VISION GROUP

NATIONAL PRIDE • GLOBAL EXCELLENCE

HOME SCHOOLING MATERIAL

PASS O' LEVEL

BIOLOGY, PHYSICS AND ENGLISH LANGUAGE

YOUR GUIDE AWAY FROM SCHOOL

1. **B/D**; B if both parents were homozygous for their characteristics, hence ¾ of 800 and **D** if the plant was heterozygous for round seeds hence ½ of 800.
2. **C**; Natural selection leads to evolution, which depends on variation among organisms and changes in the environment that favour a variant population.
3. **C**; Since boiling soil in Y killed microorganisms in it while microorganisms in X produced carbon dioxide as they respired.
4. **B**; umbilical cord supplies required materials to the fetus through umbilical vein and removes waste products from the fetus through umbilical artery.
5. **A**; The respiratory gases cross the respiratory surfaces in a solution form.
6. **D**; Since it is the outermost layer of the epidermal layer of the skin.
7. **B**; As it is determined by alleles that are not located on sex chromosomes.
8. **B**; Since the vascular bundles are in a ring around the pith.
9. **C**; This is because if asexual reproduction occurred by meiosis, the number of chromosomes would be halved in successive generation.
10. **B**; As mammals are cold blooded, they do not have scales and carry out internal fertilisation.
11. **C**; Since nitrogen is found only in proteins, but not in carbohydrates.
12. **C**; Glycerol and fatty acids are absorbed into the lacteal, which forms part of the lymphatic system.
13. **A**; This allows many pollen grains carried by wind to land on the stigma.
14. **C**; The roots are more or less of the same size and do not begin from the stem above the ground surface.
15. **A**; If the photosynthesis in the question is corrected to transpiration as guard cells carry out photosynthesis and open.
16. **B**; Which makes the leaf brittle, boiling in water kills protoplasm, while dipping in cold water softens the brittle leaf.
17. **B**; As all the cells are isotonic to each other.
18. **C**; Since the least amount of top soil was lost in a virgin forest.
19. **C**; pollen tube nucleus does not fertilise, while generative nucleus divides to form male nuclei. Fertilisation of the ovules results in seeds.
20. **A**; As the wings move downwards generating a forward propulsive force on the bird.
21. **C**; It is the fluid in which the fetus is in and water being incompressible much of the pressure is absorbed without reaching the fetus.
22. **D**; Water and mineral salts as transported in the xylem whose primitive form is tracheid, while vascular bundles refers to both the xylem and phloem.
23. **C**; The complete path is earlobe, auditory canal, eardrum, ossicles (malleus, incus and stapes), oval window, cochlea and round window.
24. **D**; The major components of mammalian urine are water, urea and salts.
25. **A**; It has two main body divisions and four pairs of limbs.
26. **A**; Anaerobic respiration produces the same amount of energy in plants and animals, except lactic acid can be further broken down unlike alcohol.
27. **A**; Cell wall is outermost, nucleus in the cytoplasm, but at its sides.
28. **D**; Only simple nutrients are absorbed. *Do not confuse it with being small.*
29. **A**; If exocrine in the question is endocrine gland as pituitary gland is a master endocrine gland.
30. **D**; it shows the tip of a root hence it is root apical meristem.

SECTION B

31. (a)

Thin	Endometrium being broken down
Thickness increasing	Repair of endometrium occurring
Think	Thickness maintained by progesterone

b) From 11th to 24th day, as the sperm can survive for sometimes in oviduct and the released ovum can last for sometimes before degenerating.

c) (i) Increase in oestrogen concentration due developed follicle secretion, stimulates anterior pituitary gland to secrete Luteinising hormone to cause ovulation, hence the rapid increase towards the 14th day.

(ii) Initial increase is due to secretion following low levels of progesterone in blood to cause development of follicles. Mature follicles secrete oestrogen that inhibits further secretion of FSH.

d) It secretes progesterone that maintains the thickness of the uterine wall, preventing occurrence of miscarriage.

e)(i) - It allows occurrence of variation among organisms.
- it reduces maintenance of poor quality organism due to crossbreeding.

(ii) - Abstinence and use of condoms.

BEN OCAN,
ST MARY'S COLLEGE, KISUBI

OJOK DEOGRACIOUS,
TRINITY SENIOR ACADEMY, BWEBAJJA

BIOLOGY PAPER ONE SOLUTIONS (OBIO006)

32. a) (i) A (ii) C

b) Complex nutrients like starch are stored in the seed, but during germination they are progressively broken down into forms that are useable (simple forms) by the growing embryo.

c)(i) The seeds were dormant; may be due to hard and impermeable testa, immature embryo and presence of growth inhibitors in them. Or it was due to absence of requirements for germination.

(ii) The seeds can be allowed longer periods to dry, have their testa scarified, treated with growth promoters or provided with requirements for germination.

33. a) X- Canine tooth, Y- Incisor tooth, Z- Molar tooth.

b) The roots are long, curved and 3 in number. The crown is broad with cusps and ridges on the top surface.

c) X; for tearing food materials due to its wedge shaped crown.
Y; for biting food materials due to its chisel shaped crown.
Z; for grinding food materials due to its broad crown with cusps.

d) X; 4 Y; 8 Z; 12.

e) - Brushing teeth after every meal using fluoride tooth paste.
- Reducing the intake of sweet drinks and foods.
- Avoiding the use of tobacco products.
- Flossing regularly.
- Visiting a dentist every year.

SECTION C

34. a) **Movement** is either the displacement of part or the whole organism from one part to another, while **locomotion** is the displacement of position of the whole organism from one place to another.

b) - **Pivot joints** are those that permit rotation of one bone round another. E.g. Between the axis and atlas.
- **Gliding joints** are those that permit sliding movement of one bone over another. E.g. Vertebral joints, carpals of the palm and tarsals of the foot
- **Saddle joints** allow movements in two planes e.g. at the base of the thumb.
- **Ball and socket joints** allow movement in all directions. They are found in the shoulder and hip joints.
- **Hinge joints** allow movement in one plane or direction only and they include knee joint, elbow joint.

d) - Protects delicate organs of the body.
- Stores calcium for use in the body.
- Allows manufacture of erythrocytes (red blood cells).
- Allows breathing to occur by adjustment of ribcage.
- Permits support to all parts of the body.
- Allows locomotion by providing levels for attachments of muscles.
- Allows transmission of sound by ear ossicles in the ear.

35. (a)

Life processes	Meaning and importance
Nutrition	They obtain nutrients from the environment. The nutrients are used to produce energy and also to make parts of their bodies.
Respiration	The breakdown the obtained nutrients to produce energy. The energy is used in different activities in the body.
Excretion	The removal of harmful, excess nutrients and products from the body. Allows body reactions to occur continuously.
Growth	A permanent increase in size and complexity. This enables them to reach maturity and reach reproductive age.
Reproduction	This is the process by which living things give rise to offspring. Ensures continuity of species hence prevent extinction.
Movement	Living things change positions of their parts. Allows attainment of some materials.
Sensitivity or irritability	Response to changes in the environment. Enables organisms to adjust and adapt to changes in the environment

(b)(i)

Seed	Fruit
Develops from a fertilised ovule	Develops from a fertilised ovary
Has one scar	Has two scars
Has a micropyle	Does not have a micropyle
It encloses an embryo	It encloses a seed or seeds
The external coat testa	External coat a pericarp

(ii) - The fruits are succulent, have brightly coloured epicarps and are edible but with indigestible seeds which are passed out with the animal's faeces.
- The fruits are succulent, have brightly coloured epicarps and are edible and the seeds thrown away.
- Possession of hooks which attach the fruit onto the animal's fur or clothing/body and is removed or thrown away elsewhere.
- Possession of sticky hairs on the fruit coat which attach onto animal's body/ fur/ hair/clothing and taken elsewhere
- Some have a good scent when ripe to attract animals

(iii) - It prevents overcrowding, which may lead to diseases among members of the same species.
-It prevents competition among the offspring and parents for resources.
- It ensures better colonising of new and favorable habitats.

36 a) - **Motor neurone**; transmits impulses from the central nervous system to effectors.
- **Sensory neurone**; transmits impulses from receptors to central nervous system.
- **Relay neurone;** transmits impulses within central nervous system from sensory neurone to motor neurone.

b) This is an elongated cell with branched ends. At one end, there is a thick part called the cell body which contains the nucleus and cytoplasm that is bounded by a cell membrane. The centron also bears processes known as dendrons which branch further into dendrites. From the cell body, there extends a long fibre called an axon which is covered by mylein sheath. The axon membrane is continuous with the plasma membrane of the centron and it encloses axoplasm, which is also continuous with cytoplasm of centron. The myelin sheath is secreted by Schwann cells and the intervals between the sheaths is node of Ranvier.

c) When a hand touches a hot object, the stimulus is detected by the heat and pain receptors in the skin. These receptors initiate impulses, which are transmitted along the sensory neurons in dorsal arm and enter the spinal cord. The impulses are then transmitted through the intermediate neurone to the motor neurone, which leaves the spinal cord via the central root to biceps and triceps muscles. The biceps contract, while triceps relax, withdrawing the hand.

37. a)(i) **Microorganisms**, decompose organic matter, creates pores.

Turn to page 11

From page I

- **Humus**; provides organic nutrients for the plants.
- **Water**; for use by microorganisms and plants.
- **Air**; use in aerobic respiration by the organisms in soil.
- **Larger organisms**; create tunnels as they move.
- **Inorganic nutrients**; are used absorbed and used by plants.

b) During soil formation, rocks are progressively broken down such that particles of bigger sizes are continuously broken and pushed towards the earth surface.

c) An experiment to determine soil pH

Requirements.

Soil sample, crucible, spatula, petri dish, BDH universal indicator, pH chart.

Procedure

- Collect soil samples from any area.
- Spread the soil samples in an open to dry them up.
- Place about ½ spatula end-full of soil in a clean petri-dish.
- Add little BDH universal indicator sufficient enough to soak the soil.
- Leave it for 5 minutes of soaking.
- Tilt the dish and gently pour the liquid into a testtube or white tile.

Observation.

- Compare the colour of indicator against the chart supplied with the indicator.
- Quote the pH value from the chart as pH of the sample.

BIOLOGY PAPER ONE QUESTIONS (OBIO007)

SECTION A

1. The correct path of light in a microscope after being reflected by the mirror is,
   A. Diaphragm → Condenser → Stage →Objective lens → Eye piece lens
   B. Condenser →Diaphragm → Eye piece lens →Stage → Clip
   C. Eye piece lens →Turret →Objective lens →Diaphragm →Stage
   D. Diaphragm →Stage →Eye piece lens→Objective lens→ Clip

2. Which of the following best describes the relationship between plasmodia and mosquitoes?
   A. Mutualism.
   B. Commensalism.
   C. Parasitism.
   D. Symbiosis.

3. Which of following adaptations provide an advantage to animals in desert but not to those in aquatic environment?
   A. Long loop of Henle and excretion of urea.
   B. Short loop of Henle and thick medulla.
   C. Water proof surface and excretion of ammonia.
   D. Storing much lipids and short loop of Henle.

4. Figure 1 below shows the head of an insect. Which of the following is the best description of the mouth part of the insect?

   A. Proboscis hence a biting mouthpart.
   B. Mandible hence a biting mouthpart.
   C. Proboscis hence a sucking mouthpart.
   D. Mandible hence a sucking mouth part.

5. Which of the following joints allows rotational movement in all directions?
   A. Hinge joint
   B. Pivot joint
   C. Ball and socket joint.
   D. Gliding joint.

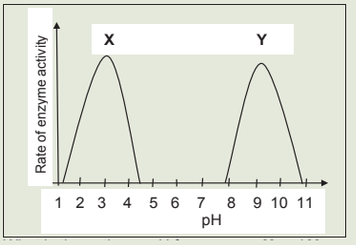
6. The following are forces that cause water movement up the plant.
   I. Capillarity.
   II. Cohesion.
   III. Adhesion.
   IV. Transpiration pull.
   V. Root pressure.

Which of the following is directly responsible for formation of a continuous transpiration stream?
   A. I, V and II.
   B. III, II and V.
   C. IV, II and III.
   D. I, II and III.

7. Which of the following is the first sign of occurrence of germination?
   A. Swelling of the seed.
   B. Emergence of radicle.
   C. Emergence of plumule.
   D. Peel of seed coat.

8. Which of the following causes a bird to move forward during flapping flight?
   A. Downward stroke.
   B. Recovery stroke.
   C. Upward stroke.
   D. Soaring stroke.

9. Figure 2 below shows the relationship between two enzymes and changes in pH.



What is the optimum pH for enzymes X and Y respectively?
   A. 1 and 11. B. 2 and 8.
   C. 3 and 8. D. 3 and 9.

10. Contraction of diaphragm muscles during ventilation causes the diaphragm to;
   A. form a dome shape increasing volume of thoracic cavity
   B. flatten increasing volume of thoracic cavity
   C. flatten decreasing volume of the thoracic cavity
   D. form a dome shape decreasing volume of thoracic cavity

11. After three months of pregnancy, which of the following organs secrete oestrogen and progesterone hormone.
   A. Fetus. B. Umbilical cord.
   C. Placenta D. Amnion membrane.

12. Which of the following is the importance of haemoglobin in red blood cells?
   A. Increase the amount oxygen carried by red blood cells.
   B. Prevent carbon dioxide from entering inside red blood cells.
   C. Ensure red blood cell does use up the oxygen being transported.
   D. Prevent oxygen from diffusing outside the red blood cells.

13. The part of the brain that controls language, memory and decision making is the;
   A. cerebrum B. thalamus
   C. hypothalamus D. cerebellum

14. Which of the following glands is an exocrine gland?
   A. Adrenal gland. B. Ovary
   C. Testis D. Salivary gland

15. The organisms in kingdom monera differ from organisms in kingdom plantae as they;
   A. are unicellular while plants are multicellular
   B. feed on already made food wile plants make their own food
   C. multicellular while plants are single-celled
   D. move while plants do not move

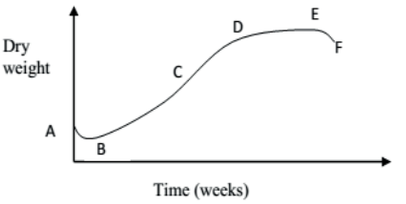
16. Solute materials move along a concentration gradient by
   A. Osmosis B. Active transport
   C. Diffusion D. Phagocytosis

17. Which type of immunity does the baby obtain from the mother during breastfeeding?
   A. Natural active immunity.
   B. Artificial passive immunity.
   C. Natural passive immunity.
   D. Artificial active immunity.

18. What is the percentage chance that a couple with two children will have one boy and one girl
   A. 75% B. 0%
   C. 25% D. 50%

19. The effect of taking in a drink rich in glucose in a diabetic person is;
   A. increase in blood glucose level above the norm
   B. secretion of insulin hormone
   C. increase of rate of respiration in the liver
   D. conversion of excess glucose to glycogen

20. Which of the following is the reason for decrease in dry weight of a seedling between A and B in figure 3 below?



   A. Hydrolysis of complex nutrients to simple nutrients.
   B. Breakdown of stored nutrients during respiration.
   C. Absorption of water that does not contribute to dry weight.
   D. The cotyledons breaking after exposure to light.

21. Which of the following crosses is carried out to determine the genotype of an organism showing a character determined by a dominant allele?
   A. Test cross. B. Selfing cross.
   C. Back cross. D. Mendelian cross.

22. Which of the following compounds is a final product of digestion in the mammalian ileum?
   A. Maltose B. peptides
   C. Galactose D. Lactose

23. In an experiment to determine amount of humus in a soil sample, a student used a crucible of 25g. The results obtained during the experiment were; weight of crucible and fresh soil was 115g, weight of crucible and dry soil was 100g while the weight of crucible and soil heated to red hot was 85g. What was the amount of humus in the soil sample?
   A. 30g B. 19g
   C. 15g D. 25g

24. Which of the following are the first two vertebrae in mammals?
   A. Cervical and atlas.
   B. Atlas and axis.
   C. Axis and thoracic.
   D. Cervical and thoracic.

25. A stimulus is a;
   A. change that organisms respond to
   B. response of an organism to changes in the environment
   C. sudden response controlled by the spinal cord
   D. an organ that detects changes in the environment

26. Which of the following plant hormones cause ripening of fruits?
   A. Auxins. B. Gibberellins.
   C. Ethene. D. Abscisic acid

27. Which of the following parts of a cell make up the cell protoplasm?
   A. Cell membrane and cytoplasm.
   B. Cytoplasm and nucleus.
   C. Nucleus and cell membrane.
   D. Cell wall and cytoplasm.

28. The process of removal of microorganisms from objects by use of high temperature is;
   A. incubation B. sterilisation
   C. inactivation D. denaturation

29. In which animal does the inhaled air and exhaled air follow different routes?
   A. Fish.
   B. Insects.
   C. Frogs.
   D. Mammals.

30. The first stage of holozoic nutrition is;
   A. absorption
   B. assimilation
   C. egestion
   D. ingestion

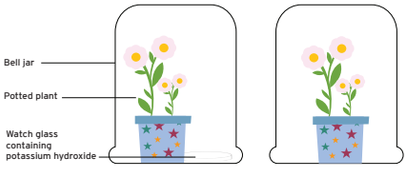
SECTION B

31. An investigation was carried out on the effect of mulching on the amount of surface water runoff and top soil lost in the semi-arid area of Kotido district in north eastern Uganda. The results are shown in the table below.

Thickness of mulch (cm)	Surface runoff (mm)	Amount of top soil lost (tones per hectare)
0	200	100
5	150	50
10	100	30
20	40	10
30	0	0

(a) Represent the above results in a graphical form.
(b) Compare the variation of amount of surface runoff and top soil lost.
(c) State the relationship between the thickness of the mulch and amount of
i) surface runoff
ii) top soil lost
(d) Explain your response in (c) above.
(e) Suggest suitable methods for preventing soil erosion in hilly areas.

32. **Figure 7** below shows an experimental setup to investigate the need for carbon dioxide in photosynthesis.



a) Explain the use of the following in the experiment.
i) Potassium hydroxide.
ii) Burning candle.
b) Suggest the observation made after testing a leaf from each plant for starch.
c) Explain your response in (b) above.
d) Suggest the role carbon dioxide in photosynthesis.
e) How is a leaf adapted for absorption of carbon dioxide?

33. a) Suggest the difference between complete and incomplete metamorphosis.
b) State advantages of metamorphosis to organisms.
c) Describe the life cycle of a housefly.
d) Suggest ways of controlling spread of diseases by houseflies.

SECTION C

34. Albinism in man is determined by a recessive which is transmitted in Mendelian fashion. A non-albino couple have four children and the first three are non-albinos while the fourth is an albino.
a) Suggest the genotype of the
i) parent
ii) of each of the four children
b) Explain the possibility that the next child will be an albino.
c) Suggest explanations for the expected characteristic of the first child if;
i) a non-albino child of the couple married a non-albino partner
ii) an albino a child of the couple married a carrier for albinism.
d) Explain co-dominance in sickle cell trait inheritance in humans.

35. a) Explain and give an example from your community of the following;
i) food chain
ii) food web
b) (i) What is meant by pollution.
(ii) Discuss the various activities in urban centres in Uganda that result in pollution.
(iii) Suggest preventive strategies that can be put in place the urban centres to overcome the pollution.

36. a) State the main floral whorls.
b) Describe the process of fertilisation in flowering plants.
c) State the events that occur after fertilisation in (b) above.

37. a) Suggest the meaning and importance of the following.
i) ATP.
ii) Anaerobic respiration.
b) Describe an experiment to show that heat is produced during respiration.
c) Describe the gaseous relationship between plants and animals.

ENGLISH LANGUAGE SOLUTIONS (OENG006)

PAPER ONE

WRITING A CURRICULUM VITAE

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

A C.V should have the following qualities:
- The format should be British style.
- It should follow the proper order.
- It should have a record of personal data i.e. name, current address, e-mail address, telephone contact, nationality, marital status.
- It should have a detailed educational background and work experience of the applicant.
- It should bear all past and present achievements.
- It should have personal interests, skills etc., especially those relevant to the job.
- It should indicate the language proficiency and hobbies of the applicant, especially those that may be relevant.
- It should have at least two referees to be contacted in case more information about the applicant is needed.
- It should be written in standard English with perfect grammar and any other rules of the language.
- It should not be too long/detailed.
- It should have a declaration as true information.
- It should be signed on the left-hand side.

N.B:
- Only reflect those qualifications that are relevant to the job and leave out the many others that you may have.
- You are encouraged to use the British style since British English is our official language in Uganda.
- Use small letters for titles but capitalise the initials and underline. In English writing, we do not underline capital lettered-titles.
- We begin with the most recent achievements and end with the oldest.
- Your C.V. should be inclined towards the requirements of the job/job advert
You may leave out marital status, gender, nationality unless they are asked for.

SAMPLE OF A CURRICULUM VITAE (C.V.)

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. Date of birth: 16th August, 2005
3. Physical address: Kawuku, Wakiso
4. Telephone contact: 0703916732
5. E-mail address: keithrwezahura@gmail.com

Profile: Keith is an outgoing, sociable, and hardworking young man who is able to work under minimum supervision.

Education Background

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

Work Experience

2018 – 2020	Chairperson Investor's Club ■ Supervising club activities ■ Keeping records ■ Balancing club funds	St. Christine S.S.
2017 – 2018	Investor's Club Canteen	St. Christine S.S.
2014 – 2016	Treasurer, Writer's Club	Mt. St. George P/S
2013 – 2015	Class captain	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

English	very good
Luganda	very good
Luo	good
French	fair

Hobbies
1. Creative writing
2. Debating
3. Swimming
4. Reading for leisure

N.B: *You are advised (student) not to skip lines for purposes of examinations to avoid losing marks.*

EDGAR MUTARYEBWA,
AUTHOR AND TEACHER

SARAH TUMWEBAZE,
ST MARY'S COLLEGE, KISUBI

PAPER TWO

SUMMARY WRITING
ROUGH COPY

PROBLEMS HAMPERING DEVELOPMENT OF THE FISHERIES INDUSTRY

The fisheries industry is hampered by declining fish stocks due to excessive fishing, destructive gear, capturing immature fish and ~~introduction~~ rearing exotics. Pollution of fish habitats, water hyacinth, inadequate information on the biology ~~and ecology~~ of fish species and limited community participation are additional problems. Poor investment skills, non-availability of quality fish fry, poor technology for fish production and lack of affordable and locally available fish feeds hamper the industry. People have poor management practices. Inadequate knowledge on ~~the~~ control of pests and diseases ~~and~~ the economy, and feasibility of fish farming hampers the industry. Inadequate knowledge on the contribution of fisheries to the national economy and fish marketing systems are problems too. The fish folk participate less in the management of fisheries resources.

PASS O'LEVEL

From page III

FAIR COPY

THE PROBLEMS HAMPERING DEVELOPMENT OF THE FISHERIES INDUSTRY

The fisheries industry is hampered by declining fish stocks due to excessive fishing, destructive gear, capturing immature fish and rearing exotics. Pollution of fish habitats, water hyacinth, inadequate information on the biology of fish species and limited community participation are additional problems. Poor investment skills, non-availability of quality fish fry, poor technology for fish for fish production and lack of affordable and locally available fish feeds hamper the industry. People have poor management practices. Inadequate knowledge on control of pests and diseases, the economy, and feasibility of fish farming hamper the industry. Inadequate knowledge on the contribution of fisheries to the national economy and fish marketing systems are problem. The fish folk participate less in the management of fisheries resources.

(120 words)

Passage 2A

2.1 A heavy drinker is the alcohol-dependent drinker who drinks everyday and finds it difficult and unpleasant to stop.

2.2
i) heart disease
ii) cancer
iii) mental disease
iv) alcohol related deaths e.g. cirrhosis

2.3
- To relax at the end of a tiring day
- To please peers
- To reduce shyness/relax nervous tensions, etc.
- Escape from facing reality (escapism)
- Young people are convinced by advertisements of alcohol

2.4 Education is the real cure to alcohol disease

2.5
(i) impairs – cripples/ affects negatively/hurts/weakens
(ii) adversely – negatively/unfavourably
(iii) vehemently – strongly/passionately/greatly
(iv) surpassed – beaten/challenged

2B

1.B 2.A 3.D 4.B 5.A 6.C 7.D 8.A 9.B 10.A

3A

3.1. The suspect alleged that the police had beaten him up.
3.2. There were hardly any spectators.
3.3. You are not as good as you are at singing than you are at acting.
3.4. He apologised that he didn't know where to find him.
3.5. Children are more attracted to rice than adults are. (without 'are' = 0)
3.6. Does Gerald have something to do with that robbery?
3.7. KCCA can boast of having good roads.
3.8. It was rumoured that a baby spoke after birth in Busoga.
3.9. Never have I heard such annoying news before.
3.10. Will you?

3B

3.11. A 3.12. B 3.13. B
3.14. C 3.15 C 3.16. B3.
17. D 3.18 B 3.19.D
3.20.B

ENGLISH LANGUAGE QUESTIONS (OENG007)

PAPER TWO

1. Read the passage below and answer the questions after

One of the worldwide dangers on planet earth is crime. The many forms of crime that inflict on humanity may include drug abuse, rape, murder, robbery, burglary, assault ……. the list is endless. Crime is most sweet, more especially when it is for vengeance purposes. Crime can be carried out both in isolation and in unison. If committed in isolation, crime can pose a big threat to fight against.

Crime is a vice that cuts across. Be it that the numerous religious beliefs have endeavoured to rival crime, it is only on the multiplication trend. It is also surprising that the more crime is preached against, the more it is experienced; and as long as population increases, and people of different origins get more and more integrated, humanity must be ready and prepared to face the wrath's high levels.

Most syntheses attribute crime to the fact the peer pressure plays a very big role, poverty in many parts of the world is yet another reason why crime is so rampant. We cannot also ignore the fact that crime is hereditary. If the father or the mother was a thief, the offspring is also most likely to be affected in the same line.

Greed and envy are another cause of crime. Many people are rarely able to get satiety. They may have one and a hundred and still want to have at the expense of others, moreover the disadvantaged. Some of these characters are inborn. Envy, mostly propelled by societal primitivism, can be very fatal in spearheading crime. People do not like others to have or to excel, and, in a bid to cripple the opportunity of others, crime is the result.

In line with the above, witchcraft plays a major role in helping to fulfill their intentions. Truthful and fake witchdoctors have played a very big role in murder; many people have gotten sick at the hands of witchdoctors. Both the witchdoctors or wizards and their accomplices are criminals.

In the more developed world, the manufacture of firearms, their availability on the world market and their mobility from and to even hostile people inhibited, has pitched crime rate. Such arms are used to perpetrate robbery, murder and revenge; and as much as revenge is a cause of crime, the reverse is true.

It all calls for vigilance of the law enforcing organs to be able to override such causes of crime but what does the law do? There is so much unbearable weakness in the law; on top of the law enforcers themselves indulging in crime.

It is not true that all people that commit crime do it upon their own will. There are many people who fall a victim of circumstances. Ignorance is one factor that people commit crime. Fabrication, blackmail and influence-peddling have all led to crime. Many big officers have misused their offices to condition the junior officers to execute illegal deals. Others have been merely intimidated into carrying out or accepting orders since they are more of stogies or puppets than autonomous workers, and office bearers.

Without the deterrent factors, crime would be a normal environment to live with. In fact, prostitution as a vice is acceptable in many Western world countries. Governments even get revenue for it; unlike in other countries in Africa and Asia where poverty is the propellant for prostitution.

Drug trafficking and human trafficking as crime, lead to much more crime. Drug abuse, smuggling and prostitution will result from the above. Alcoholism, domestic violence and juvenile delinquency are all crimes that cause more crime.

If one's business is to import or export marijuana or cocaine, the nicotine and intoxicants, will easily cause brain damage to the one who uses them. He will get a quick urge to the extent of raping or defiling women or girls.

In order, therefore, to fight crime, churches should stop calling crime sin. If it be theft, let the priest stand at the podium and say it, that it is crime in thought, crime in words and crime in deeds or in what one has failed to do. Parents should not pamper their children so that they may avoid permissiveness. Governments should decry corruption and bribery as crime.

Question

In not more than 120 words, summarise the causes of crime as shown in the passage above.

2. A Read the passage below and answer the questions that follow.

British people are not only ignorant of the facts concerning immigrants, but are also ignorant about the immigrants themselves. "We are lumped together as the same coloured person," was the way a west Indian housewife in Liverpool put it. It does not make any difference how light or dark, or where you come from; you're still coloured to them. This habit of "lumping together" overlooks the vast difference between West Indians and Pakistanis, as well as the vast difference among West Indians themselves. Similarly, there is a great difference an Eastern Pakistani from a village and an educated Pakistani from the city.

These differences cannot be swept aside as soon as the immigrants land at Southampton. It is no good inviting the Pakistani worker to a pub as you would a West Indian since his Moslem religion forbids him to drink. A Punjabi cannot be expected to read safety regulations when, unlike the West Indian, his native language is not English. An Indian will not automatically put up curtains in his English house if all his life has been used to a house where the windows, small and set high up in the wall, did not need curtains. If integration is to work, this kind of background knowledge is indispensable.

Having studied the background of the immigrants, it is of equal importance to look at the background of the society which receives the immigrants in the British society. It is no use talking wildly of colour prejudice and colour discrimination without asking the question: are prejudice and discrimination the unique result of coloured immigration? The answer is obviously that they are not. It is also no use a coloured calling everything unpleasant or unfamiliar that happens to him in Britain, coloured prejudice. An Indian in Southall complained bitterly of colour prejudice because he sat in a train for seven hours and none of the English people in the carriage talked to him. How many millions of English people have had the same experience?

Often so much of the anguish of the newly arrived coloured immigrant is not so much because he is coloured but because he is newly arrived. A new comer, even with a white skin, can have hard time of it; as for example, the woman who moved from a town to a village in Scotland; "The circumstances were really bad for a time. They didn't know what they were doing to me by ignoring me, by forgetting about me".

As with prejudice and segregation, discrimination too in British may have nothing purely to do with colour. An indian may be discriminated against employment in slough, but Roman catholics in Belfast have been similarly treated by Protestants. It is just to say that examples of colour prejudice and colour discrimination must never be taken in isolation.

(Adapted from "Britain's coloured immigrations," a magazine article by Richard Hooper)

Questions

2.1 What mistakes do the British people make about their perception of immigrants?
2.2 Identify any two examples of discrimination in the passage.
2.3 What major point did the writer stress in the passage?
2.4 (i) Why would it be difficult for an Indian immigrant to use curtains in his English house?
(ii) What mistakes do coloured immigrants make?
2.5 Explain the meaning of the words or expressions below as they are used in the passage.
(i) lumping together
(ii) swept aside
(iii) automatically
(iv) anguish

PAPER ONE

SECTION A

This question is compulsory. Use 200-250 words

1. Assume you are having trouble at home with your siblings about carrying out domestic chores during the lockdown. Some don't want to work while others do the work late, causing conflicts and upsetting your parents. A family meeting is convened chaired by a parent to apportion each person work and the tie to do it. Write minutes for that meeting.

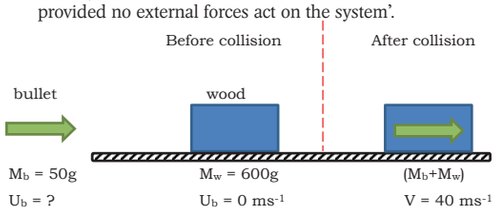
SECTION B

Choose one question from this section and write a composition of 500-600 words

2. Write a story ending "… and there she lay, motionless and lifeless, leaving behind a host of orphans.
3. Write an essay giving advice to adolescents why they should not engage in sexual activities until they are mature enough.
4. Narrate an incident when you were given something for free but with strings attached and what happened as a result.
5. Do you think Uganda's presidential elections for 2021 should be postponed? Give reasons for your stand.
6. Write a story which reflects the saying: Every cloud has a silver lining.
7. Discuss the importance of religion in someone's life.

PHYSICS PAPER TOW SOLUTIONS (0PHY006)

1. (a) **A joule** is the work done when a force of one newton moves a body through a distance of one metre in the direction of the force.
(b) (i) **Linear momentum** is the product of mass of a body and its velocity.
(ii) **The law of conservation of linear momentum** states that when two or more bodies collide, their total momentum remains constant provided no external forces act on them.
OR: It can also be stated as; 'In a system of colliding bodies, the total linear momentum remains constant provided no external forces act on the system'.



(i) Let U_b be the speed with which the bullet hit the wood. From the principle of conservation of linear momentum, total momentum before collision = total momentum after collision.

$M_b U_b + M_w Uw = (M_b + M_w) V$

$\frac{50}{1000} \times Ub + \frac{600}{1000} \times 0 = \left(\frac{50}{1000} + \frac{600}{1000}\right) \times 40$

$\frac{50U_b}{1000} = \frac{650}{1000} \times 40$

$50\ U_b = 26000$

$U_b = \frac{26000}{50}$

$Ub = 520 ms^{-1}$

(ii) Kinetic energy lost = kinetic energy before - kinetic energy after.

Kinetic energy before $= \frac{1}{2} M_b U_b = \frac{1}{2} \times \frac{50}{1000} \times (520)^2$

$= 0.025 \times 520 \times 520$

$= 6760J$

Kinetic energy after $= \frac{1}{2} (M_b+M_w)V^2$

$= \frac{1}{2} \times \left(\frac{50}{1000} + \frac{600}{1000}\right) \times 40^2$

$= \frac{1}{2} \times \frac{650}{1000} \times 1600$

$= 0.325 \times 1600 \quad = 520J$

Kinetic energy lost = kinetic energy before – Kinetic energy after

$= 6760J - 520J$

$= 6240J$

The energy is lost in form of heat and sound.

(d) Energy changes that are involved in (c) above include;
Potential energy → Kinetic energy → Heat energy + sound energy

Read about the various energy transformations.

2. (a)i) Diffusion is the movement of molecules from a region of high concentration to a region of low concentration through a concentration gradient.
ii) Capillarity is the rise or fall of a liquid in a narrow tube.

Read about applications of capillarity.

(b) i) The paper gets soaked and sinks, but the steel needle remains floating on the surface of water. This is because the water surface behaves like a stretched elastic skin trying to contract.
ii) Addition of soap solution lowers the surface tension of the liquid. When surface tension lowers, then the steel needle sinks.

Read about other factors that affect surface tension and its effects.

(c)i) It is because the force of cohesion between molecules of mercury is greater than the force of adhesion between molecules of mercury and molecules of glass. Because of this, mercury gathers itself into a globule or forms droplets on the glass surface.
However, the force of adhesion between the water molecules and the glass surface are greater than the cohesion forces of attraction between water molecules. That is why water just flows over the glass surface.

IBRAHIM SSENDAWULA, NABISUNSA GIRLS' SCHOOL

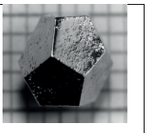
TONNY SSEMWANGA, MT ST HENRY'S H/S, MUKONO

(ii) **Advantages of mercury over alcohol.**
- Mercury is a better conductor of heat than alcohol. Therefore, it can rapidly take up the temperature of the surrounding.
- Mercury is opaque, hence can easily be seen. Alcohol has to be coloured to be easily seen.
- Mercury does not wet glass, but alcohol, because of its concave meniscus, tends to cling to the walls of the stem of the thermometer. This leads to an inaccurate reading.
- Mercury is not easily vapourised whereas alcohol can easily be vapourised even at low temperatures.
- Mercury can measure higher temperatures than alcohol. This is because mercury boils at 357^{0}C while alcohol boils at 78^{0}C.

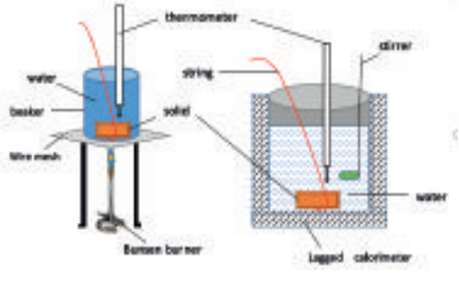
Read about advantages of alcohol over mercury as a thermometric liquid.

(d)i) Crystal cleavage is the tendency of crystals to split along certain planes.

ii)

Characteristics of crystals include;	Crystal structure.
✓ The have hard smooth surfaces ✓ They have sharp edges ✓ They have regular shapes	

3. (a)i) Specific heat capacity is the amount of heat required to raise the temperature of a one kilogram mass of a substance by 1K or 1^{0}C.
ii) Experiment to determine specific heat capacity of a solid using the method of mixtures.

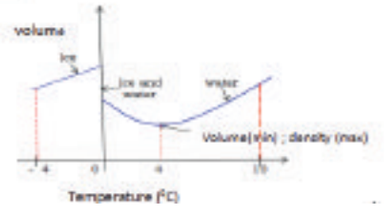


✓A solid of known mass Ms and specific heat capacity Cs is heated to a known temperature θ_1.
✓It is then quickly transferred into water of known mass Mw and specific heat capacity Cw contained in a calorimeter of known mass Mc and specific heat capacity Cc all at the same known temperature θ_2.
✓The mixture is stirred gently until a new constant \ temperature θ_3 is obtained as read from the thermometer.
✓Assuming no loss of heat to the surroundings then;
Heat lost by the hot solid = heat gained by water + heat gained by calorimeter

$Ms\ Cs\ (\theta_1 - \theta_2) = Mw\ Cw\ (\theta_3 - \theta_2) + Mc\ Cc\ (\theta_3 - \theta_2)$

If all the quantities are known and substituted into the equation, then the specific heat capacity, Cs of the solid can be determined.

b) (i) Graph of volume against temperature form -5^{0}C to 10^{0}C.



ii) When you heat ice at -5°C to water at 10°C, the following events will take place:
- **From ice at -5°C to ice at 0°C:**
As you heat the ice, its volume will increase. (cubical expansion due to the imparting of thermal energy)
- **From ice at 0°C to water at 0°C:**
When you heat ice at 0°C, temperature will not increase, while the mass of ice melts to form an equal volume of water (this is due to the latent heat of fusion of ice).
- **From water at 0°C to water at 4°C:**
At this stage, on addition of heat, the water will, quite surprisingly, contract, till it reaches minimum volume (maximum density) at 4°C. (This negative thermal expansion is termed as the anomalous expansion of water)
- **From water at 4°C to water at 10°C:**
In this temperature range, water will show a positive cubical thermal expansion like other substances and gradually expand with the increase in temperature.

c) **The bottle cracks.** This is because, as the temperature reduces, the volume of the water inside the bottle expands. And since the bottle is tightly corked, there is no room for expansion therefore leading to the cracking of glass.

d) Water is preferred while cooling car engines because of the reasons below;
- Water has a high specific heat capacity. This means that it takes long to change its temperature by 1K as compared to other liquids with a lower specific heat capacity. Therefore, it can absorb a lot of heat from the engine before it boils off, hence helping in cooling the engine.
- Water is relatively cheaper and largely available.

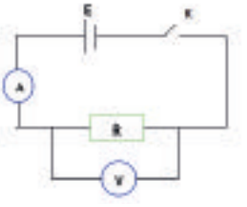
Note: The table below shows specific heat capacity values for some common substances.

Substance	Specific heat capacity (Jkg^{-1}K^{-1})
Water	4200
Ice	2100
Aluminium	900
Copper	400

4. a) i) **Potential difference** is the work done in transferring one coulomb of charge from one point to another in a circuit.
ii) **Internal resistance** is the opposition to the flow of current within the cell.

b) In the primary cell, there is polarisation; that is the accumulation of hydrogen bubbles on the positive electrode of the cell. These bubbles of hydrogen form a layer/coating on the positive electrode that insulates other hydrogen ions from obtaining electrons to become hydrogen gas. This reduces the voltage, thereby reducing the rate of flow of charge in the cell, hence increasing internal resistance. However, for the case of secondary cells, there is no polarisation and, therefore, internal resistance is lower.

c)



Turn to page VI

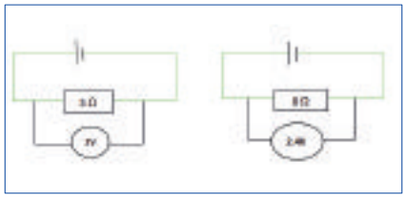
From page V

- ✓ Connect the circuit as shown above.
- ✓ Note the voltmeter reading **E** when the switch is open.
- ✓ Close the switch.
- ✓ Read and record the voltmeter reading, **V** and the corresponding ammeter reading, **I.**
- ✓ Calculate the internal resistance of the cell, **r** from; $r = \frac{E - V}{I}$, where E is the emf of the cell

Note:

This expression is derived from $E = I(R+r)$

- The procedure of the experiment can be repeated using other resistors of different resistances and then finally, take the mean value (average) of internal resistance.



(i)

From;	Also;
$E = I(R+r) = I(5+r)$	$E = I(R+r) = I(8+r)$
Also $I = \frac{V}{R} = \frac{2}{5} = 0.4A$	Also $I = \frac{V}{R} = \frac{2.4}{8} = 0.3A$
$E = 0.4(5+r)$.....(i)	E = 0.3 (8 + r).....(ii)

Equating (i) to (ii) gives;

$0.4(5+r) = 0.3(8+r)$

$20. + 0.4r = 2.4 + 0.3r$

$0.1r = 0.4$

$r = \frac{0.4}{0.1}$

$r = 4\ \Omega$

ii) To find the EMF of the cell, use;

$E = I(R + r)$

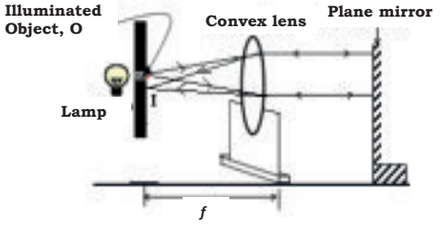
$E = 0.4(5+4)$

$= 0.4 \times 9 = 3.6V$

Read about the experiment to verify Ohm's law.

5 a)i) **Principal focus** is a point on the principal axis from which all rays originally close and parallel to the principal axis **converge to** or **appear to diverge from** after refraction through the lens.

ii) **Power of a lens** is the reciprocal of its focal length expressed in metres.



Procedure;

- ✓ A convex lens in a holder is placed in between a plane mirror and an illuminated object.
- ✓ The position of the lens is adjusted until a sharp image of the illuminated object is formed on the screen.
- ✓ The distance between the less and the screen is measured and is the focal length, f of the lens.
- ✓ The experiment is repeated several times to obtain the average value of the focal length.

Read about the experiment to determine the focal length of a convex lens using;

- ➢ Using a distant object
- ➢ Using a plane mirror and an optical pin

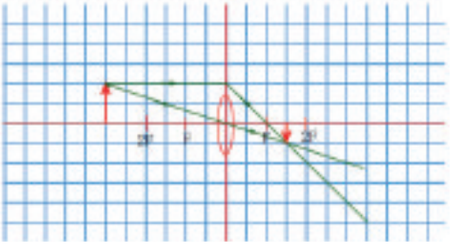
c) Convex lenses are applied in

- ✓ Microscopes
- ✓ Cameras
- ✓ Phones
- ✓ Telescopes

d) Refer to graph paper

Horizontal scale: I unit rep 10 cm ;

Vertical scale : 1 unit rep 2 cm



i) Position of the image = 3 units × 10 cm = 30 cm from the lens.

ii) Size of the image = 1 unit × 2 cm = 2cm

Note: The image is real, inverted and smaller than the object.

6. a) Soft iron is permeable to magnetic field lines, therefore, when it is placed on the poles of a magnet all the field lines pass through the soft iron. Thus strengthens the field near the poles and reduces receding of poles.

b)

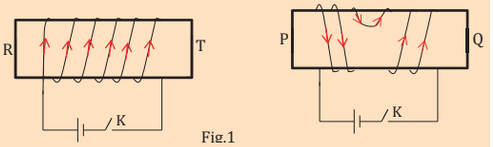


Fig.1

R is a North Pole and T is a south pole.

Both P and Q are south poles.

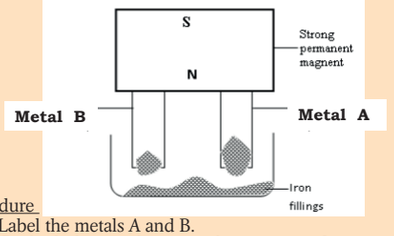
The polarity is determined by just looking at the direction of current at that end. The end where current flows in a **clockwise direction is the south pole,** while the end where current flows in an **anti clockwise direction is a north pole**.

In figure (ii), both ends are south poles because they both have current flowing in a clockwise direction due to **the turn** in the wire in the middle of the rod.

c) The strength of an electromagnet can be increased by;

- ✓ Placing an iron core inside the coil.
- ✓ Increasing the magnitude of the current.
- ✓ Increasing the number of turns in the coil.

d)



Procedure

- ✓ Label the metals A and B.
- ✓ Get both the metals attracted on a piece of a permanent magnet as shown above.
- ✓ Dip the arrangement of the metals in iron fillings.
- ✓ Note out which metal attracts more iron fillings and which one attracts less.

Observation:

The metal that attracts more iron fillings is iron and the one that attracts few iron fillings is steel. This is because the induced magnetism in iron is stronger than that in steel. Iron is easily magnetised than steel.

- ✓ Now remove the permanent magnet.
- ✓ Again observe which of the two metals loses almost all the iron fillings and which one loses very few or none.

Observation:

The metal that loses more iron fillings is iron and the one that loses a few or none of the iron fillings is steel. This is because the induced magnetism in iron is temporary (easily lost), while the induced magnetism in steel is permanent (very hard to be lost).

Conclusion

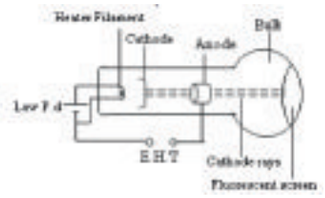
Iron is a soft magnetic material i.e temporarily magnetised while steel is permanently magnetised and thus hard magnetic material.

Read about applications of soft and hard magnets.

7. a) **Thermionic emission** is the process by which free electrons are emitted from a heated or hot metal surface while **Photo electric emission** is the process by which electrons are released from a metal surface when electro magnetic radiation of sufficient energy falls on it.

Photoelectric emission normally occurs in phototubes or photoelectric cells.

b)i) **Discharge tube**



- ✓ Reduce the pressure of the gas in the tube to about 0.0001 mmHg by using a vacuum pump.
- ✓ The cathode is heated by a low p.d applied across the filament.
- ✓ The cathode then emits electrons by thermionic emission.
- ✓ The emitted electrons are then accelerated by a high p.d (E.H.T) applied between the filament and the anode so that they move with a very high speed to constitute the cathode rays.

Note:

- ✓ Properties of cathode rays can be studied in a discharge tube in which electricity is passed through a gas at low pressure.
- ✓ Electrical discharge through gases can only be observed at very low pressures and very high voltages.
- ✓ Pressure of different gases can be adjusted by evacuation using a vacuum pump.

Read about how the Cathode Ray Oscilloscope (CRO) works.

ii) Properties of cathode rays

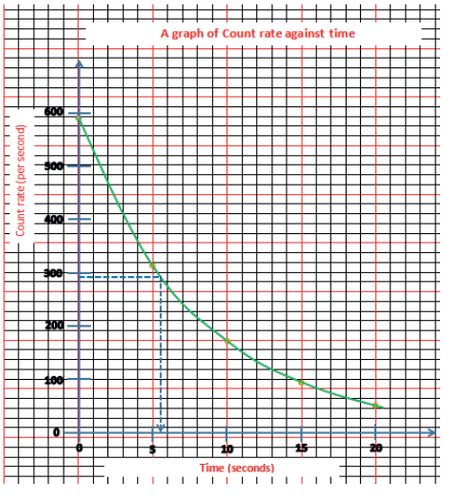
- ✓ They travel in straight lines.
- ✓ They carry a negative charge
- ✓ They darken photographic film.
- ✓ They cause fluorescence in glass
- ✓ They produce X- rays when stopped by mater
- ✓ They possess momentum hence kinetic energy.
- ✓ They penetrate small thickness of mater.
- ✓ They are deflected by both electric and magnetic fields.
- ✓ They ionise air and gas molecules.

c)i) Bones are composed of much denser material than flesh.

- ✓ To locate the broken part of a bone, a photographic film or plate is placed behind the suspected part of the patient.

X rays are then directed to the suspected part of the patient. The X – rays will pass through the broken part, but will be absorbed by the unbroken (solid) part of the bones. On developing the photographic film, the unbroken part will appear bright while the broken part will appear dark.

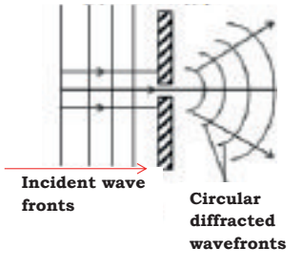
d)



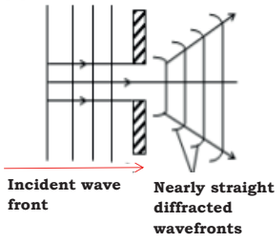
From the graph the half life of the source is **5.6 seconds.**

8. a)i) **Amplitude** is the maximum displacement of a particle from its rest or mean position.
ii) Wave length in the distance between any two particles in phase.
OR: **Wavelength** can be defined as the distance between two successive crests or troughs.

(b) (i) Small gap



ii) Big gap



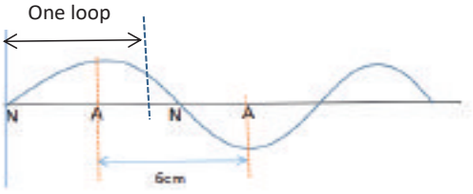
c)i) A **longitudinal wave** is one in which the particles of the medium vibrate parallel to the direction of the wave.
OR: These are waves in which the particles of media vibrate in the same direction as the wave.
Where as;
A transverse wave is one in which the particle of the medium vibrate at right angle to the direction of the wave.

ii) Examples include;

Longitudinal waves	Transverse
✓ Sound waves ✓ earth quakes, ✓ compression waves of a spring.	✓ light water ✓ Water waves ✓ wave of a rope ✓ electromagnetic wave.

d) **Electromagnetic waves**
- ✓ They are transverse in nature
- ✓ They travel through a vacuum
- ✓ They can be reflected, refracted, diffracted and can under go interference.
- ✓ They travel at the speed of light.
- ✓ They can be plane polarised

e)



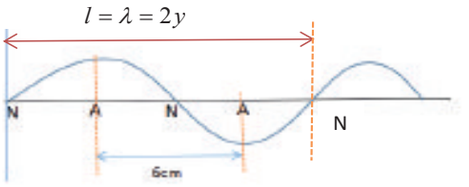
Let y be the number of loops

$6 \times y = 60$

$y = \frac{60}{6} = 10$

$\therefore\ y = 10$ *loops*

ii) Wave length is the distance between three successive nodes or anti nodes.
So it corresponds to 2 loops



Therefore, wavelength $\lambda = 2$ length of two loops
$= 2 \times y$
$= 2 \times \frac{10}{100}$
$= 0.2$m

Read about ;
- Refraction, difraction and reflection of waves.
- The superposition principle
- Experiment to show that sound waves do not pass through a vacuum.

PHYSICS PAPER ONE (OPHY007)

Specific heat capacity of water	=	$4200 Jkg^{-1}k^{-1}$.
Acceleration due to gravity,	=	$10 ms^{-1}$
Speed of light in air	=	$3.0 \times 10^{8} ms^{-1}$.

SECTION A:

1. The density of a material of mass, *m* grams and volume is;
   A. $m \times 10^{-1} kgm^{-3}$.
   B. $m \times 10^{-2} kgm^{-3}$.
   C. $m \times 10^{-4} kgm^{-3}$.
   D. $m \times 10^{3} kgm^{-3}$.
2. Which one of the following instruments can deliver a definite volume of a liquid?
   A. Pipette.
   B. Burette.
   C. Measuring cylinder.
   D. Beaker.
3. Which of the following gives a list of colours of increasing frequency?
   A. Red, Green, Blue.
   B. Green, Blue, Red.
   C. Blue, Green, Red.
   D. Red, Blue, Green.
4. Which of these is a natural magent?
   A. Horse shoe.
   B. Bar magnet.
   C. Diamagnet.
   D. Lodestone.
5. The quantity of heat required to raise the temperature of 0.1kg of water by 1°C is;
   A. 4200J.
   B. 420J.
   C. 42,000J.
   D. 42J.
6. The alternative unit to an ampere is;
   A. Cs^{-1}.
   B. JC^{-1}.
   C. Js^{-1}.
   D. VA^{-1}.
7. A wave makes 960 complete cycles in two minutes. Determine its frequency
   A. 180Hz.
   B. 120Hz.
   C. 8Hz.
   D. 1920Hz.
8. At what height above the ground must a mass of 5kg be raised to have a potential energy equal in value to the kinetic energy possessed by a mass of 15kg moving with a velocity of $10 ms^{-1}$;
   A. 3*m*.
   B. 15*m*.
   C. 30*m*.
   D. 10*m*.
9. How much heat is needed to change 20g of ice at 0°C to steam at 100°C? (Take specific latent heat of ice and steam to be and $3.4 \times 10^{5} Jkg^{-1}$ and $2.3 \times 10^{6} Jkg^{-1}$, respectively).
   A. 6,800J.
   B. 8,400J.
   C. 54,400J.
   D. 61,200J.
10. The frequency of a vibrating string;
    A. increases with increase in its length.
    B. increases with increase in its diameter.
    C. increases with increase in tension.
    D. is independent of its size.
11. The following demonstrates rectilinear propagation of light except;
    A. formation of shadow.
    B. occurrence of an eclipse.
    C. working of a pin hole camera.
    D. refraction.
12. The quantity of charge delivered by a steady current of 2mA for one hour is;
    A. 2.0C.
    B. 720C.
    C. 12C.
    D. 7.2C.
13. Soft X-rays are used to detect bone fractures because of the following reasons except;
    A. they are not very highly penetrative.
    B. they affect photographic plates.
    C. they are electromagnetic radiations.
    D. they travel in straight lines.
14. The bulb in a projector is placed.
    A. at the focal point of the reflector.
    B. at the centre of curvature of the reflector.
    C. between the focal point and the centre of curvature of the reflector.
    D. between the pole and the centre of curvature of the reflector.
15. **Figure 1** below shows a graph of extension against load for an elastic material.

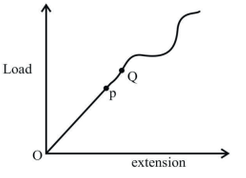


Fig. 1

In the region *OP*, the material is;
    A. elastic and obeys Hooke's law.
    B. elastic but does not obey Hooke's law.
    C. plastic but obeys Hooke's law.
    D. plastic but does not obey Hooke's law.
16. A hot air balloon rises in air because;
    A. weight of balloon equals to weight of displaced air.
    B. weight of balloon is less than weight of displaced air.
    C. weight of balloon is greater than weight of displaced air.
    D. weight of balloon is zero.
17. The earth behaves as if it contains a short but a powerful bar magnet with;
    A. it's north pole in the southern hemisphere.
    B. it's north pole in the northern hemisphere.
    C. it's north pole in east – west direction.
    D. no poles.
18. **Figure 2** below shows that the current *I*, through the 2Ω resistor is 7.5A.

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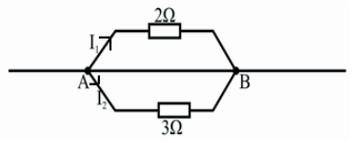

Fig. 2

A. $\frac{2 \times 7.5}{3}$ A B. $\frac{3 \times 7.5}{2}$ A

C. $\frac{3}{2 \times 7.5}$ A D. $\frac{3 \times 2}{7.5}$ A

19. When a student is wearing a red skirt with a blue blouse under a green street light, her skirt and blouse will respectively appear
    A. yellow and cyan.
    B. red and black.
    C. green and blue.
    D. both black.
20. The particles of the medium through which radio waves travel
    A. remain stationary.
    B. move along with the wave.
    C. move faster than the wave.
    D. vibrate perpendicularly to the direction of the waves.
21. To test whether a piece of metal is a magnet or not, one would see if it;
    A. attracts steel and iron fillings.
    B. attracts a magnet.
    C. repels a known magnet.
    D repels a metal bar.
22. The image in a plane mirror is
    A. upright, virtual with a magnification of 1.
    B. upright, real with a magnification of 1.
    C. inverted, virtual with a magnification of 1.
    D. inverted, real with a magnification of 1.
23. **Figure 3** shows a primary and secondary coils wound on a soft iron core.

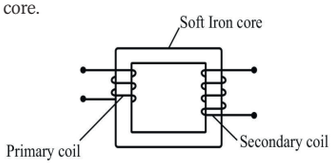

Fig. 3

The p.d across the secondary will increase if the
    A. secondary coil has more turns than the primary coil.
    B. primary coil has more turns than the secondary coil.
    C. p.d across the primary coil is reduced.
    D. frequency of the primary voltage is reduced.

24. A galvanometer reads 0.05A at full scale deflection and has a coil of resistance 1.0Ω. Find the value of the resistance that must be connected in series with it to convert it into a voltmeter which reads 3V at full scale deflection.
    A. 50Ω.
    B. 60Ω.
    C. 3600Ω.
    D. 180Ω.

25. Air in a $3m^3$ vessel at 27°C exerts pressure of 2*Pa*. Calculate the pressure that the same mass of air would exert if it was contained in a $2m^3$ vessel at 10°C .
    A. 111Pa.
    B. 283Pa.
    C. 818Pa.
    D. 810Pa.
26. A nuclide of polonium ^{210}Po decays by emission of two alpha particles and a beta particle. Which of the nuclides below is the final product?
    A. .
    B. .
    C. .
    D. .
27. In a simple cell, the effect of local action on the cell is to;
    A. surround the cathode with hydrogen bubbles stopping the cell action.
    B. waste the zinc even when the cell is not in action.
    C. dilute the electrolyte.
    D. heat the load.
28. In which of the following devices is kinetic energy converted into electrical energy?
    A. An accumulator.
    B. Dynamo.
    C. An electric motor.
    D. A combustion engine.
29. A see breeze occurs
    A. when cool air blows towards the land.
    B. warm air blows towards the land.
    C. during the night.
    D. when cool air blows towards the sea.
30. Which one of the following statements is true of a wedge used as a simple machine?
    A. A very small force is required to lift a big load.
    B. Work done is always so much.
    C. Effect on the wedge is applied vertically.
    D.There is no frictional force.
31. A body of mass 3kg is thrown upwards with a velocity of 12ms-1. Calculate the maximum height reached,
    A. 0.5 m B. 7.2m
    C. 5.0m D. 10.0m
32. The distance between the lower and upper fixed points on the celcius scale of an unmarked mercury in – glass thermometer is 25cm. If the mercury is 5cm below the upper fixed point, then the temperature is
    A. 5°C .
    B. 20° C.
    C. 80° C.
    D. 95° C.
33. Calculate the effort required to raise a load of 72N using a block system of five pulleys and efficiency 80.
    A. 11.52N.
    B. 18N.
    C. 57.6N.
    D. 228N.
34. A needle floats on the surface of water even when its density is greater than that of water because of;
    A. capillarity.
    B. tension.
    C. surface tension.
    D. Brownian motion.
35. Calculate the angle of incline of two plane mirrors in order to produce 8 images.
    A. 45° .
    B. 51°.
    C. 40°.
    D. 60°.
36. Which one of the following is the mode of heat transfer from fire to a person seated beside it?
    A. conduction.
    B. radiation.
    C. convection.
    D. evaporation.
37. A transformer has 3000 turns on the primary coil. If the primary voltage is 600V and the voltage across the secondary is 200V, the number of turns on the secondary coil is;
    A. $\frac{3000 \times 200}{600}$ B. $\frac{3000 \times 600}{200}$
    C. $\frac{600 \times 200}{3000}$ D. $\frac{600}{3000 \times 200}$
38. The following are factors affecting pressure in fluids except;
    A. depth below the surface of the fluid.
    B. density of the liquid.
    C. pressure exerted on the liquid surface.
    D. surface area of the liquid.
39. A thermometer is said to be sensitive when
    A. it can record big changes in temperature.
    B. it can record small changes in temperature.
    C. it has a large capillary bore in it's stem.
    D. it is sensitive to heat.
40. Cathode rays consists of;
    A. fluorescent particles.
    B. beams of fast moving particles.
    C. light rays from a hot filament.
    D. beams of fast moving electrons.

SECTION B:

41. (a) Define the term electric potential difference.
    (b) A current of 10A flows through a heater for an hour and converts 8.64MJ of electrical energy into heat energy. Calculate the;
    (i) total charge circulated through the heater.
    (ii) p.d across the heater.
42. (a) Distinguish between stationary and progressive waves.
    (b) Microwaves from a radar station are reflected by an aeroplane and received back in a total time of 2.0×10^{-4}. Calculate the distance of the aeroplane from the station.
43.

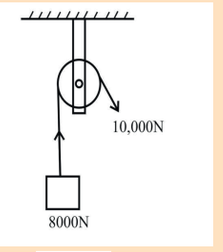

Fig. 4

    (a) The diagram in **fig. 4** shows a machine used to raise a load at a construction site.
    What is it's efficiency?
    (b) State one way in which such a machine eases work.
44. (a) Define the term diffusion.
    (b) In an oil film experiment to estimate the size of a molecule, $0.05cm^3$ of oleic acid was dropped on lycopodium powder on a water surface, the mean diameter of the acid was 5cm. Calculate the thickness of the oleic acid molecule.
    (c) State any two factors that affect the rate of diffusion.
45.

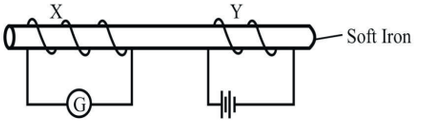

Fig. 5

    (a) The diagram in **fig. 5** shows two coils wound on a piece of soft iron. State
    (i) What is observed when the key is closed and then opened.
    (ii) Two ways in which the effect in 45. (a) (i) can be increased with out changing the cell.
    (b) State two causes of power loss in a transformer and give one solution for each.
46. (a) Distinguish between a real and a virtual image with respect to light.
    (b) Complete the diagram in **fig. 6** below to show the formation of an image by a plane mirror.

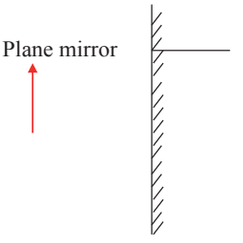

Fig. 6

47. A ticker timer has a frequency of 25Hz. Determine
    (a) its periodic time
    (b) the distance between two successive dots if the velocity of the tape from the machine is $10ms^{-1}$.
48. (a) Define a saturated vapour.
    (b) Sketch a graph to show the variation of saturated vapour pressure with;
    (i) temperature
    (ii) volume
    (c) State two ways of raising the boiling point of a liquid.
49. (a) Draw a well labelled diagram of a Gold leaf electroscope.
    (b) The atoms of a very small body lose electrons to form a point charge. Draw a diagram to show the electric field pattern around it.
50. (a) Define half-life of a radioactive material.
    (b) A radioactive material takes 50 hours for 93.75% of its mass to decay, find it's half-life.

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