LESSON 1: Use of Adverbs

Learning Outcomes

By the end of this lesson, you should be able to:

i) identify ways of doing things.

ii) use of adverbs in your daily life activities.

You will need:

• a pen

• a book

Introduction

An adverb is a word that tells more about a verb, an adjective and another adverb. Adverbs tell us how an action is done: when? why? how? and where?

Examples

i) The cyclist is riding slowly.

ii) Children should cross the road carefully.

Activity 1

Use the correct form of the word in the brackets to complete the sentences below.

Examples have been given to guide you.

1. Tino cleverly avoided the punishment. (clever)

2. Uganda's population is steadily rising. (steady)

3. St Thomas choir sang the second compulsory song beautifully. (beauty)

4. The host welcomed us cheerfully. (cheer)

5. We patiently waited for his return from Ojipaku market. (patience)

6. Italians have seen the worst coronavirus attacked. (worse)

7. They answered the question wisely. (wise)

8. A machete is usually bigger than a knife. (usual)

9. The hungry boy ate the mango greedily. (greed)

10. The hunter bravely attacked the lion in its den. (brave)

Activity 2

Order of Adverbs

When more than one adverb is used in a sentence, they usually follow in this order: manner (how?), place (where?) and time (when?).

Example

The pedestrian crossed the road carefully (how?) at the zebra crossing (where?) yesterday (when?).

From the sentences below, underline the adverbs of manner, place and time.

1. The traffic officer called the driver loudly at the junction in the morning.

2. Many cyclists ride carelessly at the traffic lights every day.

3. The bus driver spoke politely to the passenger on the bus on Tuesday.

4. My mother nicely made cakes from the kitchen last weekend.

5. It rained heavily in our area last year.

LESSON 2: Informal Letter Writing

Learning Outcomes

By the end of this lesson, you should be able to:

i) express your views on safety on the road.

ii) write a letter about safety on the road.

Introduction

Letter writing is one way of sending a message between or among people. You can write a letter to a friend, parents, relatives and many others.

Activity 1

1. (a) Write a letter to your father appreciating him for his effort to keep everybody well in this period of COVID-19 pandemic. Wish him a longer stay in this life. Use your school address.

(b) The letter below has some words missing. Using the words in the box, complete it by filling in the gaps correctly.

reap advise purpose academic not arua discussions hear dear examinations
1. **B/D:** If both parents were homozygous for their characteristics, hence ¼ of 600 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 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 sexual reproduction occurred by meiosis, the number of chromosomes would be halved in successive generations.

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 tettle, 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 reducing the fetus.

22. **B:** 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, tympanic membrane and open.

24. **C:** 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.

29. **A:** If excitone in the question is endocrine gland as pituitary gland is a master endocrine gland.

30. **D:** It shows the top of a root hence it is root apical meristem.

**SECTION B**

31. **A:** Thymus

<table>
<thead>
<tr>
<th>Condition</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thymus being broken down</td>
<td>Thickness increasing repair of endometrium occurring</td>
</tr>
</tbody>
</table>

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 tests, immature embryo and presence of growth inhibitors. But it was due to absence of requirements for germination.

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

33. **a**. Y: Canine tooth, Y- Incisor tooth, Z- Molar tooth. b) Roots are long, curved and 3 in number. The crown is broad with cusps and ridges on the top surface. c) 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.

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 around 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 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.

35. **a**

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

36. **a**

**Seed**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Fruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>d) Develops from a fertilised ovule</td>
<td>Develops from a fertilised ovary</td>
</tr>
<tr>
<td>Has one scar</td>
<td>Has two scars</td>
</tr>
<tr>
<td>Has a microple</td>
<td>Does not have a microple</td>
</tr>
<tr>
<td>It envelopes an embryo</td>
<td>It encloses a seed or seeds</td>
</tr>
<tr>
<td>The external coat tests</td>
<td>External coat a pericarp</td>
</tr>
</tbody>
</table>

37. **a(i)**

**Microorganisms**, decompose organic matter, creates pores.
From page 1
- 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.

SECTION A

1. The correct path of light in a microscope after being reflected by the mirror is:
   A. Diaphragm → Condemnier → Stage → Objective lens → Eye piece lens
   B. Condemnier → 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 shoot.
   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.

   ![Graph](image)

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

10. Contraction of diaphragm muscles during ventilation causes the diaphragm to:
    A. Increase rate of respiration volume of thoracic cavity
    B. Flatten increasing volume of thoracic cavity
    C. Flatten decreasing volume of 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. Placenta
    B. Umbilical cord
    C. Liver
    D. Aminon 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 like animal plants make their own food
    C. Multicellular white 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. 69%
    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?

   ![Graph](image)

   - 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 test tube or white tile.
   - Quote the pH value from the chart as pH of the sample.

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 soil heated to red obtained during the experiment were; weight of crucible and soil heated to red hot was 105g. 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. Assimilation
    B. Assimilation
    C. Epithelium
    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:

<table>
<thead>
<tr>
<th>Thickness of mulch (cm)</th>
<th>Surface runoff (mm)</th>
<th>Amount of top soil lost (tonnes per hectare)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>200</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td>10</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>30</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

(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 housethief.
   d) Suggest ways of controlling spread of diseases by housethiefs.

### SECTION C

54. Albinism in man is determined by a recessive gene 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
      i) the 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 child of the couple married a carrier for albinism.
   d) Explain co-dominance in sickle cell trait inheritance in humans.

55. 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.
   c) Suggest preventive strategies that can be put in place in urban centres to overcome the pollution.

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

57. a) Suggest the meaning and importance of the following:
   i) ATP
   ii) Aerobic 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 detailed educational background and work experience of the applicant.
- It should contain past and present activities.
- It should have personal information, 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.

**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**

**Biography**

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**

<table>
<thead>
<tr>
<th>Year</th>
<th>School/Institution</th>
<th>Grade/Qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017 – 2020</td>
<td>St. Christine S.S.</td>
<td>Uganda Certificate of Education</td>
</tr>
<tr>
<td>2010 – 2016</td>
<td>Mt. St. George P/S</td>
<td>Primary Leaving Examinations</td>
</tr>
</tbody>
</table>

**Work Experience**

<table>
<thead>
<tr>
<th>Year</th>
<th>Role</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 – 2020</td>
<td>Chairperson Investor’s Club</td>
<td>St. Christine S.S.</td>
</tr>
<tr>
<td>2018 – 2018</td>
<td>Investor’s Club Canteen</td>
<td>St. Christine S.S.</td>
</tr>
<tr>
<td>2014 – 2016</td>
<td>Treasurer, Writer’s Club</td>
<td>Mt. St. George P/S</td>
</tr>
<tr>
<td>2013 – 2015</td>
<td>Class captain</td>
<td>Mt. St. George P/S</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Language</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Very good</td>
</tr>
<tr>
<td>Luganda</td>
<td>Very good</td>
</tr>
<tr>
<td>Lino</td>
<td>Good</td>
</tr>
<tr>
<td>French</td>
<td>Fair</td>
</tr>
</tbody>
</table>

**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.

### 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.
FAIR COPY

THE PROBLEMS HAMPERING DEVELOPMENT OF THE FISHERIES INDUSTRY

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(120 words)

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, murder, theft, 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 union. In a group committed in isolation, crime can pose a great 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 synthesize 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 satisfy. 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 who do not like others to have got 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 fulfil 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 inhabited, 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 stooges 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 crime and intoxication will 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 he be thief, 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 no more than 120 words, summarise the causes of crime as shown in the passage above.

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

British people are not only ignorant of the facts concerning immigration, 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.

The 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 Muslim 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 no use a coloured calling everyone 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 impetus 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 leaving 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 Why would it be difficult for an Indian immigrant to use a cinema in his English house?

2.5 Explain the meaning of the words or expressions below as they are used in the passage.

(i) lumping together

(ii) adversely

(iii) automatically

(iv) anguished
PASS O’LEVEL

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’.

(ii) Let \( m_b \) be the speed with which the bullet hit the wood.

\[
\begin{align*}
\text{Before collision:} & \\
M_b = 50 g & \quad U_b = 7000 m/s \\
\text{After collision:} & \\
M_w = 600 g & \quad U_w = 4000 m/s \\
\end{align*}
\]

\[
\begin{align*}
\text{Kinetic energy before} &= \frac{1}{2} (50 \times 7000^2) = 275000000 J \\
\text{Kinetic energy after} &= \frac{1}{2} (600 \times 4000^2) = 240000000 J \\
\end{align*}
\]

(i) Let \( U_b \) be the speed with which the bullet hit the wood.

\[
\begin{align*}
\text{Before collision:} & \\
M_b = 50 g & \quad U_b = 7000 m/s \\
\text{After collision:} & \\
M_w = 600 g & \quad U_w = 4000 m/s \\
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\end{align*}
\]

Energy lost = kinetic energy before – kinetic energy after.

\[
\text{Energy lost} = 275000000 J - 240000000 J = 35000000 J
\]

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

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

3. (a) 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°C.
(b) Experiment to determine specific heat capacity of a solid using the method of mixtures.

A solid of known mass \( M_s \) and specific heat capacity \( C_s \) is heated to a known temperature \( \theta_s \).

1. It is then quickly transferred into water of known mass \( M_w \) and specific heat capacity \( C_w \) contained in a calorimeter of known mass \( M_c \) and specific heat capacity \( C_c \) all at the same known temperature \( \theta_t \).
2. The mixture is stirred gently until a new constant \( \theta_3 \) is obtained as read from the thermometer.
3. Assuming no loss of heat to the surroundings then: Heat lost by the hot solid = heat gained by water + heat gained by calorimeter.

\[
M_s (\theta_s - \theta_t) = M_w C_w (\theta_3 - \theta_t) + M_c C_c (\theta_3 - \theta_t)
\]

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

b) (i) Graph of volume against temperature form -5°C to 10°C.

(ii) When you heat ice at -5°C to water at 10°C, the following effects will take place:

- From ice at -5°C to ice at 0°C:
  - As you heat the ice, its volume will decrease. (cumulative expansion due to the latent heat of fusion)
- 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.

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

- Mercury is a better conductor of heat than alcohol.
- 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 be easily be vapourised even at low temperatures.
- Mercury can measure higher temperatures than alcohol. This is because mercury boils at 357°C while alcohol boils at 78°C.

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

![Diagram of a circuit with voltmeter and ammeter readings](image)

From; $E = I (R + r) = (5 + r)$

Also; $E = I (R + r) = (8 + r)$

$E = 0.4(5 + r) = 2.0$

Equating (i) to (ii) gives:

$0.4 (5 + r) = 2.0$

$0.4 + 0.4r = 2.4 + 0.3r$

$r = 0.4$

$r = 0.4$ Ω

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

$E = I (R + r)$

$E = 0.4 (5 + 0) = 2.0$ V

Read about the experiment to verify Ohm’s law.

5 a) 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.

![Diagram of an illuminated object, convex lens, plane mirror, and lamp](image)

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 lens 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
➢ Convex lenses are applied in

Microscopes
Cameras
Phones

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) The strength of an electromagnet can be increased by;

- Increasing the number of turns in the coil.
- Placing an iron core inside the coil.
- 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.D) applied between the filament and the anode so that they move with a very high speed to constitute the cathode rays.

![Diagram of cathode ray oscilloscope](image)

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 matter.
✓ They possess momentum hence kinetic energy.
✓ They penetrate small thickness of matter.
✓ They are deflected by both electric and magnetic fields.
✓ They ionise air and gas molecules.

b) X-rays 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.

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) Discharge tube

![Diagram of a discharge tube](image)
From the graph the half life of the source is \(5.6 \text{ seconds}\).

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

![Incident wave fronts and Circular diffracted wavefronts](image)

ii) Big gap

![Incident wave front and Nearly straight diffracted wavefronts](image)

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 medium 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;

<table>
<thead>
<tr>
<th>Longitudinal waves</th>
<th>Transverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Sound waves</td>
<td>✓ light water</td>
</tr>
<tr>
<td>✓ earth quakes,</td>
<td>✓ Water waves</td>
</tr>
<tr>
<td>compression waves</td>
<td>✓ wave of a rope</td>
</tr>
<tr>
<td>of a spring.</td>
<td>✓ electromagnetic wave</td>
</tr>
</tbody>
</table>

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

Let \(y\) be the number of loops

\[ \lambda = 2y \]

Therefore, wavelength \(\lambda = 2\) length of two loops

\[ \lambda = 2 \times \frac{60}{10} = 2 \times 6 = 0.2 \text{m} \]

Read about:

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

For enquiries, send an email to learners@newvision.co.ug

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**PHYSICS PAPER ONE (OPHY007)**

| Specific heat capacity of water | \(4200 \text{ Jkg}^{-1}\text{K}^{-1}\) |
| Acceleration due to gravity | \(10 \text{ ms}^{-2}\) |
| Speed of light in air | \(3.0 \times 10^8 \text{ ms}^{-1}\) |

<table>
<thead>
<tr>
<th>SECTION A</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The density of a material of mass, (m) grams and volume is; A. (m \times 10^3 \text{ kgm}^{-3}), B. (m \times 10^4 \text{ kgm}^{-3}), C. (m \times 10^5 \text{ kgm}^{-3}), D. (m \times 10^6 \text{ kgm}^{-3}),</td>
</tr>
<tr>
<td>2.</td>
<td>Which one of the following instruments can deliver a definite volume of a liquid? A. Pipette, B. Burette, C. Measuring cylinder, D. Beaker,</td>
</tr>
<tr>
<td>3.</td>
<td>Which of the following gives a list of colours of increasing frequency? A. Red, Green, Blue, B. Blue, Green, Red, C. Blue, Green, Red, D. Red, Blue, Green,</td>
</tr>
<tr>
<td>4.</td>
<td>Which of these is a natural magnet? A. Horse shoe, B. Bar magnet, C. Diamagnet, D. Lodestone,</td>
</tr>
<tr>
<td>5.</td>
<td>The quantity of heat required to raise the temperature of 0.1 kg of water by 1°C is; A. 420J, B. 4200J, C. 42,000J, D. 42J,</td>
</tr>
<tr>
<td>6.</td>
<td>The alternative unit to an ampere is; A. C(\text{e}^{-}), B. J(\text{c}^{-}), C. Js(^{-}), D. VA(^{-}),</td>
</tr>
<tr>
<td>7.</td>
<td>A wave makes 960 complete cycles in two minutes. Determine its frequency. A. 180Hz,</td>
</tr>
</tbody>
</table>

| 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 10ms\(^{-1}\)?

A. 3m, B. 15m, C. 50m, D. 10m, |

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 3.34 x 10\(^5\) Jkg\(^{-1}\) and 2.5 x 10\(^6\) Jkg\(^{-1}\), respectively).

A. 6800J, B. 8400J, C. 54400J, D. 61200J, |

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.

![Figure 1](image)

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 west – west direction, D. no poles, |

18. Figure 2 below shows that the current \(I\), through the 2\(\Omega\) resistor is 7.5A.
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.

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 10Ω. 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. 360Ω.
D. 180Ω.

25. Air in a 3m³ vessel at 27°C exerts pressure of 2.0Pa. Calculate the pressure that the same mass of air would exert if it was contained in 2m³ vessel at 10°C.

A. 111Pa.
B. 288Pa.
C. 818Pa.
D. 810Pa.

26. A nuclide of polonium ²¹⁴Po 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.

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 2m/s. Calculate the maximum height reached.

A. 0.5 m
B. 7.2 m
C. 5.0 m
D. 10.0 m

32. The distance between the lower and upper fixed points on the celsius 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 and tackle system of five pulleys and efficiency 80%.

A. 11.32N.
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 coil is 200V, the number of turns on the secondary coil is:

A. 3000 x 200
B. 3000 x 600
C. 600 x 200
D. 5000 x 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 power consumed by the heater in W.

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 x 10⁻¹⁰ s. Calculate the distance of the aeroplane from the station.

43. (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, 0.05cm³ 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. (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.
   (c) 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.

46. (a) The diagram in **fig. 6** 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.

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.