimful of humility one would swear I was the biblical lamb. With acquiescence, he allowed me to check out.

Edgar was every girl's dream Adonis that greeting you alone was a feather in your cap. When he told me he was head over heels in love with me, I was at first a hard nut to crack, just like a burnt child that dreads the fire. Besides, I was still endeavouring tooth and nail to make amends with my parents after the grotesque elopement that had bred bad blood between us. I tried to shun any more iniquitous and nefarious acts that would upset them after receiving their hard-earned forgiveness.

Nevertheless, it is said that habit is second nature, so Edgar's broad chest, vibrating baritone and lofty physique swept me off my feet and here I was, standing face to face, with just the two of us and nothing else seemed to matter. Once again, I had decided to plough a lonely furrow where ingenuity went against conscience and my parent's values and wise counsel.

A glitch in my menstrual cycle was the first red flag that forespoke the cocktail of snifles that we were soon to follow. I tried to wait patiently for the so much desired menses, but it was merely looking for a needle in a haystack.

The day had drawn to its close and it was getting dark. My father, who had smelt a rat that something was amiss, summoned me and asked me about it. As I was trying to eat humble pie, he pretended to enter his bedroom and darted out with his machete ready to hack me to pieces. My mother's pleas to him to forgive me fell on deaf ears. I sprang to my feet, tore through the open door and took to my heels. I sought refuge at Edgar's place, but it was a horrible nightmare! He told me he was too young to give birth and dumped me like hot coal. I spent the night in the shrubs.

"Surely," I said to myself. "Aunt Marie will be my shoulder to lean on." At cock's crow, that was my next destination.

Upon reaching Aunt Marie's domicile, she poured oil on troubled waters! She called me a worthless whore and other names. Everything was rough and tumble. Nonetheless, she allowed me to stay, but subjected me to hard labour till it was due for me to bring forth a new life.

"Pu.u.u.sh…!" urged the traditional birth attendant in the neighbourhood. At first, my efforts were futile, but finally, a bouncing baby boy gave a heart-rending cry, throwing all of us in a frenzy and wild excitement.

However, at the age of only fifteen, my body was too tender for motherhood so I ended up with a bitter reward of fistula! Not even my aunt could bear the foul smell and leaking body anymore. She advised me to go back home and face the music of my father's wrath to pay for my sins.

I had to take the bull by the horns, carried my baby and trekked back home in a heavy downpour. There I stood like a drowned rat before my father, mother and siblings, baby in my hands, emaciated and reeking of fistula. They held my hand, took me in the house and later on took me to the hospital. That is when I concluded that nothing compares to a parent's love.

PAPER TWO

SUMMARY WRITING

ROUGH COPY

THE BEST WAYS OF PREPARING FOR UCE ENGLISH

UCE English requires you to consolidate those ~~new~~ skills you learnt earlier. Enlarge and reinforce your command of language by reading. Make time for ~~reading~~ all kinds of reading, including novels ~~short stories~~ magazines and specialist reading. Read in the careful comprehending way. ~~Read~~ critically with an eye to the style and content. ~~Try to~~ Be discriminating, use your dictionary and build up your word stock. Talk about your reading ~~too~~ with anybody ~~you can find~~ who shares your interests but ~~do not ramble~~ without rambling on. When talking, ~~try to~~ be clear and crisp. Arrange your ideas to be followed sensibly. Study your examination syllabus and specimen papers to get ideas for coursework and extra practice material. Experiment as you write trying out different openings and overall structure. Be adventurous with words and vary your sentences.

FAIR COPY

THE BEST WAYS OF PREPARING FOR UCE ENGLISH

UCE English requires you to consolidate ✓1 those skills you learnt earlier. Enlarge and reinforce your command of language by reading✓2. Make time for all kinds ✓3 of reading including novels, magazines and specialist ✓4 reading. Read in the careful comprehending ✓5 way, critically ✓6, with an eye to the style ✓7 and content ✓8. Be discriminating ✓9, use your dictionary ✓10 and build up your word stock. Talk ✓11 about your reading with anybody who shares your interests without rambling on. When talking, be clear ✓12 and crisp. Arrange ✓13 your ideas to be followed sensibly ✓14. Study your examination syllabus ✓15 and specimen papers to get ideas for coursework ✓16 and extra practice material. Experiment ✓17 as you write trying out different openings and overall structure ✓18. Be adventurous ✓19 with words and vary ✓20 your sentences.

(120 words)

2A

2.1. The students had nowhere to go between classes except the corridor or the street and they preferred the street.

2.2

(a) - He knew that the school always had a good name which had to be preserved at all costs.
- He threatens to expel any student who tries to spoil the name of the school

(b) – To the neighbours, the school had a bad name.
- This can be illustrated by the number of letters of complaint they sent to the headmaster about the school.

2.3 – Indiscipline of the students
- Lack of room to accommodate students, making them go either to the corridor or the street.

2.4

(a) uncomfortable/out of place/small/uneasy/belittled

(b) emphasising/stressing the point

2.5 He weighed it against all/many odds.

2B

2.6 D
2.7 C
2.8 B
2.9 B
2.10 C

3A

3.1. On no account must the candidates leave the examination room before the end of the paper.
3.2. Never did he eat rice again.
3.3. He was so surprised at the news that he could not uner a single word.
3.4. Jane's mother has been greatly distressed by her daughter's pregnancy.
3.5. The President denied having said anything about reducing electricity tariffs.
3.6. Karenju dared not object to her proposal.
3.7. It is our intention to prepare fully for our examinations.
Our intention is to prepare fully for our examinations.
3.8. Let us play, shall we? *(If a student does not rewrite, they earn a zero)*
3.9. If I were you, I would go back and apologise to the headteacher.
3.10. But for his generosity, the poor would have starved to death.

3B

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

ENGLISH LANGUAGE (OENG0011)

PAPER ONE

SECTION A

Question One is compulsory. Use 180-200 words.

1. During a football tournament between your school and another school, one of your team members gets a severe injury. He has to undergo an operation and yet the end-of-year examinations are near. These are meant to determine his promotion to the next class. Write a friendly letter to him, expressing your feelings towards him as regards his injury and give him all important advice and encouragement in relation to the end-of-year examinations.

SECTION B

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

2. *Either:* Write a story beginning: I heard a creak and a bang in our house……
Or: Write a frightening incident that occurred one night at your house.
3. Write an original story to illustrate the saying: "A stitch in time saves nine."
4. Suggest ways by which your city can be kept clean.
5. Discuss how the youth have been affected by modern technology.
6. How can the education system in your country be improved? Discuss this by giving very clear examp
7. Describe your most memorable event at school.

PAPER TWO

SECTION A

1. **Read the following passage carefully and answer that follows.**

More and more Tanzanians are abandoning hospitals in favour of traditional healers, citing deepening poverty and failure of many modern drugs to cure the common diseases. "Herbs are cheap and effective, why should anyone bother attending a hospital where he or she will definitely not be able to afford the bill!" says Mwanahuwa Fuwe who lives near Mwanyamala government hospital in Dar-es-Salaam, yet seldom visits the hospital.

Fuwe says that most of the ailments like malaria and diarrhea are treated by the roots, barks and the leaves sold on the road pavements by Masai tribesmen. The trend has left health experts deeply worried. "In a country where more than 50% of the population lives below the poverty line, it is not surprising that people opt to go for cheap medication," says Alan Makanjira, an official with social welfare department. He says more than half of the 30 million people of Tanzania survive on an income of less than one dollar a day – people defined as living in absolute poverty, making it difficult for them to afford decent health services.

Poverty apart, drug resistance by some diseases has discouraged many patients from seeking out hospital treatment. Malaria is a case in point. Dr. Zul Premji, a medical researcher, says it is becoming increasing difficult to treat malaria using available drugs in Tanzania. He says chloroquine has proved ineffective under five years and pregnant women. Experts say a person in Tanzania is likely to be bitten 52 times a year by mosquitoes carrying the malaria parasites. Erasto Tumbo, the minister for health, blames the

government's 'cost sharing policy' for chasing patients away from hospitals. Tumbo complains that "in spite of the fact that our hospitals are poorly stocked with drugs and poorly equipped, the government spends more money on sending political big-wigs abroad. He says that for every Shs. 10 set aside for health services, about three shillings are spent on sending politicians abroad for treatment.

According to the recent report by Tanzania Commission for Science and Technology (COSTECH), the country is in dire need of qualified doctors. There is only one doctor for every 26,000 Tanzanians. The report suggests a ration of a doctor for every 7,500 people, which means Tanzania must have a minimum of 4,000 doctors.

Dr. Andrew Kitua, Director General of the National Institute of Medical Research, says that the resistance to drugs is due to the failure of patients to abide by doctors' prescription towards western medicine as soon as they get better."

Dr. Kitua says the best prescription is better education. "The best way of curbing common diseases is to prevent their occurrence: prevention is better than cure," he says.

Adapted from: The Monitor Newspaper by Alfred Mbogo, (in Dar-es-Salaam – Gemini News)

Question:
In about 120 words, summarise the reasons why Tanzanians run away from hospitals to herbalists.

2.A Read this passage carefully and then answer the questions that follow:

I don't mind my son Toby borrowing my top coat. Sure, he looks quite ridiculous in it. I mean, I have very short arms and even if I hadn't, the arms of a strapping 18-year-old might be expected to be considerably longer than mine. Still, if he doesn't mind his wrists sticking out of my coat sleeves, then I certainly don't. nor do I care about the question of masculinity raised by the feminine appearance of the fur collar which he buttons up round his ears.

So, I don't mind his borrowing it. Where I do draw the line is when he breaks into my car while it's standing outside the front door, swipes the coat and disappears with it for two weeks when he runs away from home as a protest against the authoritarianism of this household (that is, me). It wouldn't have been so bad if he had told me about the coat, then I would not have informed the police, had a visit from a police officer, then filled in an insurance claim form.

This is just one example of my lack of rights in this, my own house. I may say that when Toby walked in, bare-wristed, ears smuggled in fur, he couldn't understand what all the fuss was about. I don't need to add that he has also borrowed my suitcase, one, of a matching set, and broken the zip. "Never buy cases with zips," he advised me sternly. "They always break." What I want to discuss is at what point parents have the rights to draw the line between their children's rights and their own.

In common with most people in our extravagant society, we are expected to go along with the habit of keeping stock of drinks for entertaining everybody who finds himself in the house for more than five minutes. We ourselves do not drink spirits. It therefore annoys when, after an evening with friends, we come home to find a drinks party in full swing, with a dozen young people applying themselves to glasses of gin and whisky, with the odd bottle of fine claret for non-spirit drinkers thrown in. is annoys still more when the party is over and we arrive to be met by empty glasses, brimming ash-trays and the smell of stale cigarette smoke, particularly as we do not smoke.

In case this sounds a light-hearted approach, make no mistake: the question of the rights of children and their friends in our house has become a major issue, ending in arguments, tears and sudden departures from home. So far there is no light at the end of this tunnel. The problem is that putting up with their habits, lifestyles and wishes, we disturb our own.

Adapted from: Ideal Home by Constance Hall

Questions:

2.1 According to the passage, how does Toby's mother think he would look ridiculous in the top coat?

2.2 Explain what the writer does not mean by the sentence "Nor do I care about the question of masculinity raised by the feminine appearance of the fur collar".

2.3 Explain in your own words what Toby was protesting when he ran away from home.

2.4 What does the writer mean when he says: "The rights of children and their friends in our house has become a major issue?"

2.5 Explain what the following phrases mean in the passage.
(i) "…lack of rights in this, my own house"
(ii) "…no light at the end of this tunnel"

2.B. Read the following passage carefully

It was a cold Monday morning. Njoroge had gone through the first two terms and now was in the third. It would soon end. Njoroge woke up as usual, said his prayers and prepared himself for the morning parade. It was such as pleasant morning in spite of the cold. After the roll call he went to the chapel for communion with God, and then to the dining hall for breakfast; that was always the daily routine. He ate his breakfast quickly for he had not yet finished the homework for the previous night.

The first class English. Njoroge loved English literature.

'Why you look happy today,' a boy teased him.

'But I'm always happy,' he said.

'Not when doing maths,' another boy cut in.

They laughed, Njoroge's laughter rang in the class. He is happy because this is an English class.'

'Do you want me to cry?' Njoroge asked. He felt buoyant.

'No it's only that mother tells me that a man should not be too happy in the morning. It's an ill omen.'

'Don't be superstitious.'

Yet Njoroge did not like the last observation. All through the week that had passed, he had been assailed by bad dreams.

There was a lot of shouting in the room. Then one boy whispered 'Teacher. Hush!' There was silence in the room. The teacher came in. He always was on time. Njoroge was often surprised by these missionaries' apparent devotion to their work. One might have thought that teaching was to them life and death. Yet they were white men. They never talked of colour; they never talked down to Africans; and they could work closely, joke and laugh with their black colleagues who came from different tribes. Njoroge at times wished the whole country was like this. This seemed a little paradise, a paradise where children from all walks of life and of different religious faiths could work together. Many people believed the harmony in the school came because the headmaster was a strange man who was severe with everyone, black and white alike.

If he was quick to praise what was good, he was equally quick to suppress what he thought was evil. He tried to bring out the good qualities in all, making them work for the good name of the school.

Njoroge was in the middle of answering a question when the headmaster came to the door. The teacher went out to see what the headmaster wanted. When he came back, he looked at Njoroge and told him that he was wanted outside. His heart beat fast. He did not know what the headmaster could have to say to him. A black car stood outside the office. But it was only when Njoroge entered the office and saw two police officers that he knew that the car outside had something to do with him. Njoroge's heart pounded with fear.

The headmaster said something to the two officers who immediately withdrew.

"Sit down, my boy,' Njoroge, whose knees had already failed him, gladly sank into the chair. The headmaster looked at him with compassionate eyes. He continued, 'I'm sorry to hear this about your family.'

Njoroge watched the missionary's face and lips. His own face did not change but Njoroge listened keenly with clenched teeth. 'You're wanted at home. It's a sad business… but whatever your family may have done or made you do in the past, remember Christ is there at the door, knocking, waiting to be admired. That's the path we have tried to make you follow. We hope you'll not disappoint us.' The headmaster sounded as if he would cry. But when Njoroge went to the car he realised that the headmaster had not given him a clue as to what his family had done. His words of comfort had only served to increase Njoroge's torment.

Adapted from: 'Weep Not, Child' by Ngugi Wa Thiong'o

Answer questions 2.6 to 2.10 by selecting the best alternatives. Show the letter of your choice by putting a ring around your best choice.

2.6. The following were part of Njoroge's morning routine except
A: morning parade
B: roll call
C: morning chapel
D: doing housework

2.7. Njoroge ate his breakfast quickly because;
A: it was such a pleasant morning
B: he wanted to finish his homework
C: he loved English literature
D: he had not seen his classmates

2.8. Which of the following statements is true about the headmaster?
A: He was severe to blacks not to the whites.
B: He praised the good easily but punished what he thought was evil.
C: He did not encourage good behaviour.
D: He admitted only children of his faith.

2.9. "Buoyant" as used in the passage means …
A: cheerful and confident
B: light and floating
C: happy and satisfied
D: strange and severe

2.10. The headmaster's words of comfort made Njoroge feel;
A: happy
B: annoyed
C: anxious
D: disappointed

3A. Rewrite the following sentences according to the instructions without altering the meaning.

3.1 I am fascinated by the way she speaks. (Re-write using 'what')

3.2 Whatever the consequences may be, I am determined to win. (Begin: Regardless……)

3.3 All the people came to give evidence. He had stolen their property. (Join as one sentence using 'whose')

3.4 It did not seem wise to pull the plug out of the socket. (Rewrite to end with …wise)

3.5 "You have the whole of this week to prepare for the wedding of our daughter." John said to his wife. (Use indirect speech beginning: John told…)

3.6 If the police had not arrived in time, the thieves would have escaped. (Begin: But…)

3.7 Everyone was surprised by the behaviour of the chairman. (Rewrite ending …surprised everybody)

3.8 My grandmother is knowledgeable about poultry keeping. (Replace 'knowledgeable' with 'skilled')

3.9 Japan had never experienced such a powerful earthquake. (Begin: Never…)

3.10 The Passion of Christ will be showing at Cineplex Cinema. It is being screened there for the fourth time. It was directed by Mel Gibson. (Join into one sentence without using which)

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

3.11. Tamale was ……..goalkeeper that the rival team could not score a goal.
A: so good
B: very good
C: such a good
D: a so good

3.12. His voice is ……..than that of any other boy in the class.
A: more loud
B: louder
C: more louder
D: loudest

3.13. Joe said that he ……..not say when Alice would come back.
A: will
B: shall
C: could
D: can

3.14. He would rather look for another job than move to another town,……..?
A: doesn't he
B: couldn't he
C: wouldn't he
D: isn't it

3.15. The crowd shouted……..the speaker.
A: up
B: back
C: down
D: off

3.16. A person who makes people furious is described as ……..person.
A: an infuriated
B: a furious
C: an infuriating
D: a fury-filled

3.17. Peter is a Ugandan national. He is born……..Ugandan parents.
A: by
B: of
C: from
D: for

Turn to page VI

From page V

3.18. Do you mind .....the windows?
A: close
B: to close
C: closing
D: have closing

3.19. John you are so slow. This project ..... weeks ago.
A: must have been completed
B: should have been completed
C: should have completed
D: might have completed

3.20. The woman who was killed was carrying a .....bag.
A: brown big leather
B: big leather brown
C: leather big brown
D: big brown leather

GRAMMAR EXTRA

Rewrite as instructed

1. We thought it would be a great defeat but it wasn't. (Begin: It.....so great.....)
2. I was born in Africa. I would like to die in Africa. (Join using: .....and it is.....)
3. I was annoyed by the way the clerks in the office seemed to assume that I was trying to cheat them. (Begin: What.....)
4. "Have you ever been informed that to be successful you must work hard?" the teacher asked me. (Rewrite in reported speech).
5. People started constructing tall buildings way back in ancient times. (Rewrite in the passive voice).
6. He was exhausted. He refused to rest until the work was done. (Join using 'nevertheless').
7. The examination was so difficult. We scored highly. (Join using a relative clause).
8. I had finished taking breakfast. The bell rang. (Rewrite using 'scarcely').
9. Marriage should come after studies and employment. (Begin: Only.....).
10. We thought the situation was easy but it was not the case. (Join using ...as...as...)

Choose the most correct alternative.

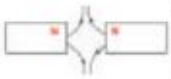
11. Which of the following is properly punctuated?
A. Go out, do you hear?
B. "Go out, do you hear?"
C. "Go out! Do you hear?"
D "Go out! Do you hear!"

PHYSICS PAPER ONE SOLUTIONS CONTINUE (0PHY009)

14. **C**
Note that:
(i). Beta particles are electrons. Electrons are negatively charged particles of an atom.
(ii). Neutrons are neutral/ uncharged particles of an atom.
Read about: Protons, atomic structure, atomic mass and atomic number.

15. **D**
Read about: The nature of images formed by curved mirrors.

16. **B**
Note: Field lines always run from the north pole to the south pole of the magnet and they never cross each other.
Read about: Electric fields and neutral point.



17. **C**
Recall that electrical power is given by
$P = IV, P = I^2R, P = \frac{V^2}{R}$ using $P = IV = \frac{200}{1000} \times 240 = 480V$
Note: *You must convert all the quantities to their S.I units before calculations are done.*

18. **D**
Inertia is the reluctance of a body to start moving when it is at rest and to stop moving when it is moving. The same phenomenon explains why passengers jerk backwards when a taxi is suddenly started or forward when it is suddenly stopped.
Read about: Newton's laws of motion.

19. **D**
Note: Critical angle is the angle of incidence in a denser medium for which the angle of refraction in a rare medium is 90°. For total internal reflection to occur, the angle of incidence must be increased beyond critical angle so that light travels back to the denser medium at the interface.

20. **D**
All the above physical quantities have a direct or indirect relationship with temperature.

21. **C**
The C.R.O has three major parts

Part	Components
Electron gun	Filament, cathode, control grid, anode
Deflecting system	X and Y plates
Fluorescent screen	Fluorescent screen

Read about: The structure of the C.R.O, uses of the different parts of the C.R.O and the uses of the C.R.O

22. A
Note: Electricity is normally measured and sold in kilowatt hours (kWh).To obtain a kilowatt hour, we multiply the kilowatts with hours for which the appliance has run.
Units used by first appliance = 2x5 = 10kWh
Units used by second appliance = $\frac{500}{1000} \times 5$ 2.5kWh
Total units =10+2.5 = 12.5kWh
1 unit costs Shs. 400
12.5 units cost 12.5 x 400 = Shs. 5000.

THE TEACHERS

IBRAHIM SSENDAWULA, NABISUNSA GIRLS' SCHOOL

TONNY SSEMWANGA, MT ST HENRY'S H/S, MUKONO

23. **C**
Note: Sound waves are mechanical and longitudinal. The molecules of the medium do vibrate in a direction parallel to that of travel of the wave.
Read about: Longitudinal, transverse, mechanical and electromagnetic waves.

24. **D**
Use the formula $n = \frac{360^\circ}{\theta} - 1 = \frac{360^\circ}{40^\circ} - 1 = 8$;
n is the number of images and θ is the angle of inclination of the mirrors.

25. **B**
$l_o = 6cm$, $l_{100} = 20cm \rightarrow$ *fundamental interval* $= 20 - 6 = 14cm$.
Using $\theta = \frac{\text{length of thread}}{\text{fundamental interval}} \times 100^\circ C$
$64 = \frac{l_t - l_o}{14} \times 100 \rightarrow l_t = \left(\frac{14 \times 64}{100}\right) + 6 = 14.96cm$

26. **A**
Speed $= \frac{2d}{t} = \frac{2 \times 150}{0.85} = 353ms^{-1}$
Read about: The Echo method of determining velocity of sound in air and the resonance method, why echoes are not heard in small rooms, experiment to verify that sound waves are mechanical.

27. **C**
Note: Repulsion is the only sure test for a charged body because even neutral conductors can be attracted by charged bodies.
Read about: Charging by induction

28. C

Applying the principle of moments, for the ruler to balance (be in equilibrium), the sum of clock-wise moments is equal to sum of anti-clock-wise moments.
The Centre of gravity of the ruler is where its weight is concentrated and since the ruler is uniform, its centre of gravity is at 50cm mark.
$\frac{200}{1000} \times 10 = m \times 40 \rightarrow m = 50g$

29. **C**
$p = hpg = \frac{740 \times 13600 \times 10}{1000}$
Read about: Factors that affect liquid pressure and solid pressure.

30. **C**
By principle of conservation of energy and the work- energy theorem,
Work done by the man = potential energy gained = mgh
Using trigonometry, $h = d\sin\theta \rightarrow$ workdone = $mgd\sin\theta$ = $20 \times 10 \times 10\sin 60^\circ$
Read about: Work, power, energy and machines.

31. **B**
Read about: Rectification (half wave and full wave rectification), the use of diodes in rectification.

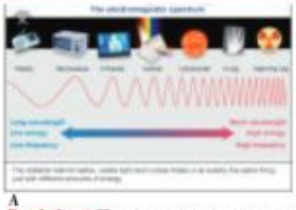
32. **C**
$F = ma = m\left(\frac{v-u}{t}\right) = 15000\left(\frac{48-0}{6}\right) = 1500\ (8)N$
Read about: The equations of linear motion and apply them to solve numerical problems.

33. **A**
Radiation is a means of heat transfer where no material medium is required. Heat is instead propagated by electromagnetic radiations.
Read about: Conduction, convection and the factors that affect the rate of heat transfer.

34. **D**
Read about: Floating and sinking, law of floatation, Archimedes' principle and forces acting on a body that is immersed in a fluid.

35. **A**
Corona discharge means the gradual loss of electrical charge appearing on and around the surface of a charged conductor. It is caused by ionisation of the surrounding matter.

36. **C**
A.c supply controls the vertical displacement and the time base controls the horizontal displacement.
Note: Time base is a special circuit connected to the X-plates for the purpose of controlling the horizontal movement of the spot.



37. **A**
Read about: The electromagnetic spectrum

38. **B**
Read about: Mechanical waves

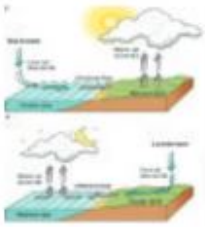
39. **B**
Period is the time spent to complete a cycle. Frequency is the number of complete cycles in a second and it is the reciprocal of period.

$T = \frac{6}{3} = 2s, f = \frac{1}{2} = 0.5Hz$

Alternatively:
Speed, $v = \frac{distance}{time} = 0.18 = 0.003 ms^{-1}$,
wavelength, $\lambda = \frac{0.18}{3} = 0.06$
Frequency, $f = \frac{v}{\lambda} = \frac{0.03}{0.06} = 0.5Hz$

Read about: The relative change in wave length and velocity of water waves as they travel from deeper water to shallow water and vice versa.

40. **A**
Note: During a sea breeze, the land is heated and the air above it expands, becomes less dense and rises upwards. The cool dense air above the sea moves towards the land and replaces the warm air that rose up. This happens during day time.



SECTION B

41. (a)(i) **Efficiency of a machine** is the ratio of the work output to work input expressed as a percentage.
ii) **Ways of improving the efficiency of a simple machine.**
Oiling or greasing the movable parts.
Using lightweight materials for movable parts.

(b) Given;
Load = 1000kg, Load distance = 5m
Effort = 250N, Effort distance = 400m

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

$M.A = \frac{load}{effort} = \frac{1000}{250} = 4$

$V.R = \frac{effort\ distance}{load\ distance} = \frac{400}{5} = 80$

$Efficiency = \frac{4}{80} \times 100\% = 5\%$

42 (a) i) **Secondary cells** are cells that can't be recharged by passing a current through them from another source once they stop working or when they reduce on the amount of current being supplied.
In the secondary cells, current is produced as a result of a reversible chemical change taking place within the cell.

(ii) Examples of an alkaline battery include;
✓ Nickel – cadmium (NiCd cells)
✓ Nickel – Iron (NiFe Cells)

(b) Given:
EMF, E = 1.5 V
Potential difference, V = 1.2 V
$E = I(R+r) = R + Ir$
$E = V + Ir$
$1.5 = 1.2 + Ir$
$r = \frac{1.5 - 1.2}{3} = 0.1A$

43. (a) It means that Cobalt takes 1600 years to decay to half its original mass.
(b) $^{108}_{50}Sn$ is one of the isotopes of tin. It decays by emission of two alpha particles and one beta particle to form element X.
(i) **Composition of Sn.**
Sn has atomic number (number of protons) = 50, number of neutrons = 58 and atomic mass = 108.
(ii)

$$^{108}_{50}Sn \longrightarrow ^{100}_{47}X + 2^{4}_{2}He + ^{0}_{-1}e$$

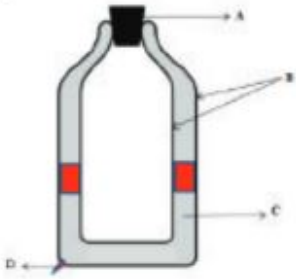
44. (a) Energy changes that occur while charging a phone.
Electrical energy → chemical energy + heat

You're converting electrical energy from the wall outlet into chemical energy inside the battery, plus a bit of wasted heat energy, since battery charging is less than 100% efficient.

(b) The power of the horse.
Given:
Mass, m = 1500 kg
Distance, d = 1 km = 1000 m
Time, t = 40 minutes = 40 × 60 = 2400 s
Using; power = $\frac{work\ done}{time\ taken} = \frac{force \times distance}{time\ taken}$
$= \frac{mgxd}{t} = \frac{1500 \times 10 \times 1000}{2400} = 6250W$

(c) Secondary energy sources include resources that have been converted or stored.
Secondary energy cannot be harnessed directly from nature;
These include;
✓ **electricity** (generated from primary fuels like natural gas,
✓ **bio fuels,**
✓ **petrol,** etc.
Note:
Primary energy sources consist of unconverted or original fuels. These include; natural gas, petroleum, coal, biomass, flowing water, wind and solar radiation. These are fuels that can be mined, extracted or harnessed directly.

45. (a).Thermos flask.



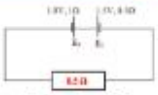
A - cork
B - silvered surfaces
C - vacuum
D - Vacuum seal

(b) Flask controls heat losses through the following ways;
-**Conduction** and **convection** are minimised by the vacuum since for heat to be transferred by these ways, a material medium is required.
-**Convection** from the hot liquid upward to the outside is reduced by the cork which also reduces heat loses by conduction because it is a poor conductor of heat.
-**Radiation** is also minimised by the two silvered surfaces since they are bad emitters.

Note:
However, when a hot liquid is kept in the vacuum flask for a long time, it cools because at a small rate, heat is lost by conduction, convection and radiation.

46. (a). **An ohm** is the resistance of a conductor through which a current of one ampere flows when a p.d across it is one volt.

(b) Given; $E_1 = 1.0\ V$, $r_1 = 1.0\ \Omega$
$E_2 = 1.5\ V$, $r_2 = 0.5\ \Omega$



Since the positive terminals are connected to each and the negative terminals are also connected to each other, then the cells are in a parallel combination.
And also since the cells have different values of EMF, their effective is got by subtraction.
Note: If the cells were of the same EMF, then their effective would be just the value of one of them.
So, effective E.M.F, $E = E_2 - E_1 = 1.5 - 1.0 = 0.5\ V$

Effective internal resistance $r = \frac{r_1 \times r_2}{r_1 + r_2} = \frac{1.0 \times 0.5}{1.5 + 0.5} = 0.33\Omega$
(internal resistors are also in parallel).
Using $E = I(R+r)$
$0.5 = I\ (8.5 + 0.33)$
$0.5 = 8.83I \Rightarrow I = \frac{0.5}{8.83} = 0.057A$

47. (a). **A longitudinal wave** is the wave in which the particles of the medium vibrate in the same direction as the wave.

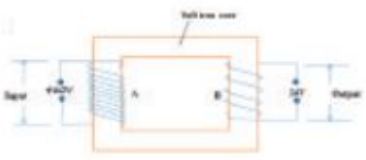
OR:
It is a wave in which the particles of the medium vibrate parallel to wave motion e.g. sound waves, waves in pipes, waves from a slinky spring etc.
Read about transverse waves.

(b). Factors which determine the velocity of sound in air
(i) **Temperature**
Increase in temperature increases the speed of sound i.e. sound travels faster in hot air than in cold air.
(ii) **Wind**
Speed of sound is increased if sound travels in the same direction as wind.
(iii) **Altitude**
Sound travels faster on a low altitude and slower on higher altitude.
(iv) **Humidity**
The higher the humidity, the higher the speed of sound and velocity.
(v) **Density of the medium.**
Speed of sound is more in denser medium than in the less dense medium.

(c).

Given;
Frequency, $f = 800Hz$
Wavelength $\lambda = 40\ cm = \frac{40}{100} = 0.4m$
Using; $V = f\lambda$
$= 800 \times 0.40$
$= 320\ ms^{-1}$

48. (a).



(i) A - primary coils
(ii) B - secondary coils
(b). Given;
$V_p = 480V$, $N_p = 800$ turns
$V_s = 24V$, $Ns = ?$
Using; $\frac{N_P}{N_S} = \frac{V_P}{V_S} \Rightarrow N_S = \frac{N_P \times V_S}{V_P}$

$NS = \frac{800 \times 24}{480} = 40$ turns

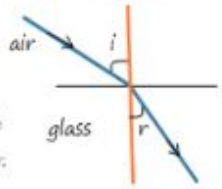
Turn to page VIII

PASS O'LEVEL

From page VII

Read about factors that affect the efficiency of a transformer and ways to minimise them.

49. (a) **Refractive index** is the ratio of sine of angle of incidence to sine of angle of refraction for a ray of light traveling from one medium to another of different optical densities. i.e.
If light travel from air to glass, then the refractive index of glass with respect to air is given by;



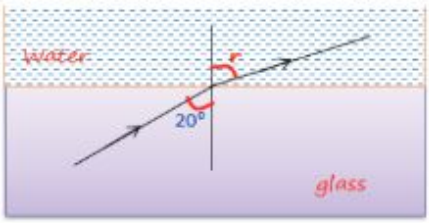
$$_{a}n_{glass} = \frac{\sin i}{\sin r}$$

Alternatively;
It can also be defined as the ratio of the speed of light in one medium to the speed of light in another medium.

Hence; $_{1}n_{2} = \frac{v_1}{v_2} = \frac{\text{speed of light in medium 1}}{\text{speed of light in medium 2}}$

Read about methods of determination of refractive index.

(b) Given;



$n_g = 1.55$, $n_w = 1.33$
From ; $n \sin i = \text{constant}$
$n_g \sin i_g = n_w \sin i_w$
$1.55 \sin 20 = 1.33 \sin r$
$\sin r = \frac{1.5 \sin 20}{1.3} = 0.3986$
$\therefore r = 23.5°$

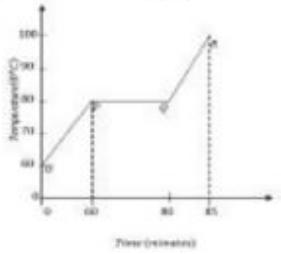
50. (a) **Absolute zero of temperature** is the temperature at which the molecules of a substance have their lowest possible kinetic energy.
(b) Given:
Volume, $V_1 = 200cm^3$
Temperature, $T_1 = 17°C + 273 = 290K$
Volume, $V_2 = 50\ cm^3$
Temperature, $T_2 = ?$
From ;
$\frac{V_1}{T_1} = \frac{V_2}{T_2} \Rightarrow T_2 = V_2 \times \frac{T_2}{V_1} = \frac{50 \times 290}{200} = 72.5K$

PHYSICS PAPER TWO QUESTIONS (0PHY0010)

Useful constants
- *Acceleration due to gravity, g = 10ms⁻²*
- *Specific heat capacity of copper = 400Jkg⁻¹k⁻¹*
- *Specific heat capacity of water = 4200Jkg⁻¹k⁻¹*
- *Specific latent heat of fusion of water = 340000Jkg⁻¹*
- *Speed of sound in air = 320ms⁻¹*
- *Velocity of electromagnetic waves = 3.0 × 10⁸ ms⁻¹*

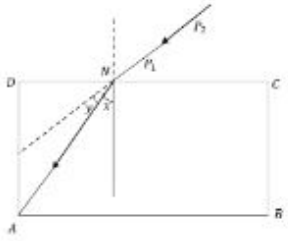
1. (a). Define uniform velocity.
(b). A ball of mass 500g is thrown vertically upwards from the ground with a velocity of 20ms⁻¹, calculate the;
(i) Maximum height attained.
(ii) Potential energy gained at the maximum height.
(c) (i) Define pressure.
(ii) Explain why one feels more pain when pricked by a pin than a nail.
(d). (i) Define momentum.
(ii) State Newton's second law of motion
(iii) A constant force acts on a body of mass 2kg for 8s and the body accelerates from 10ms⁻¹ to 50ms⁻¹. Find the magnitude of the force.

2. (a). What is meant by the term conduction as applied to heat?
(b). A composite rod is made by joining a copper rod and a wooden rod. A piece of paper is wrapped several times around the joint. The composite rod is passed through a Bunsen flame several times. Explain what is observed.
(c). The graph below shows the change of temperature of naphthalene heated from 60°C to 100°C in 85 minutes. Explain the features of the graph.



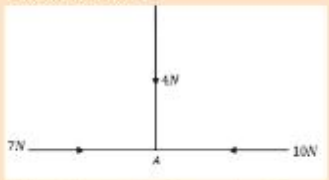
(d). Dry ice of mass 50g at 0°C is put in a copper calorimeter of mass 1kg. The initial temperature of the calorimeter is 25°C. Find the amount of ice that melts.

3. (a). State the laws of refraction of light.
(b). While determining the refractive index of a glass block, a student placed pins at P_1 and P_2 so that they are in line with edge A of the block. The student then drew lines P,N and NA as shown below.



If *x* and *y* were measured and found to be 50° and 20° respectively, find the refractive index of glass.
(c). (i) What is meant by focal length of a lens?
(ii) Describe a simple experiment to determine the focal length of a convex lens.
(d). A convex lens of focal length 8cm when used as a magnifying glass forms an image of height 5cm at a distance of 12cm from the lens. Draw a scale diagram to find the;
(i). object distance
(ii). height of the object

4. Categorise the following quantities into scalars and vector; density, displacement, power and strain.
(b). Three forces of 10N, 7N and 4N act on a body of mass 250g. Determine;
(i). magnitude of the resultant force on A
(ii). acceleration of A.



(c) (i) State the principle of conservation of momentum.
(ii) Explain briefly what happens when the neck of an inflated balloon is suddenly opened.
(d) (i) State the forces acting on a small metal ball falling through oil
(ii) What is meant by terminal velocity?

5. (a) Define the following terms as applied to waves:
(i) Wave front
(ii) Wave length
(b) (i) State three differences between light and sound waves
(ii) A turning fork of frequency 525 Hz causes an air column in a closed pipe to resonate with its fundamental note. Calculate the length of the tube.
(c) (i) Describe an experiment to demonstrate resonance in sound.
(ii) If the fundamental frequency of a note is 600HZ, find the frequency of a note two octaves lower.
(d) State two ways in which the frequency of vibration of a stretched wire can be increased.

6. (a) Define the following terms as used in electricity:
(i) Coulomb
(ii) Conductor
(iii) Resistance
(b) (i) Describe briefly how a gold heat electroscope can be charged negatively by induction.
(ii) Draw a sketch diagram to show the electric field lines due to two parallel plates with opposite charge.
(c) State one reason why:
(i) Electricity is transmitted as a.c and NOT as d.c.
(ii) Electricity is transmitted at every high voltage.
(iii) A fuse is necessary in house wiring.

7. (a) (i) Define a hard magnetic substance and a soft magnetic substance.
(ii) Give one example of each of the above substances.
(b) (i) Sketch magnetic field lines for two bar magnets with like poles facing each other and use it to explain the neutral point.
(ii) Explain why repulsion is the only sure test for testing for whether a given substance is a magnet.
(c) (i) Describe the mode of operation of a moving coil galvanometer.
(ii) A moving coil galvanometer has a resistance of 40Ω and gives a full scale deflection of 2mA.
How can the galvanometer be converted to an ammeter reading up to 5.0 A?

8. (a). What is meant by the following:
(i). Radioactive decay
(ii). Radioisotope
(b). A radioactive element has a half-life of 30 minutes, if the initial count rate is 512 per minute;
(i). How long does it take to reach the count rate of 32 per minute?
(ii). What fraction of the original number of atoms decays in this time?
(c). (i). What are cathode rays?
(ii). Describe briefly how cathode rays are produced in a cathode ray tube.
(iii). State two uses of the cathode ray oscilloscope.
(d). Define the following;
(i). Thermionic emission.
(ii). Photo electric emission.

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