# F4 TERM 2 OPENER

# ALL SUBJECTS

***Dear Candidates, Attempt these School Exams!***

## For Marking Schemes Call 0705525657

**443/1**

**AGRICULTURE**

**PAPER 1**

SECTION A (30 MARKS)

Answer all the questions in this section in the spaces provide.

1. State four categories used in classifying inorganic fertilizers (2 marks)

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2. Give three reasons why maize meant for silage making should be harvested at milk stage. (1½ marks)

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3. State four practices which indicate that Agriculture is an art. (2 marks)

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4. Outline four factors that are considered when selecting planting materials (2 marks)

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5. Suggest two methods in which splash erosion can be controlled (1 mark)
6. Highlight four advantages of communal land tenure system. (2 marks)

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7. State two causes of hardpans in a crop field (1 mark)

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8. Give four types of water pumps used in the farm (2 marks)

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9. Identify four control measures of maize streak disease in a maize field (2 marks)

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10. How does soil loose its fertility? State six ways. (3 marks)

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11. Outline three problems which farmers face in marketing of vegetables (1½ marks)

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12. Give two reasons that may lead to swellings in the roots of bean plants (1 mark)

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13. Define the following terms used in crop production

a) De-suckering (1 mark)

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b) Cutting back (1mark)

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14. Mention four nursery management practices carried out when seedlings are growing on a nursery bed (2 marks)

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15. State **THREE** precautions that should be observed in the harvesting of sugarcane. (1½marks)

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16. Highlight two ways of lowering acidity in crop production (1 mark)

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17. Name three vegetative materials used in crop propagation (1½ marks)

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18. Suggest two ways in which pesticides act on pests. (1 mark)

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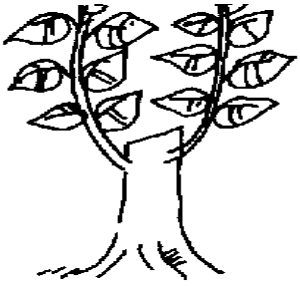
**SECTION B (20 MARKS)**

**(Answer all the questions in this section in the spaces provided)**

19. Below are diagrams marked A and B illustrating methods of pruning coffee. Study the diagrams and answer the questions that follow:

**A**



**B**

a) Identity the two methods used in pruning coffee plants illustrated above

A

…… (1 marks)

B

…… (1 marks)

b) State two reasons for pruning in coffee plantation (2 marks)

……

……

c) Name four tools used in pruning crops in the farm (2 marks)

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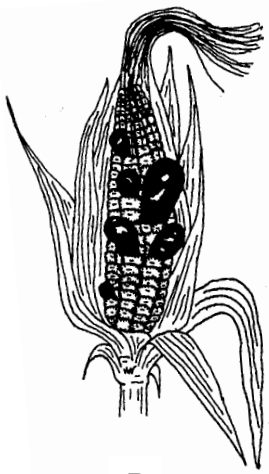
20. The diagrams labeled E and D below represents diseases of particular crops in the field. Study the diagrams and answer the questions that follow:

**E**



**D**

a) Identify the diseases illustrated in diagrams E and D above

E

…… (1marks)

D

…… (1marks)

b) Name the causative agents of each disease E and D

E

…… (1marks)

D

…… (1marks)

c) Give one cultural control method of the diseases illustrated in the diagrams E and D. (1mark)

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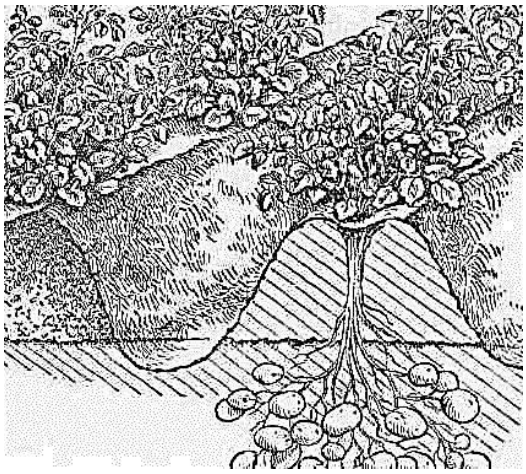
21. Below is a field practice carried out in crop production. Use it to answer the questions that follow;



a) Identify the practice illustrated in the diagram above (1 mark)

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b) Name two crops in which the above illustrated practice is carried out. (2 marks)

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c) Give two reasons for the practice shown in the diagram above (2 marks)

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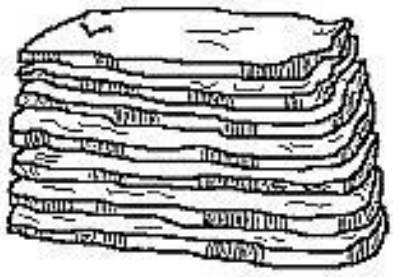
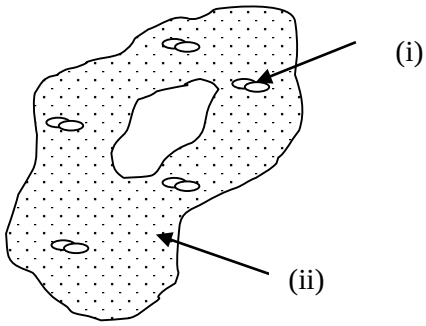
22. Below are diagrams of soil structures found in the soil labeled as C and D. use them to answer the questions that follow;



C




D

a) Identify the soil structures illustrated as C and D.

C

…… (1 marks)

D

…… (1 marks)

b) Give the names of the parts labeled as (i) and (ii) in diagram B above

i) (1 mark)

……

ii) (1 mark)

……

c) State one effect of the diagram illustrated as C above in crop production (1 mark)

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**SECTION C – 40 MARKS**

**Choose only two questions in this section**

23. a) Describe the production of finger millet under the following sub-headings

i) ecological requirements (3marks)

ii) Field preparation (3 marks)

iii) Planting and field management (6 marks)

iv) Harvesting (2 marks)

b) Give six categories of vegetables used on part used as food (6 marks)

24. a) Give FIVE qualities of a mother plant which should be considered when selecting vegetable materials for planting (5 marks)

b) Outline any FIVE factors which may lead to land fragmentation (5 marks)

c) Explain SIX importance of drainage as a land reclamation practice. (6 marks)

d) Describe FOUR disadvantages of shifting cultivation (4 marks)

25 a) Describe the safety measures a farmer should take in the use of herbicides in the farm. (10marks)

b) State and explain FIVE reasons why minimum tillage is a suitable crop production practice. (10 marks)

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# FORM 4 OPENER EXAM

## AGRICULTURE
## PAPER 2

**SECTION A. (30MKS)**

**Answer all questions in this section in the spaces provided after each question**

1. Differentiate between apiculture and aquaculture (1mark)

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2. Study the table below and fill in the missing words (3marks)

| **Description** | **Cattle** | **Pigs** | **Poultry** |
|---|---|---|---|
| Young from birth/ hatching to wearing | _____ | _____ | Chick |
| Young female before first perturation / laying | _____ | Gilt | _____ |
| Mature male for breeding | Bull | _____ | _____ |

3. Names four livestock animals that are likely to be attacked by coccidiosis (2marks)

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4. Name one intermediate host for each of the following livestock parasites.

(i) Liverfluke (Fasciola SP) (½ mark)

……

(ii) Tape worm (Taenia sp) (½ mark)

……

5. Give four reasons for feeding a lamb on colostrum (2marks)

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6. Give two advantages of concrete blocks over timber as building materials. (2marks)

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……

7. State four disadvantages of nomadic pastoralism (2marks)

……

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8. Name the tool used alongside the following

(i) Wood chisel. (½ mark)

……

(ii) Trocar. (½ mark)

……

9. Outline six advantages of a grass legume mixture. (3marks)

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10. State three periods of specialized feeding in livestock. (1½ marks)

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11. a) Explain the term epistasis as used in breeding (½ mark)

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b) State three methods used in selection of livestock for breeding (1½ marks)

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12. Give four features of housing that help to control livestock diseases (2marks)

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13. Mention three methods of administering vaccines in animals (1½ marks)

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……

……

14. Distinguish between the following practices as used in livestock management

(i) Crutching and ringing (1mark)

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……

……

(ii) Cropping and harvesting in fish farming (1mark)

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……

15. Name four methods of fish preservation (2marks)

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16. State two biotic factors that affect livestock production (1mark)

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17. State two roles of drones in a bee colony (1mark)

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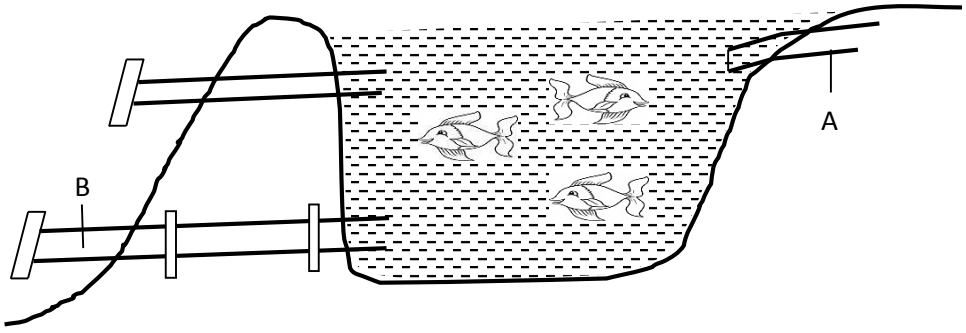
**SECTION B**

**Answer all questions in this section in the spaces provided**

18. The diagram below shows a farm structure. Study it carefully and answer the questions that follow.




a) Name the parts labeled A and B (2marks)

A

……

B

……

b) State two maintenance practices carried out on the above drawn structure (2marks)

……

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c) Mention two methods used to maintain high level of oxygen in the above structure (2marks)

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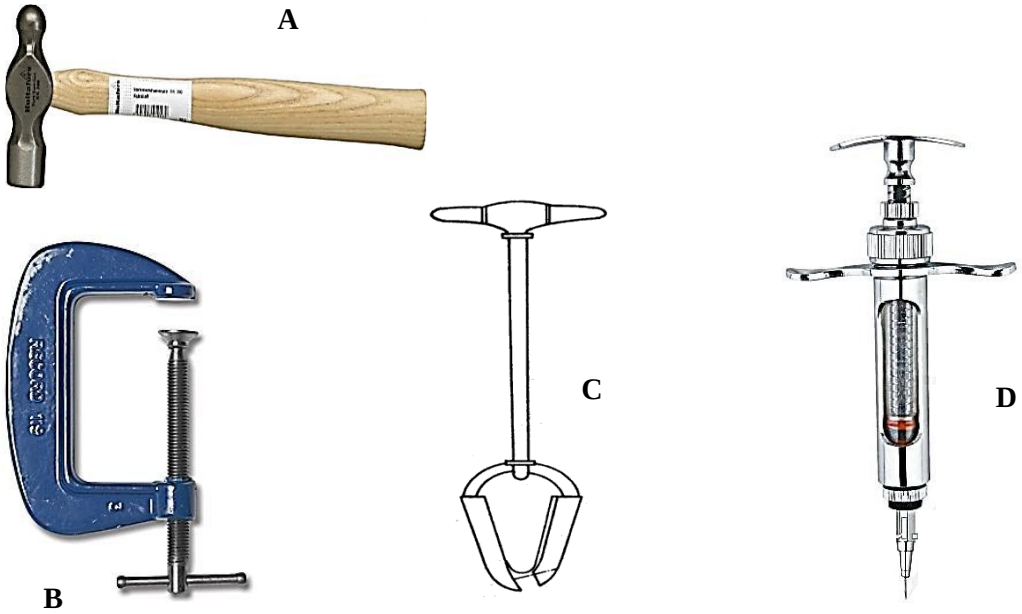
19. The diagram below illustrates some farm tools and equipment




(i) Identify the tool/equipment labeled A and B

A

…… (1mark)

B

…… (1mark)

(ii) State one appropriate use of the tool labeled C (1mark)

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(iii)Explain two maintenance practices done on tool D (2marks)

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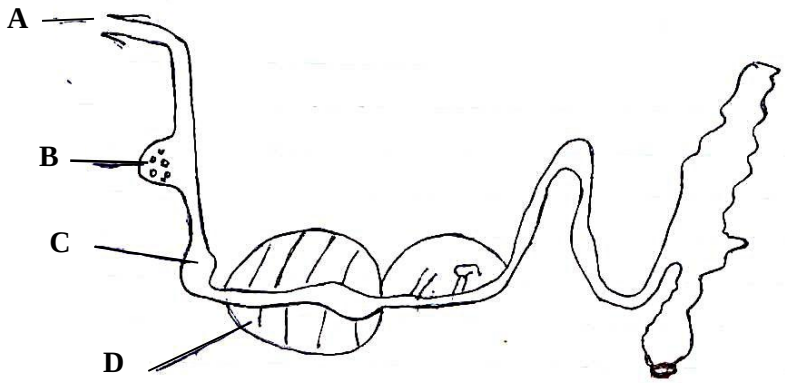
20. The diagram below shows the poultry digestive system. Use it to answer the questions that follow




a) State the function of part labeled B (1mark)

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b) Why is part C known as the true stomach (1mark)

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c) State two advantages of part labeled D to its function (2marks)

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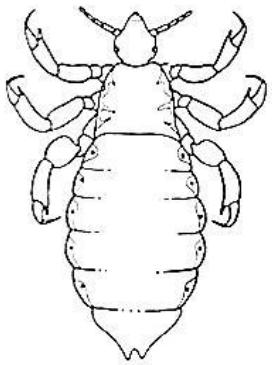
21. The diagram below indicates a livestock parasite



a) Identify the parasite (1mark)

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b) State the major harmful effects of the parasite (2marks)

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c) Explain two control measures for the parasite (2marks)

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**SECTION C**

**Answer any two questions from this section in the spaces provided**

22. Explain the factors considered when ;

a) Culling livestock (5marks)

b) Describe ten uses of a fence in the farm (10marks)

c) Describe five pre- disposing factors to livestock diseases (5marks)

23. a) Explain eight characteristics of good beef cattle (8marks)

b) Outline twelve general methods of disease control (12marks)

24. a) Describe the life-cycle of a host tick (5marks)

b) Explain ten advantages of artificial insemination (10marks)

c) Outline five advantages of Kenya top bar hive. (5marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education

**BIOLOGY**
**Paper 1**
**Time: 2 Hours**

1. Other than having many features in common, state 3 other characteristics of species (1 mark)

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2. An organism is with an exoskeleton; segmented body; two pairs of legs per segment; a pair of eyes and pair of short antennae. Which phylum does the organism belong? (1 mark)

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   ……

3. State two functions of cell sap (2 mark)

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   ……

4. Which organelle would be abundant in;

   (a) Skeletal muscles.

   ……

   ……

   (b) Palisade cells

   ……

   ……

5. (a) What is the formular for calculating linear magnification of a specimen when using a hand len (1 mark)

   ……

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   ……

   (b) Give a reason why staining is necessary when preparing specimen (1 mark)

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6. State three functions of golgi apparatus (3marks)

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7. State the functions of the following parts of a light microscope

a) Mirror (1 mark)

……

……

b) Body tube (1 mark)

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8. Explain what would happen to red blood cells if they were placed in a concentrated salt solution (2 marks)

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9. Give a reason for each of the following

a) A mature plant cell does not lose its shape even after loosing water. (1 mark)

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……

b) Xylem vessels do not collapse even when they do not contain water (1 mark)

……

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10. Outline three roles of active transport in human body (3 marks)

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11. State the importance of osmosis in plants (3 marks)

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12. Distinguish between haemolysis and plasmolysis (2 marks)

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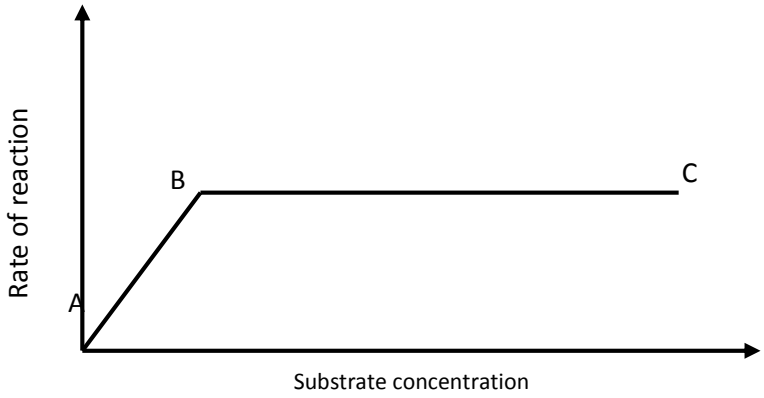
13. The graph below shows the effect of substrate concentration on the rate of enzyme reaction




Account for the shape of the graph between

a) A and B (2 marks)

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b) B and C (2 marks)

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14. a) Name one defect of circulatory system in human beings (1 mark)

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b) State three functions of blood other than transport (3 marks)

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15. State two ways in which the root hairs are adapted to their function (2 marks)

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16. State three structural differences between arteries and veins (3 marks)

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17. The number of stomata on the lower surface of two leaves from plant species A and B were counted under the field of view of a light microscope. The results were as shown below.

| Loaf | Number of stomata | |
|---|---|---|
| A | 5 | 16 |
| B | 22 | 27 |

(a) Which of the two leaves would be expected to have lower rate of transpiration (1 mark)

……

……

……

(b) Give a reason for your answer in (a) above (1 mark)

……

……

18. a) What is wilting? (1 mark)

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b) Explain how an increase in temperature affects the rate of diffusion (2 marks)

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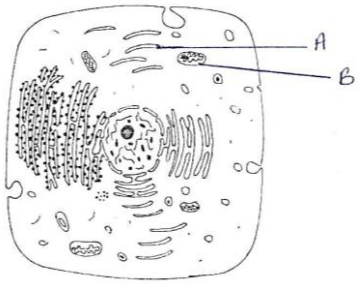
19. The diagram below represents a fine structure of a generalized animal cell as seen under an electron microscope.




a) Name the parts labeled A and B

A _____

B_____

b) How is the structure labeled B adapted to junction (2 marks)

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20. a) State three observable features found in the class mammalian only (3 marks)

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b) Name the phylum whose members possess notochord (1 mark)

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21. a) Explain how sex determine a person's energy requirements (2 marks)

……

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b) What is the role of mucus in the stomach (2 marks)

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22. A cell was magnified 100 times using a light microscope whose eye piece lens magnification was x 10. What was the magnification of the objective lens show your working. (3 marks)

23. Explain how protogyny prevents self-pollination (2 marks)

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24. A student used 1 $m^2$ quadrant to determine the population of star grass in a 10m x 20m plot. He collected the data and recorded it as shown in the table below.

| Quadrat | Population of star grass |
|---|---|
| 1 | 20 |
| 2 | 10 |
| 3 | 15 |
| 4 | 12 |
| 5 | 18 |

Using the data above, determine the total population of the star grass (3 marks)

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25. a) What causes the following diseases?

i) diabetes melitus (1 marks)

……

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ii) Diabetes inspidus (1 mark)

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b) An individual shows the symptoms of diabetes mellitus. How would you determine in the school laboratory whether they are positive for the condition (3 marks)

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26. Study the bio-chemical reactions given below and answer the questions that follow;

Glucose + glucose $\xrightarrow{I}$ water + maltose

Maltose + water $\xrightarrow{II}$ Glucose + glucose

a) i) Name the enzyme involved in the process II (1 mark)

……

……

……

ii) Name the processes I and II

I _____ (1 mark)

II _____ (1 mark)

b) Explain how the process marked II can be carried out in a laboratory. (1 mark)

……

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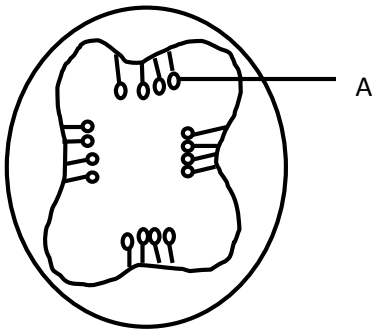
27. The diagram below represents transverse section of an ovary of a certain flower.




a) i) Name the structure labeled A (1 mark)

……

……

ii) Name the type of placentation illustrated in this diagram (1 mark)

……

……

b) Give an example of a plant whose flowers have the type of placentation named in a. (ii) above (1 mark)

……

……

28. State three functions of water in seed germination (3 marks)

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29. 5 $C_{51}H_{98}O_6$ + 145$O_2$ →102$CO_2$+ 98$H_2O$

The above equation shows an oxidation reaction of a food substance

a) What do you understand by the term respiratory quotient? (1 mark)

……

……

b) Determine the respiratory quotient of the oxidation of the food substance (1 mark)

c) Identify the food substance (1 mark)

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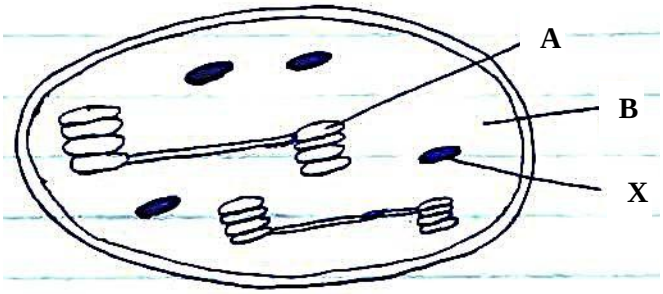
# FORM 4 OPENER EXAM

## BIOLOGY
## Paper 2
## Time: 2 Hours

**SECTION A – 40 MARKS**

1. The diagram below represents a plant cell organelle.




a) Name the organelle (1 mark)

……

……

b) In which of the labeled parts does carbon (IV) oxide fixation occur (1 mark)

……

……

c) Name the parts labeled A and B and state how each is adapted to its functions (4 marks)

A

……

……

B

……

……

d) Explain what would have happened to the structures labeled X had the plant been kept in darkness for 48 hours. (2 marks)

……

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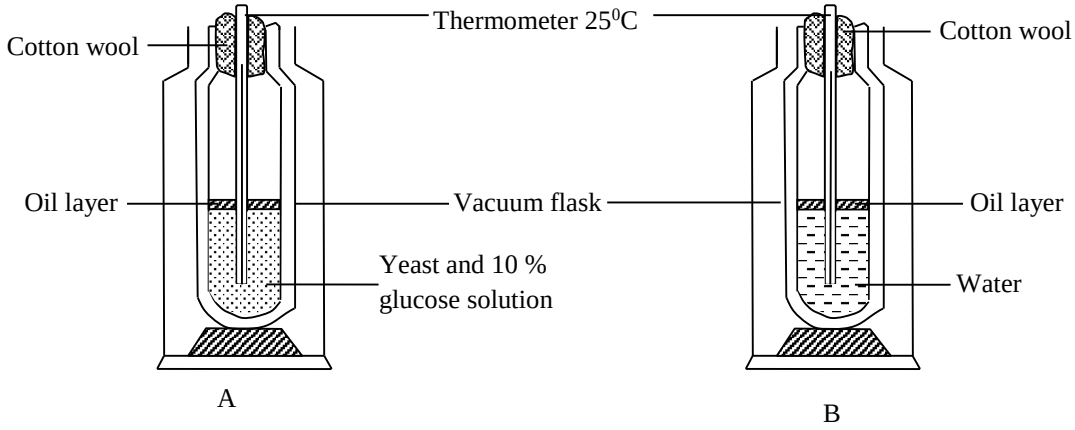
2. Two flasks were set up as shown below




What was the aim of the investigation ? (1 mark)

b) Explain the following

i) Vacuum flasks were used instead of conical flasks (1 mark)

……

……

ii) Cotton wool was used instead of a rubber cork (1 mark)

……

……

c) i) What is expected of the thermometer readings after two hours? (2 marks)

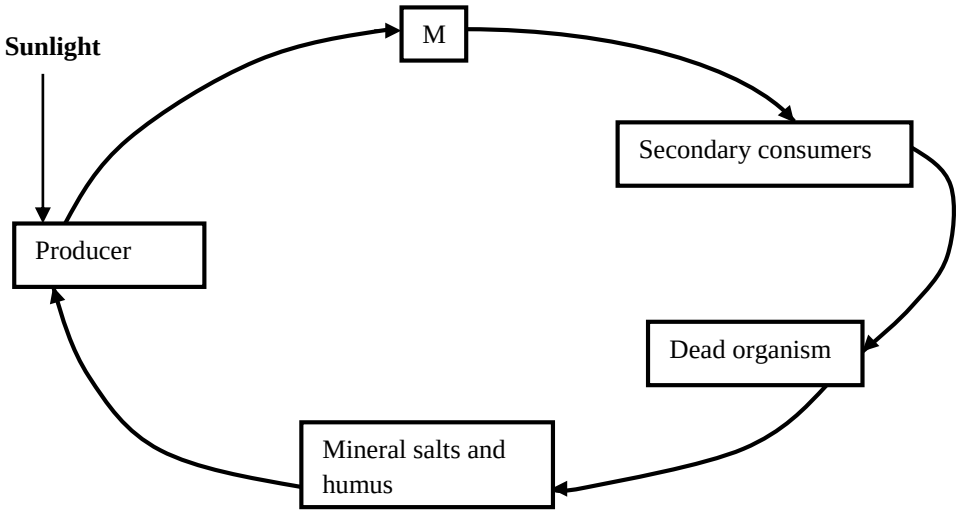
……

……

ii) Account for the expected results in thermometer A (2 marks)

d) What is the purpose of flask B? (1 mark)

The diagram below represents recycling of nutrients in a certain ecosystem.



a) Name the trophic level represented by M (1 mark)

……

……

b) Name the processes represented by I, II, III (3 marks)

……

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……

……

c) Name the organisms involved in process II (1 mark)

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……

d) What would happen within the ecosystem if all secondary consumers were eliminated (3 marks)

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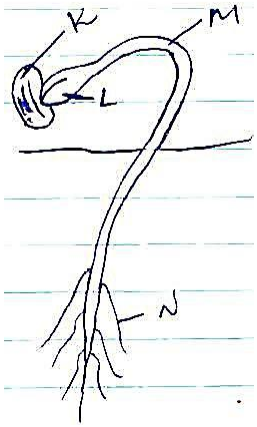
3. Below is a diagram of a germinating seed




a) Name the structures labeled K, L, and M (3 marks)

K ……

L ……

M ……

b) i) Name the type of germination (1 mark)

……

……

ii) What is the role of structure M in this type of germination. (1 mark)

……

……

iii) Describe the role of part L after germination before it withers away. (1 mark)

……

……

c) State the role of the structure labeled N (1 mark)

……

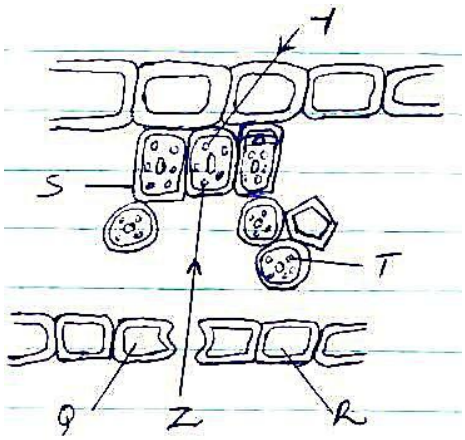
……

d) Name the type of germination exhibited by a maize seed (1 mark)

……

……

4. The diagram below shows the internal structure of a leaf.




a) Name the substances from the environment represented by arrows T and Z during photosynthesis (2 marks)

Y

……

Z

……

b) i) Name cell Q, R and S (3 marks)

Q

……

R

……

S

……

ii) State one structural difference between cells Q and R (1 mark)

……

……

c) i) Name the structure labeled T (1 mark

……

……

ii) What is the role of structure T in photosynthesis (1 mark)

……

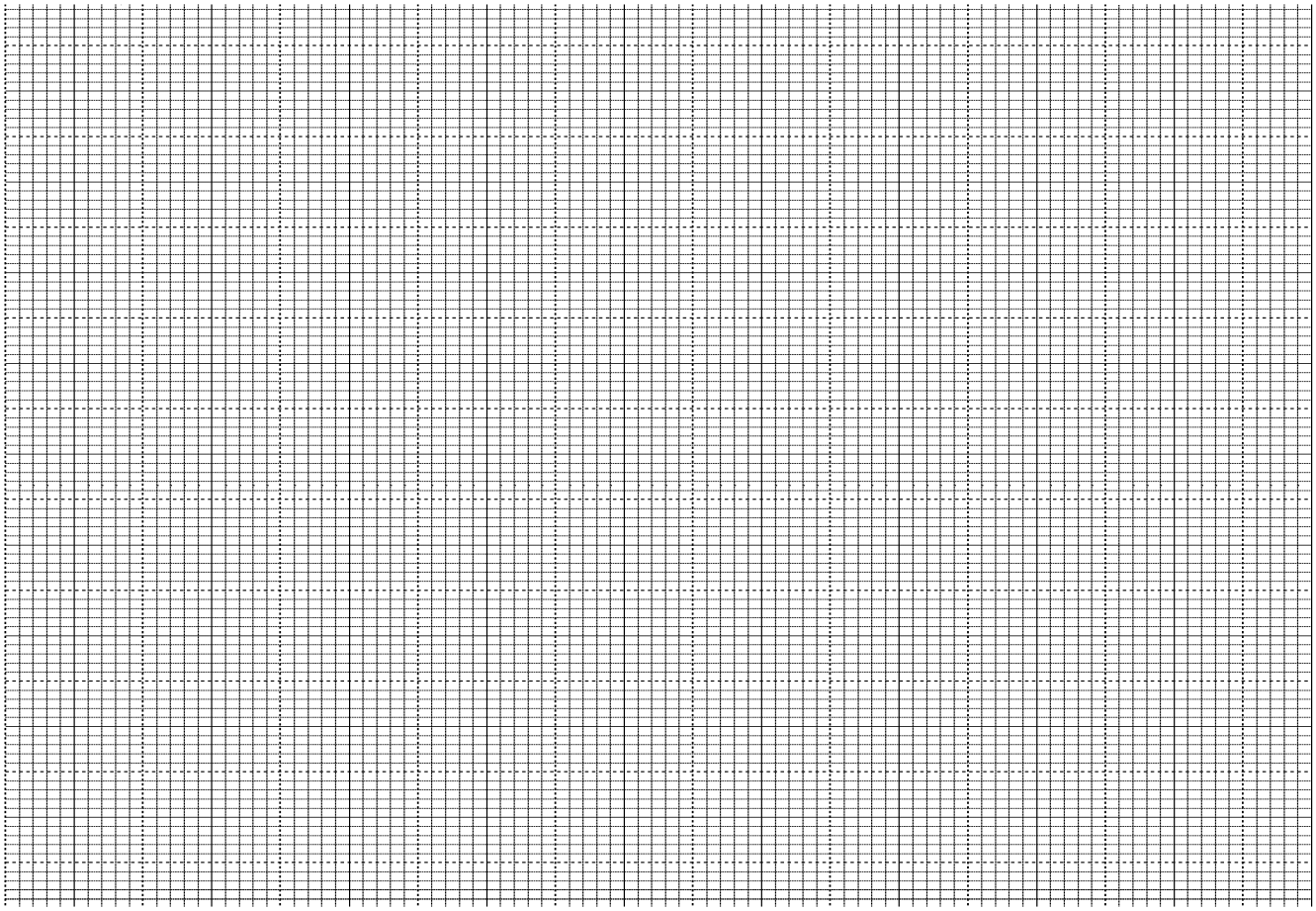
……

**SECTION B-40 MARKS**

5. Some students used a model to demonstrate the effect of sweating on human body temperature. Two boiling tubes A and B were filled with hot water. The temperature of water in tubes was taken at the start of the experiment and then at 5 minutes interval. The surface of tube A was continuously wiped with a piece of cotton wool soaked in methylated spirit. The results obtained are shown in the table below.

| **Time ( minutes)** | **Temperature (ºc) in tubes** | |
|---|---|---|
| | **A** | **B** |
| 0 | 80 | 80 |
| 5 | 54 | 67 |
| 10 | 40 | 59 |
| 15 | 29 | 52 |
| 20 | 21 | 47 |
| 25 | 18 | 40 |

a) On the same axes, plot graphs of temperature of water in the tubes against time (7 marks)



b) At what rate was water cooling in tube A (2 marks)

……

……

c) Account for the rate of cooling in tube A. (2 marks)

……

……

d) State two processes of heat loss in tube B (2 marks)

……

……

e) What would be the expected results in tube A if it was insulated? (1 mark)

……

……

f) What would the insulation be compared to in ;

i) Bird (1 mark)

……

……

ii) Mammals (1 mark)

……

……

g) Name the structure in the human body that detects;

i) External temperature changes (1 mark)

……

……

ii) Internal temperature changes (1 mark)

……

……

h) Name two physiological means of temperature regulation in humans during cold weather (2 marks)

……

……

6. State and explain how the mammalian small intestines are adapted to perform their function (20 marks)

7. How are flowers adapted to wind and insect pollination (20 marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E.)

### BUSINESS STUDIES

### PAPER 1

### TIME: 2 HOURS

1. Identify four subjects combined to have business studies (4marks)
   a) ……
   b) ……
   c) ……
   d) ……
2. Highlight four ways through which an employer can improve on the productivity of its employees (4marks)
   a) ……
   b) ……
   c) ……
   d) ……
3. Explain the meaning of the following term as used in satisfaction of human wants. (4marks)
   i) Scarcity

   ……

   ……

   ……

   ii) Opportunity cost

   ……

   ……

   ……
4. Highlight four feature of preference shares that distinguish them from ordinary shares (4marks)
   a) ……
   b) ……
   c) ……
   d) ……

5. Outline four importances of Kenyan government issuing traders with licences. (4marks)

a) ……

b) ……

c) ……

d) ……

6. Highlight four causes of shift to the left of the demand curve (4marks)

a) ……

b) ……

c) ……

d) ……

7. Give four reasons for the existence of small firms despite economies of scale enjoyed by large firms. (4marks)

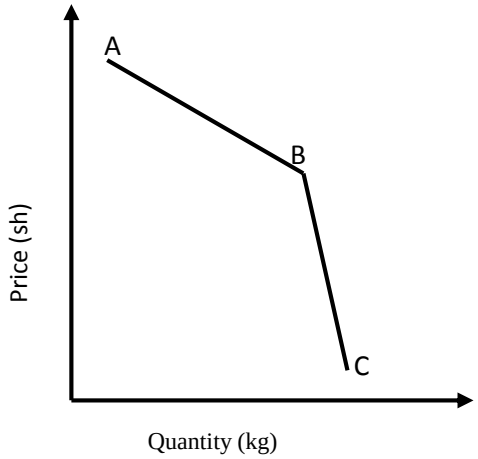
a) ……

b) ……

c) ……

d) ……

8. The diagram below shows a demand curve of a firm




(a) Identify the type of market structure in which the firm operates (1mark)

……

……

(b) What is the name of the demand curve (1mark)

……

……

**(c)** Identify two features of the market structure in which the firm operates (2marks)

……..……

……..……

……..……

9. Indicate the type of utility created by each of the following activities (4marks)

| Activity | Type of utility |
|---|---|
| a) Student obtaining a biro pen bought from school canteen | |
| b) School cook preparing lunch for students | |
| c) Students carrying water from river to school | |
| d) Farmer storing hay for use during dry season | |

10. Identify the use of the following office equipment in an office (4marks)

(i) Guillotine machine

……..……

……..……

(ii) Dictaphone

……..……

……..……

(iii)Paper shredder

……..……

……..……

(iv)Franking machine

……..……

……..……

11. Give four reasons why Boda boda (motorbikes) have become popular means of transport in rural areas (4marks)

a) ……..……

b) ……..……

c) ……..……

d) ……..……

12. Mention four barriers to affective communication (4marks)

a) ……..……

b) ……..……

c) ……..……

d) ……..……

13. List down any four expenses incurred by middlemen in the distribution of products (4marks)

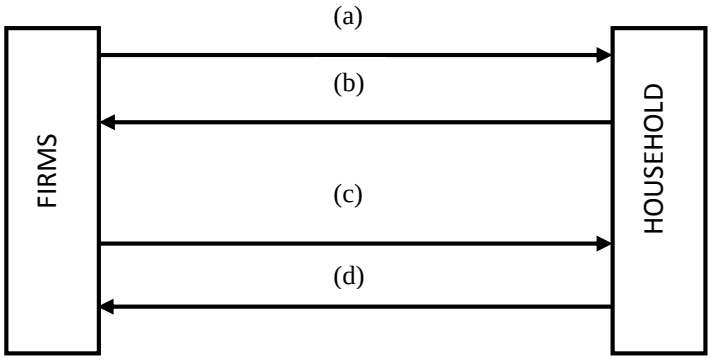
a) ……..……

b) ……..……

c) ……..……

d) ……..……

14. The diagram below shoes a simple circular flow of income in two sector economy.




Label the diagram (4marks)

a) ……..……

b) ……..……

c) ……..……

d) ……..……

15. Identify four services retailers offer to the buyers (4marks)

a) ……..……

b) ……..……

c) ……..……

d) ……..……

16. Mbithe bought a fridge from Sonko Investments whose marked price was Ksh. 40,000. She was allowed a trade discount of 10% and a cash discount of 5%. If payment is done within a month and 3% settled in two months.

How much did Mbithe pay for the fridge if she paid debt after 21 days. (4marks)

17. Give four advantages of a bonded warehouse to the government (4marks)

a) ……

b) ……

c) ……

d) ……

18. Give four types of unemployment (4marks)

a) ……

b) ……

c) ……

d) ……

19. The following was obtained from Mali Investment on 31/12/2014

| | **Kshs.** |
|---|---|
| Capital | ? |
| Stock | 40,000 |
| Building | 85,000 |
| Creditors | 22,000 |
| Net profit | 23,500 |
| Cash | 37,500 |
| Debtors | 50,000 |
| Bank overdraft | 47,000 |

Required prepare Muli investment balance sheet as at 31/12/2014. (5marks)

20. Outline four differences between insurance and gambling (4marks)

| **Insurance** | **Gambling** |
|---|---|
| i) | i) |
| ii) | ii) |
| iii) | iii) |
| iv) | iv) |

21. Name three intentions of product promotion (3marks)

a) ……

b) ……

c) ……

22. Identify four accounts showing changes in stock in ledger (4marks)

a) ……

b) ……

c) ……

d) ……

23. Study the three column cash book below for Uwezo traders and answer the questions that follow.

**DR** **CR**

| **Date** | **Details** | **Folio** | **D.A** | **Cash** | **Bank** | **Date** | **Details** | **Folio** | **D.R** | **Cash** | **Bank** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/6/15 | Balance | Bld | | 10,000 | | 1/6/2015 | Balance | Bld | | | 20,000 |
| 10/6/15 | Sales | | | | 50,000 | 15/6/15 | Mutua | | 550 | 4,950 | |
| 18/6/15 | John | | 2,000 | | 20,000 | 25/6/15 | Bank | C | | 3,000 | |
| 26/6/15 | Cash | C | | | 3,000 | | | | | | |

Explain the entries done on the following dates

(i) 1/6/15 (4marks)

……

……

(ii) 15/6/15 (2marks)

……

……

(iii) 25/6/15 (2marks)

……

……

24. Classify the following ledger accounts as either personal real, or nominal (4marks)

(a) Sales

……

……

(b) Delivery van

……

……

(c) Syombua traders

……

……

(d) Commission income

……

……

25. Give an example of parties in each classification category below (4marks)

| | Classification | Example |
|---|---|---|
| **(a)** | Capital contribution | |
| **(b)** | Liability | |
| **(c)** | Management | |
| **(d)** | Age of partners | |

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# FORM 4 OPENER EXAM

## BUSINESS STUDIES
## Paper 2
## Time: 2 Hours

1. a) Highlight five advantages of using a computer in an office (10marks)
   b) Explain any five principles of insurance (10marks)
2. a) Explain five reasons why a business plan is important as a tool for starting and managing a business (10marks)
   b) Give five differences between public company and a public corporation (10marks)
3. a) Kenya has been experiencing unemployment problem for many school leavers. Explain five causes of unemployment (10marks)
   b) Explain five benefits Kenya may get from exploiting its natural resources (10marks)
4. a) Kenya has invested heavily in the upgrading the existing pipeline from Nairobi to Mombasa. Explain five benefits of transporting petroleum by pipeline transport to our country. (10marks)
   b) Mulei had the following assets and liabilities on 1st May 2016

| | **SH** |
|---|---|
| Debtors | 12,000 |
| Creditors | 30,000 |
| Stock of goods | 25,000 |
| Bank overdraft | 15,000 |
| Premises | 260,000 |
| Cash in hand | 18,000 |
| Motor vehicles | 140,000 |
| Capital | 410,000 |

During the month, the following transaction took place

2016

May 4 received sh. 7,000 cash from debtors

May 10 sold motor vehicle for Sh. 140,000 out of which Sh. 90,000 was deposited in the bank and the balance used to buy stock of goods.

Required

Prepare a balance sheet as at 31st May 2016, (10marks)

5. a) Explain five factors to consider when choosing an appropriate media through which to advertise a product (10marks)
   b) Explain five reasons why a higher per capita income is not an indicator of better living standards (10marks)
6. a) Highlight five benefits that Kensalt, a manufacturer will get by distributing goods through wholesalers (10marks)
   b) The accounts of Latitude Traders showed the following balance on 1st January 2014.

| | SH. |
|---|---|
| Cash | 250,000 |
| Debtors | 60,000 |
| Creditors | 42,000 |
| Stock | 30,000 |
| Bank loan | 120,000 |
| Motor vehicle | 310,000 |

The following transactions took place during the month of January 2014.

Jan 2: Bought stock worth sh. 50,000 on credits

Jan 3: Cash sales sh. 80,000
Jan 5: Received sh. 20,000 cash from debtors
Jan 10: Paid part of loan shs. 70,000 cash
Jan 12: Paid creditors sh. 52,000
Jan 16: Bought office furniture sh. 45,000 cash
Jan 20: Paid salaries sh. 40,000 cash
Jan: 25: Deposited sh. 100,000 into the bank

Required:

Record the above transactions in the relevant ledger accounts and balance the accounts on 31st January 2014. (10marks)

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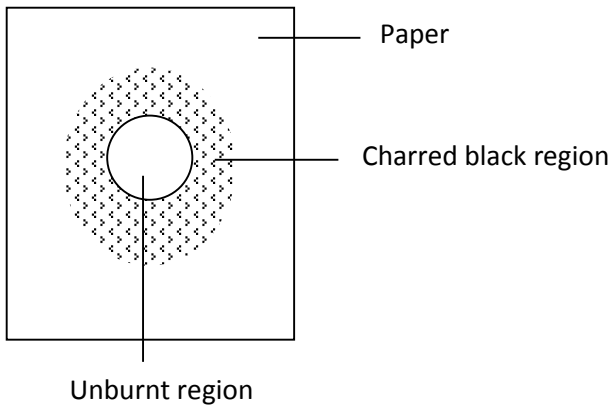
# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E)

### CHEMISTRY
### Paper 1
### Time: 2 Hours

1. The figure below shows a paper that was placed horizontally across the middle of a non-luminous flame.




a) Explain on the observation made (2 mark)

……

……

……

2. The table below shows PH values of solutions A, B, C and D.

| Solution | A | B | C | D |
|---|---|---|---|---|
| pH | 1.0 | 7.0 | 10.0 | 13.0 |

a) Which solution produces bubbles with zinc metal. Explain (2 marks)

……

……

……

b) Select any pair that would react to form a solution of PH = 7 (1 mark)

……

3. Using dot(.) and crosses (x) to represent electrons, show bounding in the compounds formed when the following elements react (Si=14, Na=11 and C1 = 17)

a) Sodium and chloride (1 mark)

b) Silicon and chlorine (1 mark)

4. Explain why the following substances conduct electric current

a) Magnesium metal (1 mark)

……

……

b) Molten magnesium chloride (1 mark)

……

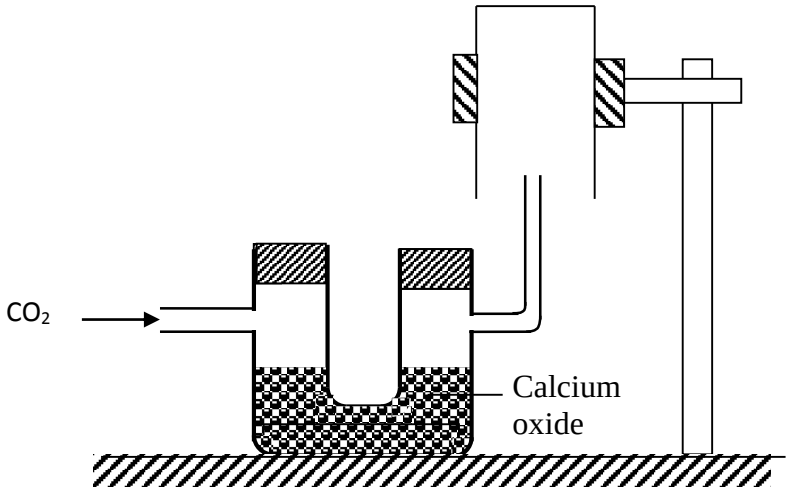
……

c) Aqeous sodium chloride (1 mark)

……

……

5. The set up below was used to collect a dry sample of a gas




Give two reasons why the set up cannot be used to collect carbon (IV) oxide. (2 marks)

……

……

……

6. A compound of carbon, hydrogen and oxygen contains 71.12% oxygen, 2.2% hydrogen and rest carbon. If it has a relative molecular mass of 90.

a) Determine the empirical formula of the compound C = 12, 0=6 H=1 (2 marks)

……

……

……

……

b) Determine the molecular formula of the compound (1 mark)

……

……

7. A mixture contains ammonium chloride, copper (ii) oxide and sodium chloride. Describe how each of the substances can be obtained from the mixture (3 marks)

……

……

……

……

8. The electronic structures for elements represented by letters A, B, C and D are

A 2.8.6; B 2.8.2; C2.8.1; D 2.8.8;

a) Select the element which forms

i) A double charged cation (½ mark)

……

……

ii) A soluble carbonate (½ mark)

……

……

b) Which element has the shortest atomic radius (1 mark)

……

……

9. a) State the Charles' law (1 mark)

……

……

……

b) A certain mass of a gas occupies 146dm$^3$ at 291K and 98.31kpa. What would be its temperature if its volume is reduced to 133dm$^3$ at 101.325kpa. (2 marks)

……

……

……

……

10. Painting, oiling, galvanizing and tin plating are methods of preventing rusting.

a) Explain the similarity of these methods in the way they prevent rusting (1 mark)

……

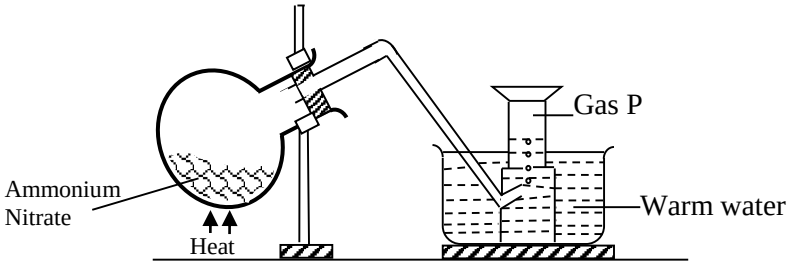
……

b) Explain why galvanized iron objects are better protected from rusting even when scratched (1 mark)

……

……

11. The set up below was used to prepare a gas P.




a) Name gas P (1 mark)

……

……

b) Write the equation for the reaction that takes place in the round bottomed flask (1mark)

……

……

c) Explain why gas P is collected over warm water (1 mark)

……

……

12. Hydrogen gas is used in the laboratory to reduce copper (II) oxide. Name any other two gases which can be used in the place of hydrogen gas (2 mark)

……

……

……

……

13. Describe how a pure sample of lead (ii) Sulphate can be prepared in the laboratory starting with lead metal (3 marks)

……

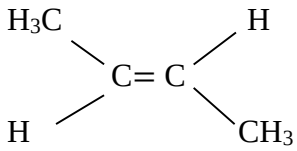
……

……

……

14. Give the systematic names of the following organic compounds.

a) i)




(½ Mark)

ii) $CH_3(CH_2)_4\ CH_3$ (½ Mark)

b) Describe a simple chemical test which can be used to distinguish the following organic compounds $C_4H_8$ and $C_5H_{12}$ (2 marks)

……

……

……

……

15. When the chlorides of Aluminium and silicon are dissolved in water, the resulting solution has a Ph of 3.0. Explain (2marks)

……

……

……

……

16. 0.84g of Aluminium reacted completely with chlorine gas. Calculate the volume of chloride gas used (molar gas volume is $24dm^3$, Al = 27) (3 marks)

……

……

……

……

17. Graphite is one of the allotropes of carbon

a) Name one other element that exhibits allotrophy (1 mark)

……

……

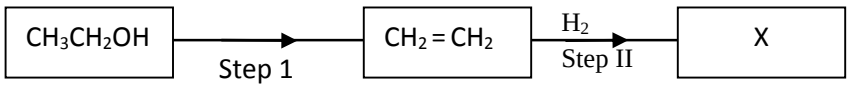
b) Explain why graphite is used as a lubricant (2 marks)

……

……

……

18. Study the flow diagram below and answer the questions that follow




a) Name the reagent used in step 1 (1 mark)

……

……

b) Name the catalyst used in step II (1mark)

……

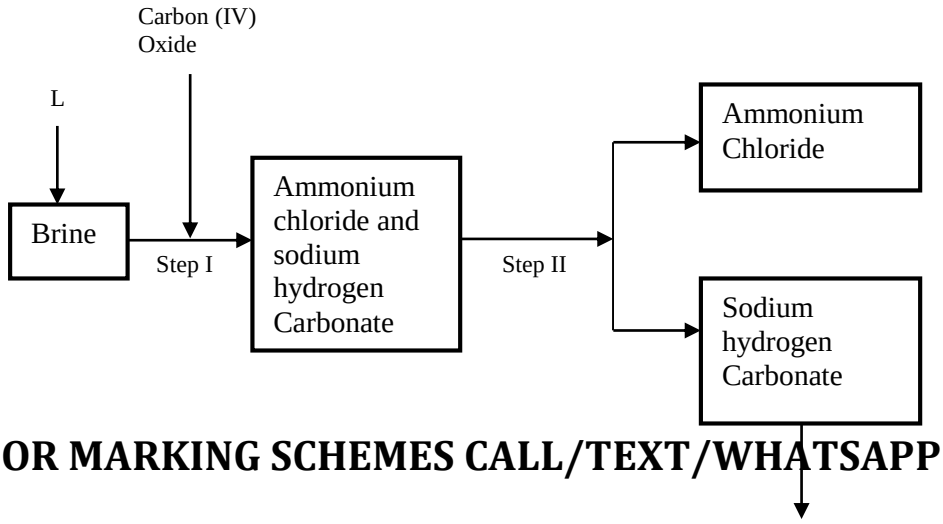
……

c) Name x (1mark)

……

……

19. The simplified flow chart shows some steps in the manufacture of sodium carbonate by Solvay process.



Step III

Sodium Carbonate

a) Identify substance L (1 mark)

……

……

b) Name the process taking place in step II (1 mark)

……

……

c) Name one use of sodium carbonate (1 mark)

……

……

20. Under certain conditions, chlorine gas reacts with sodium hydroxide to form sodium hypochlorite.

a) Name the conditions under which sodium hydroxide reacts with chlorine to form sodium hypochlorite (2 mark)

……

……

b) State one use of sodium hypochlorite (1mark)

……

……

21. Write down the property of concentrated sulphiric (vi) acid which is shown by the reactions below (3 mark)

a) $CH_3CH_2OH_{(l)} \xrightarrow{ConcH_2\ So_4} CH_2 = CH_{2(g)} + H_2O_{(l)}$

……

……

b) $NaCl_{(s)} + H_2SO_{4(l)} \rightarrow NaHSO_{4(aq)} + HCl_{(g)}$

……

……

c) $CU_{(s)} + 2H_2SO_{4(l)} \rightarrow CUSO_{4(aq)} + SO_{2(g)} + 2H_2O_{(l)}$

……

……

22. Write equations to show the effect of heat on each of the following.

a) Ammonium nitrate (1 mark)

……

……

b) Lead (II) carbonate (1 mark)

……

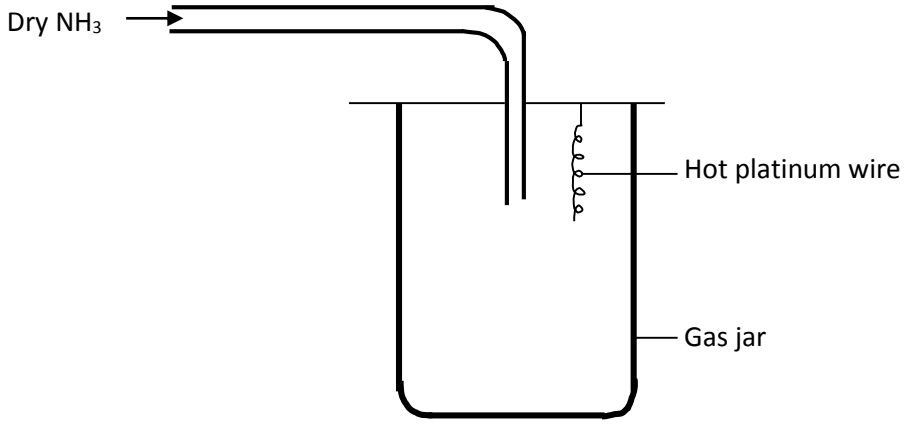
……

c) Sodium hydrogen carbonate (1 mark)

……

……

23. The apparatus below was set up to show the catalytic oxidation of ammonia. Study the diagram and answer the questions that follow;




a) Write an equation for the reaction that takes place in the gas jar (1 mark)

……

……

b) Why is it necessary to have a hot platinum wire in the gas jar (1mark)

……

……

c) After sometime brown fumes are observed in the gas jar. Explain on the observation. (1 mark)

……

……

24. 20.0cm$^3$ of a solution containing 4g per litre of sodium hydroxide was neutralized by 8.0cm$^3$ of dilute sulphiric (VI) acid. Calculate the concentration of sulphiric (VI) acid in moles per litre Na=23, 0=16 H=1 s=32 (3 marks)

……

……

……

……

25. Draw and name the structural formula of the compound formed when one mole of ethyne reacts with one mole of chlorine gas (2 mark)

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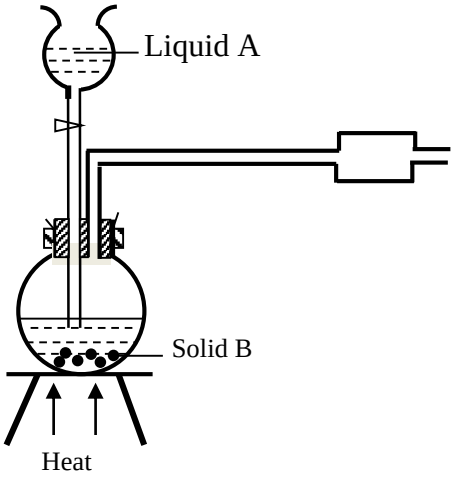
26. The diagram below shows an incomplete set up for the laboratory preparation and collection of sulphur (IV) oxide gas. Study it and answer the questions that follow.




a) Complete the set up to show how dry sulphur (IV) oxide gas may be collected (2 mark)

b) Name

i) Liquid A (½ mark)

……

ii) Solid B (½ mark)

……

27. a) i) State the Gay Lussac's law (1 mark)

ii) 10cm$^3$ of a gaseous hydrocarbon, $C_2H_x$ required 30cm$^3$ of oxygen for complete combustion. If steam and 20cm$^3$ of carbon (IV) oxide were produced, what is the value of X (2 marks)

……

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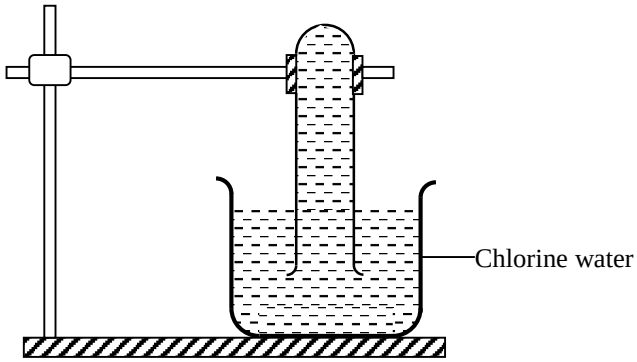
……

……

28. In an experiment a test tube full of chlorine water was inverted in chlorine water as shown in the diagram below and then the set up left in the sunlight for one day.




After one day, a gas was found to have collected in the test tube

a) Identify the gas (1 mark)

……

……

b) What will happen to the pH of the solution in the beaker after one day? Give a reason (2 mark)

29. When a solid sample of sulphur is heated in a testtube, it changes into a liquid which flows easily; on further heating the liquid darkens and does not flow easily. Explain these observations. (2 mark)

……

……

……

……

30. State and explain what would happen if a dry paper was dropped in a gas jar full of chlorine (2 mark)

……

……

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E)

**CHEMISTRY**
Paper 2
(THEORY)
**TIME: 2 HOURS**

1. The grid is part of the periodic table. The letters are not the actual symbols of the element. Use the information to answer the questions that follow.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| P | | | | | | | Y | |
| | K | | Q | | | T | | |
| | | | | | | | W | |
| R | | | | | | | | S |

a) Which one is the most reactive

i) Metal? Explain (1½ marks)

……

……

……

ii) Non- metal? Explain (1½ marks)

……

……

……

b) Name the family to which K belongs (1mark)

……

c) Identify a monoatomic element (1 mark)

……

……

……

d) Write the formula of the compound formed when Q and W react (1 mark)

……

……

e) Compare the atomic radius of K and T (2 marks)

……

……

……

f) The mass number of J is 31, its number of neutrons is 16. Place J in periodic table above (1mark)

……

……

……

g) Element K reacts with water at room temperature to produce 0.2 $dm^3$ of gas.
Determine the mass of K which reacted with water (molar gas volume at RTP = 24 $dm^3$; R.A.M of K = 12) Use the equation below (2marks)
$K_{(s)} + 2H_2O \rightarrow K(OH)_{2(cos)} + H_{2(g)}$

……

……

……

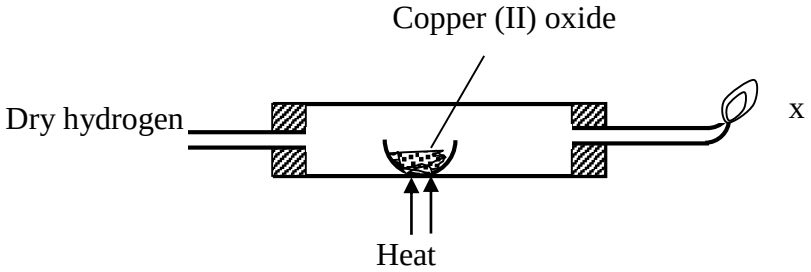
h) Use dots(.) and crosses (x) to represent the outermost electrons and show the bonding in the compound formed between K and T. (2marks)

……

……

……

2. (a) Study the set-up below and answer the questions that follow




i) State the property of hydrogen being investigated by passing the gas over heated copper (II) oxide. (1mark)

……

……

ii) State two observations made in the combustion tube (2 marks)

……

……

iii) Write a balanced equation for the reaction that occurs when hydrogen burns at point x (1mark)

……

……

(b) In the laboratory preparation of hydrogen, zinc metal is reacted with dilute hydrochloric acid to generate hydrogen. State the reason why no hydrogen gas would be generated if;

i) dilute nitric (v) acid is used in place of dilute hydrochloric acid (1 mark)

……

……

……

ii) copper metal is used in place of zinc metal (1 mark)

……

……

c) Give the main reason why helium has replaced hydrogen in filling observation balloons. (1mark)

……

……

……

d) Give a reason why phosphorous is stored in water (1 mark)

……

……

……

e) Draw a dot (.) and cross (x) diagram to illustrate bonding in a water molecule (1 mark)

f) Describe one chemical test and one physical test for water

i) chemical test (1 mark)

……

……

……

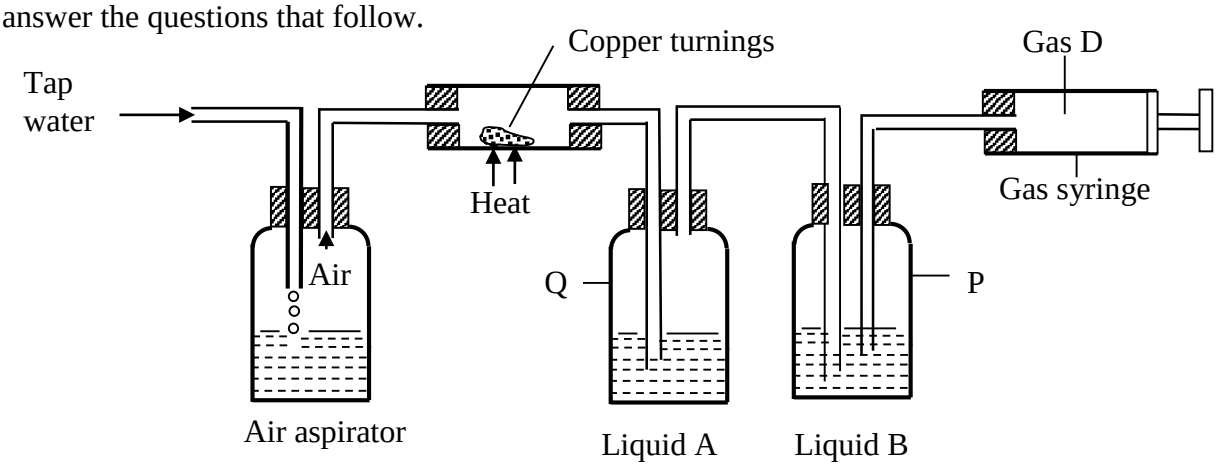
ii) physical test (1 mark)

……

……

……

3. The diagram below represents a set up that was used to isolate dry nitrogen from the air. Study it and answer the questions that follow.




Name liquid A and B (2marks)

i) A

……

……

ii) B

……

……

b) Identify one mistake in the apparatus set up (1 mark)

……

……

c) State the purpose of

i) Aspirator

……

……

ii) liquid A

……

……

iii) liquid B

……

……

iv) copper turnings

……

……

d) Write an equation for the reaction taking place in the combustion tube. (1 mark)

……

……

e) The gas D in the syringe was emptied into a gas jar when a burning magnesium was lowered into the gas jar, a white solid was formed.

i) Name the white solid (1 mark)

……

……

……

ii) Write chemical equation for the formation of the white solid (1 mark)

……

……

f) State the test for the following gases

i) Ammonia gas (1 mark)

……

……

……

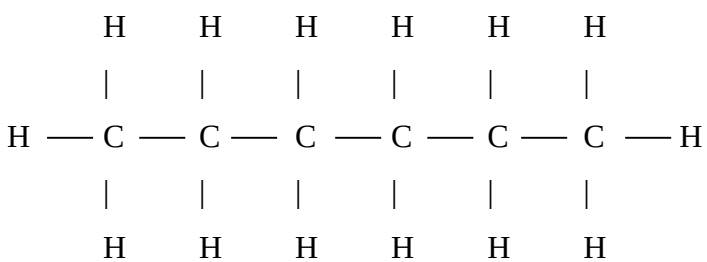
ii) Nitrogen (II) oxide (1 mark)

……

……

……

4. Below is a structure of a molecule of one hydrocarbon



i) What is the molecular formula of this molecule (1 mark)

……

……

ii) To what homologous series doe the molecule belong (1 mark)

……

……

iii) The formula of another hydrocarbon is $C_4H_{10}$. Write a balanced equation for the compete combustion of this molecule. (1 mark)

……

……

iv) The molecule below is ethane

```
H       H
|       |
C  ≡    C
|       |
H       H
```

b. i) Give a reason why the molecule above is described as unsaturated. (1 mark)

……

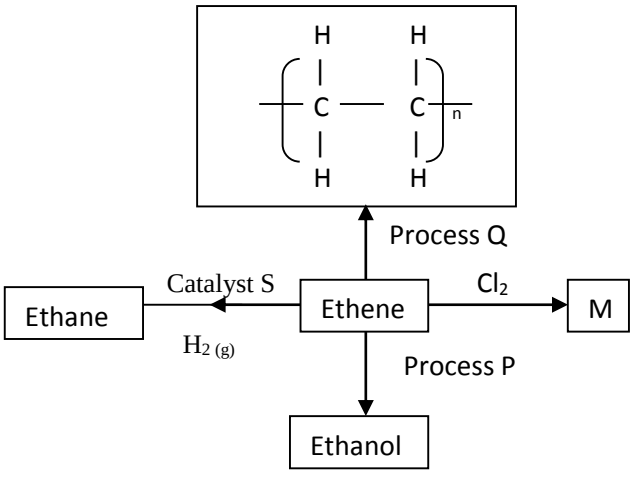
……

ii) State the observation made when bromine water is shaken with ethane. (1 mark)

……

……

c. Study the flow chart below and answer the question that follow. (1 mark)




a) Identify the processes (2marks)

i) P

……

……

ii) Q

……

……

b) Identify substances (2marks)

i) Catalyst S

……

……

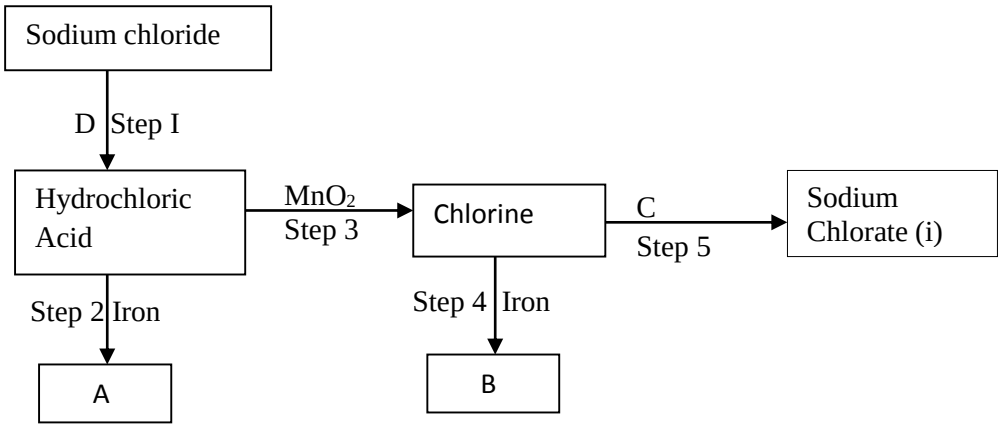
ii) M

……

……

iii) Name the type of reaction which forms substances M (1 mark

5. a) Below is a scheme of reaction sequence starting with sodium chloride. Study it and answer the questions that follow.




i) Identify substances (4 mark)

A C

…… ……

B D

…… ……

ii) Write a balanced equation for the reaction represented by step 4. (1 mark)

……

……

iii) State the role of manganese (iv) oxide in step 3 (1 mark)

……

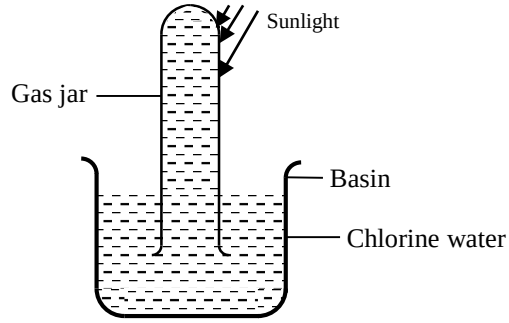
……

b) Briefly described how a mixture of iodine, sodium chloride and lead (ii) Sulphate could be separated (3 marks)

……

……

c) The set up below as used to investigate the effect of sunlight on chlorine water




State two observations made after two hours. (2 marks)

6. The table below gives some properties of three salts D, E and F.

| Salt | D | E | F |
|---|---|---|---|
| Solubility | Insoluble | Soluble | Soluble |
| Effect of heat | Decomposes forming white residue G and colourless gas H. Gas H forms a white precipitate with lime water. | Decomposes to form a yellow residue and two gases B and J .Gas B is red brown , gas J is colourless. | Dissociates into two gases KandL. Gas K turns moist red litmus paper blue. Gas K and L readily recombines to form dense white fumes of salt F |

Further tests showed that when residue G was reacted with water and the product heated with salt F; Gas K was evolved. When D reacted with Nitric (V) acid, there was an effervesce. The resulting solution formed a white precipitate with dilute Sulphuric (VI) acid, but not with hydrochloric acid

a) i) Identify

i) Gas H (½ mark)

……

……

ii) Gas B (½ mark)

……

……

iii) Salt D (½ mark)

……

……

iv) Salt F (½ mark)

……

……

ii) Write an equation for the thermal decomposition of salt D. (1 mark)

……

……

iii) Name the compound formed when residue G is reacted with water. (1 mark)

……

……

iv) A solution of salt E reacted with an aqueous solution of gas L forming a white precipitate that dissolved when warmed.

a) Write an ionic equation for the formation of the white precipitate (1 mark)

……

……

b) Write formulae of the ions that are present in salt E (1 mark)

……

……

v) Explain what would be observed if sodium hydroxide solution was added to a solution of E dropwise till in excess (1 mark)

……

……

b) In preparation of Magnesium Carbonate Magnesium was burnt in air and the product collected. Dilute hydrochloric acid was then added and the mixture filtered. Sodium carbonate was added to the filtrate and contents filtered. The residue was washed and dried to give a white powder.

i) Name the product X (1 mark)

……

……

ii) Write a chemical equation for the formation of the product X. (1 mark)

……

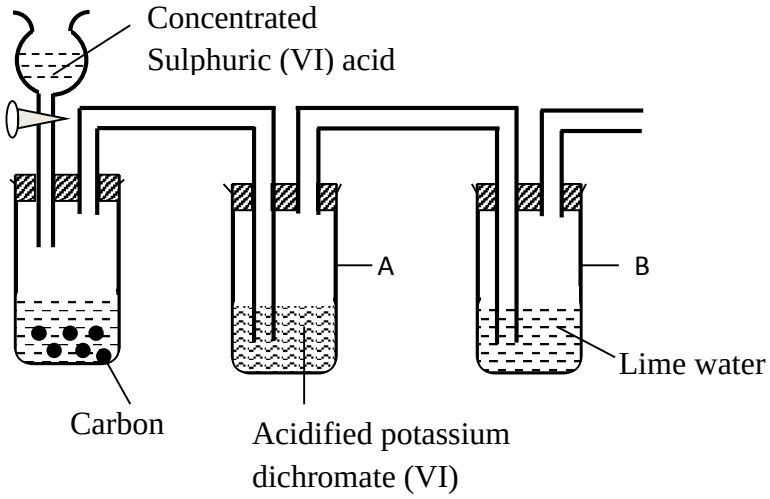
……

iii) Name the filtrate collected after sodium carbonate was added. (1 mark)

……

……

7. a) Study the set up below and answer the questions that follow.




i) State the role of concentrated Sulphuric (VI) acid in this reaction (1 mark)

……

……

ii) State the observation made in boiling tube (2 marks)

A

……

……

B

……

……

b) When concentrated Sulphuric (VI) acid is added to sugar a black solid is formed. State the property of concentrated Sulphuric (VI) acid demonstrated by the reaction. (1 mark)

……

……

c) Sulphur (IV) oxide gas was bubbled in water then a few drops of barium chloride were added immediately.

i) State the observation that was made. (1 mark)

……

……

ii) Write an ionic equation for the reaction that occurred on addiction of barium chloride (1 mark)

……

……

d) i) State the reason why sulphur (IV) oxide and air are passed through cleaners in the contact process. (1 mark)

……

……

ii) State one catalyst used in the manufacture of Sulphuric (VI) acid (1 mark)

……

……

e) Define the term allotropy (1 mark)

……

……

f) State the test for hydrogen Sulphide (1 mark)

……

……

g) A concentrated Sulphuric (VI) acid has a concentration of 18.2m. Determine the volume of the concentrated acid that would be mixed with distilled water to make one litre of 2m Sulphuric (VI) acid.

……

……

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# FORM 4 OPENER EXAM

**451/1**
**COMPUTER STUDIES**
**PAPER 1**
**(THEORY**

**SECTION A (40 Marks)**

**1.** Name four mouse clicking techniques. (2marks)

i) ……

ii) ……

iii) ……

iv) ……

2. a) List three factors to consider when deciding on the choice of an electronic data processing method. (3marks)

i) ……

ii) ……

iii) ……

b) Identify three types of computer files. (3marks)

i) ……

ii) ……

iii) ……

3. What is mail merging as used in word processing. (1mark)

……

……

……

4. Name three parts of a task bar and state their role. (3marks)

i) ……

ii) ……

iii) ……

5. Differentiate between insert mode and type over mode. (2marks)

……

……

……

6. a) What is program documentation? (1mark)

……

……

……

b) Name two types of documentation. (2marks)

i) ……

ii) ……

7. State the purpose of the following field properties as used in database. (3marks)

a) Field size

……

……

……

b) Indexed

……

……

……

c) Default value.

……

……

……

8. What is computational error? Give an example. (2marks)

……

……

……

9. a) What is the meaning of the term online processing. (1marks)

……

……

……

b) Name two applications of online processing. (1mark)

i) ……

ii) ……

c) In which situation would online processing be referred over real time processing? (1mark)

……

……

……

10. Identify three types of computer bus. (3marks)

i) ……

ii) ……

iii) ……

11. Distinguish between downloading and uploading. (2marks)

……

……

……

12. Name three functions of database management software. (3marks)

i) ……

ii) ……

iii) ……

13. a) Define line spacing as used in ms- word? (1mark)

……

……

……

b) Identify any two types of line spacing in ms-word (1mark)

i) ……

ii) ……

14. Write the following acronyms in full. (3marks)

i) WYSIWYG

……

……

ii) BCD

……

……

iii) CMOS

……

……

15. a) Name two advantages of using a laptop over desktop. (1mark)

i) ……

ii) ……

b) State two types of system units. (1mark)

i) ……

ii) ……

**SECTION B (60 MARKS)**

*Answer question **16** (compulsory) and any other **three** questions from this section in the space provided.*

16. Mungano Wote Society (MWS) pays 5% interest on shares exceeding 100,000 shillings and 3% on shares that do not meet this target. However no interest is paid on deposit in the member's MWS bank account.

a) Write a pseudo code that prompts the user for shares and deposit of a particular member, calculate the interest and saving and displays the output on the screen. (6marks)

……

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b) Draw a flowchart to implement the above pseudo code. (4marks)

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……

c) Name four examples of Third generation languages. (2marks)

i) ……

ii) ……

iii) ……

iv) ……

d) Define the following terms as used in programming

i) Source code (1mark)

……

ii) Language translator (1mark)

……

iii) Programming (1mark)

……

17. a) What does the term information system mean. (2marks)

……

……

b) Outline any three roles of a system analyst (3marks)

i) ……

ii) ……

iii) ……

c) Describe the following types of feasibility study

i) Schedule (2marks)

……

……

ii) Economic (2marks)

……

……

iii) Operational (2marks)

……

……

d) Explain any two types of changeover (4marks)

i)

……

……

……

ii)

……

……

……

18. Define the term formatting as used in word processing (1mark)

……

……

b) State and explain any three types of formatting features giving examples. (6marks)

i) ……

ii) ……

iii) ……

**c) Explain** three problems which may be encountered during printing (6marks)

i) ……

ii) ……

iii) ……

d) Give four types of search options in word processing. (2marks)

i) ……

ii) ……

iii) ……

iv)…….

19. Explain the three types of operating system using a block diagram (10marks)

b) What does the term hardware mean? (1 mark)

……

……

……

c) State four categories of hardware (2 marks)

i) …….

ii) …….

iii) …….

iv) …….

d) Mention two purpose of portioning a disk. (2 marks)

i) …….

ii) …….

20. a) State two reasons for using binary number system in computer. (2 marks)

i) …….

ii) …….

b) One of the coding schemes used in computing is binary coded decimal, name other two (1mark)

i) …….

ii) …….

c) Using two complements compute $20_{10}$ - $25_{10}$ using 8 bits (4marks)

d) Compute value of X in the following expression

i) $10101100.1110_2=X_{16}$ (4marks)

ii) $CAB_{16}=X_2$ (2marks)

iii) $2010_{16}=x_8$ (2marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education

### COMPUTER
### PAPER 2
### (PRACTICAL)
### TIME: 2½ HOURS

1. a) Type and format the following document as it appears using a Word processor. Save it as TELE1 (40marks)

**TELE AND VIDEO CONFERENCING**

The advent of the information and communications technology has brought with it several advantages that need to be made use of by both the public and private sector. Not only are those technologies convenient but some are also cost effective.

Even though most of the communications technologies are currently widely in use -Mobile telephones and internet -one area that needs seriously to be explored and utilized by both government institutions and private sector is tele and video conferencing.

*Government and private sector need to take advantage of the facilities offered by tele and video conferencing*

During the February 1 launch of the ' Just Like Home' seamless network by the region's three main mobile phone providers, Safaricom, MTN Uganda and Vodacom Tanzania, the celebration were held in the three Different countries at different times of the same day.

Nothing wrong with that only that the chief Executive of the three firms were meant to be present at all the functions. I say 'Were meant to' because I only attended the Nairobi launch.

After the Kenya launch, held at Nairobi's Serena hotel over breakfast from 7am, the three CEO's, (Safaricom's Bob Collymore, MTN's Noel Meier and Vodacom Tanzania's Romeo Kumalo) were to proceed to the other two launches. These were first the Tanzania launch at lunch time and finally, the Uganda dinner launch in kampala

Imagine all the travelling involved and the resultant fatigue for the three firms, Plus others who were part of the retinue.

Even though one would. Argue that the travelling to all three countries

Was necessary as there were pape5rs to be signed, Reliable sources tell me that a formal exercise. Everything else, including the paper work and Memoranda of cunderstanding had already been signed.

The second instance when holding a video conferencing would have been more ideal was recently when Ethiopia's premier Meles Zenawi made a few hours visit to Nairobi to discuss the Somalia crisis with the former president Kibaki.

b) Insert the following formula which is used to compute the percentage growth of a particular mobile phone provider in a region (4marks)

$$V(x) \leq \left[ K + \sum_{j=1}^{n} cue^{-Auj} + V(x+u) \right]$$

c) The following table shows the percentage growth of the three mobile phone providers in two periods of six months in the year 2011,2012 and 2013. Include it exactly as it is formatted in the passage just below the formula. Create a formula to calculate the total percentage growth over the three years for each period. (5marks)

| Years | Safaricom | | MTN | | Vodacom | |
|---|---|---|---|---|---|---|
| | Period 1 | Period2 | Period 1 | Period 2 | Period 1 | Period 2 |
| 2011 | 10 | 7 | 12 | 6 | 5 | 8 |
| 2012 | 20 | 9 | 20 | 3 | 28 | 67 |
| 2013 | 10 | 9 | 7 | 39 | 17 | 1 |
| TOTALS | | | | | | |

d) Print **TELE1.** (1marks)

2. a) i) Create a Worksheet with the following entries and save the workbook as **NOMA**. (12marks)

| **OMBAHEKIMA ACADEMY** | | | | |
|---|---|---|---|---|
| FORM THREE END EXAM MARKS | | | | |
| STUDENT NAME | ENGLISH | KISWAHILI | MATHEMATICS | HISTORY |
| Ayuku Aseka | 70 | 60 | 40 | 50 |
| Irungu Wambua | 50 | 70 | 60 | 40 |
| Khalifa Mudigo | 80 | 40 | 50 | 60 |
| Nosieta Soita | 30 | 75 | 60 | 50 |
| Onyango Otieno | 40 | 55 | 70 | 60 |

ii) Adjust column width where necessary to display all entries in details. Validate the cells to accept ONLY numerals between 0-100 and return a comment **"please enter a number between 0 and 100"** Whenever an out of range error occurs. (3marks

iii) Rename sheet 1 as MARKS1. (2marks

b) Obtain the following:

i) Total score for each student (2marks)

ii) Mean score for each student (2marks)

iii) Highest score per subject (2marks)

iv) Standard deviation per subject (2marks)

v) Rank for each student (3marks)

vi) Grade the students using the grade for each student based on the following information. (4marks)

| MEAN | |
|---|---|
| GRADE | |
| 75-100 | A |
| 60-74 | B |
| 50-65 | C |
| 35-49 | D |
| 0-34 | E |

b) Copy contents of Sheet 1 to sheet 2 and rename it as MARKS2. (2marks)

c) Insert a new row for Chege Kisilu between Ayuku Aseka and Irungu Wambua. Enter his scores as 60, 50, 80, and 20. (3marks)

d) Copy contents of sheet 1 to sheet2 and rename it as MARKS3. Format the ranges with value for mean score and standard deviation to display results to 3 decimal places. (4marks)

e) Generate a graph to compare Mathematics performance and save it in a new sheet as MATHSG.5marks

F) Print MARKS 1, MARKS2, MARKS3 and MATHSG. (4marks)

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# FORM 4 OPENER EXAM

## CHRISTIAN RELIGIOUS EDUCATION
## PAPER 1
## TIME: 2 ½ HOURS

1. (a) Identify eight works of creation as distributed in the six days of creation in the first creation account, according to Gen 1:1-24a (8 marks)
   (b) Explain God's plan of salvation after the fall of man. (6 marks)
   (c) State six ways in which man continues to be a co-creator with God. (6 marks)

2. (a) Outline eight reasons why God called Abraham. (8 marks)
   (b) Explain how Abraham demonstrated his faith in God after his call. (6 marks)
   (c) Identify the importance of modern day covenants. (6 marks)

3. (a) Identify the role played by king Jeroboam in the spread of idol worship in the northern kingdom. (7 marks)
   (b) Outline six evidences that show that Elijah was a true prophet of God. (6 marks)
   (c) State seven lessons that Christians learn about God from Elijah's ministry in Israel. (7 marks)

4. (a) State five ways in which the prophets in the Old Testament received their revelations. (5 marks)
   (b) Explain Amos teaching on remnant and restoration as recorded in Amos 9:8-15 (7 marks)
   (c) Explain eight ways in which the church in Kenya is fighting against social evils. (8 marks)

5. (a) Explain four final reforms carried out by Nehemiah after the completion of the wall of Jerusalem. (8 marks)
   (b) Outline six promises that Israelites made during the renewal of the covenant under Nehemiah's leadership. (6 marks)
   (c) State six lessons that Christian learn from the renewal of the covenant under Nehemiah's leadership. (6 marks)

6. (a) Identify the traditional African ways of worshipping God. (6 marks)
   (b) Give the importance of kinship system in the traditional African society. (8 marks)
   (c) Identify six factors that undermine the roles of elders in Kenya today. (6 marks)

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# FORM 4 OPENER EXAM

**313/2**
**CHRISTIAN RELIGIOUS EDUCATION**
**PAPER 2**
**TIME: 2 ½ HOURS**

1. (a) From the life and ministry of Jesus outline seven ways in which Jesus qualifies to be the 'man of sorrow' as foretold by prophet Isaiah. (7 marks)

   (b) Outline what the angel said about John to Zachariah during the annunciation of John's birth. (7 marks)

   (c) Identify six lessons that Christian parents learn from the dedication of Jesus. (6 marks)

2. (a) Explain four reasons why Jesus faced opposition from the Pharisees in the Galilee (Lk 5:12-6:11) (8 marks)

   (b) Identify six lessons about Jesus from the healing of the paralytic man in the Lk 5:17-26 (6 marks)

   (c) Give reasons why Christians should forgive. (6 marks)

3. (a) Describe the healing of the crippled woman in Lk 13:10-17 (7 marks)

   (b) Explain four teachings about the kingdom of God from the parable of mustard seed. (8 marks)

   (c) Show five ways in which Christians are preparing for the Parousia (5 marks)

4. (a) Describe the preparation that Jesus made for the Lords Supper. (6 marks)

   (b) Give reasons why Judas Iscariot betrayed Jesus. (7 marks)

   (c) Outline seven reasons why Christians take part in the Eucharist. (7 marks)

5. (a) Give reasons why Jesus sent the Holy Spirit to the disciples after his ascension (6 marks)

   (b) Outline the events that took place on the day of Pentecost (Acts 2:1-42) (8 marks)

   (c) Write down six activities of the church in Kenya that show that the Holy Spirit is working among Christian. (6 marks

6. (a) In what ways are the people of God described according to 1st Peter 2:9-10 (7 marks)

   (b) State the characteristics of love according to 1st Corinthians 13:4-8 (8 marks)

   (c) What are the causes of split in the churches in Kenya today. (5 marks

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# FORM 4 OPENER EXAM

# Kenya Certificate of Secondary Education

**ENGLISH**
**PAPER 1**
**(FUNCTION SKILLS)**
**2 HOURS**

1. **FUCTIONAL WRITING -20MKS**

You are the manager in Fresha Fruits Company. You sadly learn that one of the employees in your company has passed on in a fatal accident.

a) Write a memo to inform all the other employees of the news and remind them to contribute funds towards giving the deceased a good send off. (12marks)

b) Write a condolence note to the spouse of the deceased. (8marks)

**CLOZE TEST**

**Read the passage below and fill in each blank space with an appropriate word. (10marks)**

Our education sector faces a myriad of challenges. In the recent past, the sector has been in the 1.....……. for all the wrong reasons ranging from the 2……..…… strike, a wave of arsons in schools and a 3…….…… national examinations leakage. So where is education sector 4…….? What is the government doing to make things right?

The recent 5……..…… of national examinations has been a damning indictment 6…….. the larger education system and our national value system. It is a 7…….…….. to the nation. The menace is so persuasive that scores of 8…… believe they cannot pass exam without 9…… The question is, how do learners embrace 10…….. values when leaders practice dishonesty, deceit, corruption and theft of public resources?

***( Extract from daily Nation, 14th November, 2015)***

3. **ORAL SKILLS 30mks**

**A) Read the poem below and answer the questions below correctly.**

**THE FIRST SIGHT**

Lambs learn to walk ion snow
When their bleating clouds the air
Mainly stumbling to and fro
All they find outside the fold
Is a wretched width of cold.

***(By Phillip Larkin; Faber and faber)***

i) Describe the rhyme scheme in the poem. (2marks)

……
……
……

ii) Identify and illustrate one other sound pattern in the poem. (2marks)

……
……
……

iii) State and explain any two non-verbal cues you would use when reciting this poem. (2marks)

……
……
……

iv) Give another word that is pronounced the same as each word below. (3marks)

All

……

MeeT

……

Wretched.

……

**3. b)**

**1.** Your school is undertaking a benchmarking trip to another school. The principal of the host school decides to address all the students in a common assembly before classes begin.

i) What would you do to ensure that you listen effectively to the principal's speech? (4marks)

……
……
……
……
……
……

ii) State three factors that would hinder you from listening to that speech effectively. (3marks)

……
……
……

**3. c)** i) State what kind of intonation you would use in the following sentences. (3marks)

1. When were you born?

……

2. Did you complete your homework?

……

3. What a beautiful car you have bought?

……

ii) Give the meaning of the sentence when emphasis is on the underlined word. (3marks)

1. Jane washes her car only on <u>Sunday</u>.

……

2. Jane washes her car <u>only</u> on Sunday.

……

3. Jane <u>washes</u> her car only on Sunday.

……

**3. d)**

**i)** Your mother is a good story teller. She likes to tell different folk tales. On one occasion, she narrated the story of the hare, the antelope and rhinoceros. But you felt this time she did not perfect her narration. What aspects of performance do you think were lacking? (3marks)

……
……
……

ii) Imagine you are the secretary Kitaingo Breakdown services. Your boss is out.. A certain man calls to speak to him. Here is part of the conversation that takes place between you and the caller. Complete it. (5marks)

Secretary: Kitaingo Breakdown services. How may I help you?

Caller:……

…… (1mark)

Secretary Oh! Mr. Mason, I am sorry he's not in.

Caller:……

…… (1mark)

Secretary: He's attending a seminar.

Caller:……

…… (1mark)

Secretary: Two days, sir

Caller:……

…… (1mark)

Secretary: I'll definitely tell him you need to see him the soonest possible.

Caller:……

…… (1mark)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E)

### GEOGRAPHY
### Paper 1
### Time: 2 ¾ Hours

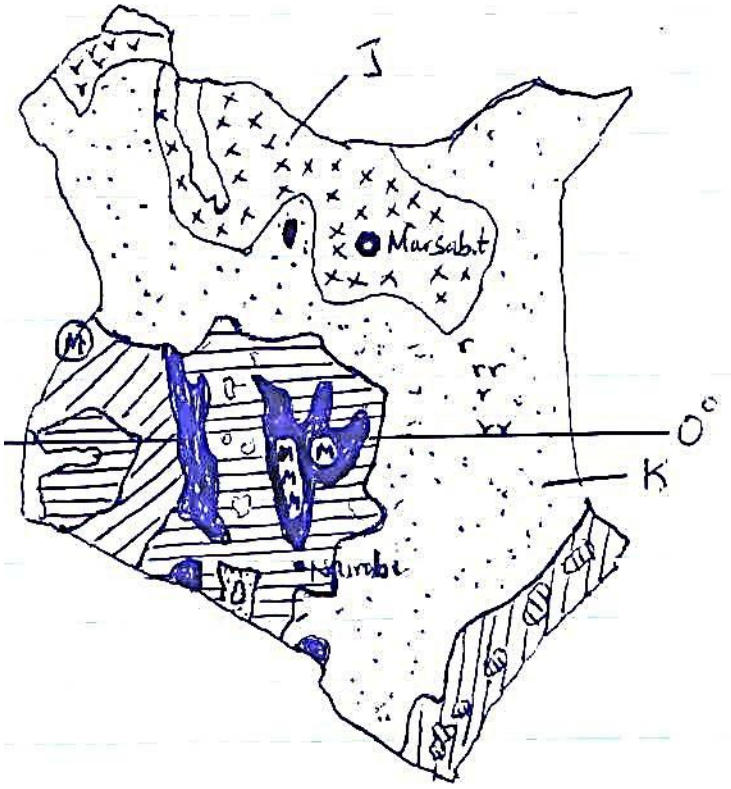
**SECTION A**

**Answer all questions in this section**

1. a) State three conditions necessary for the sitting of a weather station (3marks)
   b) Give two factors which may hinder weather forecasting (2marks)

2. a) Define the term earthquake (1mark)
   b) i) State two ways through which the strength of an earthquake can be measured (2marks)
   ii) Give two effects of earthquakes on the physical environment (2marks)

3. The map below Kenya's vegetation zones




   a) Name the vegetation zones labeled J and K (2marks)
   b) Explain two factors influencing the distribution of vegetation in Kenya (4marks)

4. a) Define the term lake (1mark)

b) Explain two ways how lakes modify the climate of their surrounding areas (4marks)

5. a) Distinguish between an ocean and a sea (2 marks)
   b) State two main characteristics of ocean water (2marks)

**SECTION B**

**Answer question 6 and any other question from this section**

6. Study the map of **Busia 1:50,000** (sheet 101/1) provided and answer the following questions.

(a) i) What type of map is Busia map? (1mark)
   ii) Identify two types of scales used on the map (2marks)

(b) i) Give two methods which have been employed to show relief in the area covered by the map (2marks)
   ii) What is the direction of the Funyula town from the Odiado hill? (1mark)

(c) Calculate the area of the land to the West of the international boundary in the North-Western part of the area covered by the map. Give your answer in square kilometers (2marks)

(d) Citing evidence from the map, identify four social services offered in the area covered by the map (4marks)

(e) Using a vertical scale of 1cm to represent 20m, draw a cross section along northing 30 and between eastings 23 and 32 (4marks)
   On the cross section, mark and name:-
   - A provincial boundary (1mark)
   - A hill (1mark)
   - Main track (motorable) (1mark)
   - Kirond river (1mark)

(f) Describe the drainage of the area covered by the map (5marks)

7. a) i) Name the three types of rocks according to their mode of formation (3marks)
      ii) Describe the formation of mechanically formed sedimentary rocks (5marks)
   b) i) State two sources of sedimentary rocks (2marks)
      ii) State three factors which determine the ease and degree of change of original rock during metamorphism (3marks)
   c) Suppose you were to carry out a field study on rocks around your school
      i) State two objectives for the study (2marks)
      ii) State two methods you would use to collect data. (2marks)
      iii) Give two activities you would be involved in during the study. (2marks)
   d) Outline six uses to which various types of rocks are put. (6marks)

8. a) Explain three causes of earth movements (6marks)
   b) Using diagrams, describe any three types of folds (6marks)
   c) i) Name two fold mountains formation periods (2marks)
      ii) Apart from Fold Mountains, name three other features formed by folding (3marks)
   d) Explain the influence of folding on the following human activities
      i) Agriculture (4marks)
      ii) Mining (4marks)

9. a) Identify three processes involved in the hydrological cycle. (3marks)
   b) Explain three ways in which a river transports its load (6marks)
   c) Describe how a river delta is formed (5marks)
   d) Explain two positive influences of rivers on human activities (4marks)
   e) Form 3 students went on a field study of a river in the neighborhood of their school;
   i) Identify two type of river erosion they might have seen (2marks)
   ii) Give two reasons why it is important to study rivers through fieldwork (2marks)

iii) State three follow up activities the students did after the field study (3marks)

10. a) i) List three constituents of the soil (3marks)
ii) Draw a diagram of a mature soil profile (4marks)
iii) List any three reasons why some soils do not develop to a mature profile (3marks)
b) i) Name any three soil formation processes (3marks)
ii) Explain how the following factors influence soil formation (6marks)
a) Time
b) Nature of the parent rock
c) Topography
c) You intend to carry out a field study of soil within the vicinity of your school
i) State four characteristics you would look for in classifying soil (4marks)
ii) Identify any two natural causes of soil degeneration you observed (2marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.SE)

**312/2**

**GEOGRAPHY**

**PAPER 2**

**TIME: 2 ¾ HOURS**

**SECTION A**

**Answer all the questions in the section**

1. a) State two types of hypothesis as used in field work (2 marks)
   b) Give three types of field work that students are likely to study. (3marks)

2. a) Name two methods applied in alluvial mining (2 marks)
   b) State three economic factors influencing exploitation of minerals (3 marks)

3. a) State two physical conditions that favour maize cultivation in Tranzoia county in Kenya (2 marks)
   b) Give three problems facing maize farming in Kenya. (3marks)

4. a) What is the meaning of agro-foresty (2 marks)
   b) Give three characteristics of trees suitable to be grown under agro-forestry (3 marks)

5. a) Differentiate between horticulture and market garden farming (2 marks)
   b) Give three main types of flowers grown in Kenya (3 marks)

**SECTION B**

***Answer question 6 and any other two from this section.***

6. The table below shows East Africa's Beef export in '000 tonnes from 1998-2001.

| Country | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| Kenya | 30 | 41 | 36 | 25 |
| Uganda | 20 | 25 | 27 | 29 |
| Tanzania | 52 | 60 | 65 | 70 |

a) i) Draw a compound bar graph to represent the above data. Use a scale of 1 cm to represent 10,000 tonnes. (7marks)
   ii) State two limitations of using a compound bar graph to represent statistical data. (2marks)
   iii) State three differences between beef exports in Kenya and Tanzania (3 marks)
   iv) Which year had the highest export of beef and by how many tones in the three countries (2marks)

b) i) Name two exotic dairy cattle breeds reared in Kenya. (2 marks)
   ii) Explain two significance of dairy farming in Kenya (4 marks)

c) i) State two similarities between dairy farming in Kenya and Denmark. (2 marks)

ii) State three steps taken by the government of Kenya to improve dairy farming (3 marks)

7. a) i) Name two major lumbering maritime province in Eastern Canada. (2 mark)
   ii) Name four characteristics of planted forests (4 marks)
   b) Explain three differences between softwoods in Kenya and Canada. (6 marks)
   c) Outline five ways in which relief influences the distribution of natural forests. (5 marks)
   d) Explain four problems facing forestry in Kenya (8 marks)

8. a) State three physical conditions that favour coffee growing in the central highlands of Kenya. (3 marks)
   b) Describe the stages involved in coffee production from picking to marketing (8 marks)
   c) Explain four problems facing coffee farming in Brazil (8 marks)
   d) Your geography class carried out a field study on a coffee farm.
      i) State four methods the class may have used to collect data. (4 mark)
      ii) During the field study the class collected data on the qualities of coffee produced in the farm in the lost five years. State two methods the class may have used to present the data (2 marks)

9. a) Name four oil producing countries in Africa (4mark)
   b) Explain how the following factors influence the exploitation of minerals
      i) mode of occurrence of mineral (4 marks)
      ii) transport (4 marks)
      iii) level of technology (4 marks)
   c) Give three reasons why Kenya imports her oil in crude form (3mark)
   d) Explain three negative effects of mining on the environment (6 marks)

10. a) What is the meaning of soil erosion (2 marks)
   b) Explain four methods used in Kenya to control soil erosion (8 marks)
   c) Briefly explain three effects of soil erosion to human activities (6 marks)
   d) Explain three reasons why it is necessary for Kenya to conserve her environment (6 marks)

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# FORM 4 OPENER EXAM

## HISTORY AND GOVERNMENT
## PAPER 1
Time: 2 ½ Hours.

**SECTION A (25 MARKS)**
**Answer ALL Questions in this section.**

1. Give two unwritten sources of information on history and government. (2 mark)
2. Name two early inhabitants of Kenya (2 marks)
3. What was the original homeland of the Eastern Cushites? (1 mark)
4. Identify the two main items of trade from the interior of Kenya during the long distance trade. (2 marks)
5. Give the main reason why the early visitors came to the Kenyan coast by 1500 AD. (1 mark)
6. State two characteristics of independent churches in Kenya during the colonial period. (2 marks)
7. Identify the constitutional change that increased the number of African members to the legislative council in Kenya in 1957. (1 mark)
8. State the main duty of the governor during the British Colonial rule in Kenya. (1 mark)
9. State two terms of Heligoland Treaty of 1890 (2 mark)
10. Name the leader of imperial British East African Company during the colonial rule. (1 mark)
11. Identify the main outcome of the Devonshire white paper (1 mark)
12. Give one reason why the government of Kenya may limit a person's freedom of speech (1 mark)
13. Give two reasons that can make a registered person lose citizenship in Kenya. (2 marks)
14. Identify two characteristics of a good constitution (2 marks)
15. Mention two characteristics of human rights (2 marks)
16. Identify one education commission established in Kenya before independence (1 mark)
17. Name one security agency making up the Kenya defense forces. (1 mark)

**SECTION B (45 MARKS)**
**Answer any THREE questions from this section**

18. a) State five economic activities of the Borana during the pre-colonial period. (5 marks)
    b) Describe the social organization of the Somali during the pre-colonial period. (10 marks)
19. a) Why did the Portuguese build Fort Jesus. (3 marks)
    b) Explain six positive effects of missionary activities in East Africa. (12 marks)
20. a) Give three reasons why Africans were put in reserves during the colonial period (3 marks)
    b) Explain six negative effects of British colonial rule on the people of Kenya. (12 marks)
21. a) State five demands made by the East African Association (EAA) to the British colonial government in Kenya (5 marks)

b) Explain five factors that promoted the rise of African Nationalism in Kenya after 1945. (10 marks)

**SECTION C (30 MARKS)**

**Answer any two questions from this section**

22. a) Give three conditions that a person should meet to qualify to be a Kenyan citizen by birth (3 marks)
    b) Explain six social rights of a Kenyan citizen (12 marks)
23. a) Give five demerits of democracy (5 marks)
    b) Explain give ways in which education system in Kenya promotes national unity. (10 marks)
24. a) Give three reasons why general elections are important in Kenya. (3 marks)
    b) Explain six functions of independent electoral and boundaries commission (IEBC) in Kenya. (12 marks)

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# FORM 4 OPENER EXAM

## HISTORY AND GOVERNMENT
## PAPER 2

Time: 2 ½ Hours.

**SECTION A (25 MARKS)**

**Answer all the questions in this section.**

1. Identify the main source of information in History and government. (1 mark)
2. Give two reasons that made the early human beings to live in groups during the stone age period (2 marks)
3. Identify one political effect of early agriculture to man (1mark)
4. Give two effects of land enclosure systems in Britain during the agrarian revolution (2 marks)
5. Give two methods of trade (2 marks)
6. Give another name for the Trans-Atlantic trade (1mark)
7. State any two disadvantages of road transport (2marks)
8. Identify the form of writing used by the ancient Egyptians (1 mark)
9. Give one theory which explain about the origin and spread of iron working in pre-colonial Africa (1mark)
10. Name any two persons associated with invention of the steam engine during the industrial revolution (2 marks)
11. Define the term "Third World" (1 mark)
12. State two social challenges facing Johannes burg as an urban centre. (2 marks)
13. State two functions of the Kabaka of Buganda Kingdom during the pre-colonial period (2 marks)
14. Identify the main reason why the Berlin conference was convened (1884-1885) (1 mark)
15. State any one charted company used to administer British colonies in Africa. (1 mark)
16. Name one coastal commune where French assimilation became successful in West Africa (1 mark)
17. State two reasons why Ghana achieved independence earlier than other African countries (2 marks)

**SECTION B (45 MARKS)**

**Answer any three questions from this section**

18. a) Identify three ways in which early man used stone tools (3 marks)
    b) Explain six ways in which fire changed man's way of life after its discovery during the Stone Age Period (12 marks)
19. a) Give five reasons why African slaves were preferred than other races during the Trans-Atlantic trade (5 marks)
    b) Explain five effects of the Trans-Atlantic trade on the people of West Africa. (10 marks)
20. a) State five limitations of messengers as a method of communication (5 marks)
    b) Explain five positive effects of modern forms of communication (10 marks)
21. a) Give three types of Nationalism in South Africa (3 marks)
    b) Explain six problems faced by the nationalists in South Africa during their struggle for independence (12 marks)

**SECTION C (30 MARKS)**

**Answer any two questions from this section**

22. a) State three economic activities of the Shona people during the pre-colonial period (3 marks)
    b) Describe the political organization of the Mwene Mtapa empire during the pre-colonial period (12 marks)
23. a) State three reasons why the Europeans came to Africa before colonization (3 marks)
    b) Explain six political effects of the European scramble and partition of Africa (12 marks)
24. a) Name three categories of land as per the land appointment act (1930) in Zimbabwe (3 marks)
    b) Explain six main differences between the British and French systems of administration in Africa. (12 marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E.)

**HOMESCIENCE**

**PAPER 1**

**TIME: 2 ½ HOURS**

**SECTION A: 40MKS**

**Answer all the questions in this section in the spaces provided.**

1. Give **two** disadvantages of using credit cards when burning /shopping. (2marks)

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2. Suggest **two** factors to consider when locating a living room in a house. (2marks)

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3. Define the following terms:

   i) A vaccine (2marks)

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   ii) An antibody (2marks)

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4. Identify **one** difference between a print patch and calico patch. (1mark)

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5. State **three** common methods of inserting a zip fastener. (3marks)

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6. What are the effects of putting hot food in a refrigerator? Give two reasons. (2marks)

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7. Highlight **three** reasons why it is important to prepare for the arrival of the baby. (3marks)

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8. State **three** basic instructions given on the use of medicine. (3marks)

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9. Give **two** reasons why fruits would settle at the bottom of a cake. (2marks)

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10. Outline **two** reasons for using a dart in garment construction. (2marks)

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11. State **three** advantages of budgeting for family finances. (3marks)

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12. Give **two** causes of seam puckering while machining. (2marks)

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13. Apart from micro-organism, suggest **two** ways in which food may be contaminated. (2marks)

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14. Identify **two** roles of fabric conditioners in laundry process. (2marks)

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15. State **two** advantages of using a food mixer. (2mraks)

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16. Outline **two** reasons why buffet service is suitable for guests. (2mraks)

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17. Mention **three** nutritional disorders associated with lifestyle. (3marks)

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**SECTION B 20MKS (COMPULSORY)**

18. You are left at home over the weekend to attend to household duties.
    a) Giving reasons, explain how you would clean your brother's woolen sweater. (10marks)

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b) Give the procedure of how you would thoroughly clean a wall coated with oil paint. (6marks)

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c) Outline the procedure of how you would thoroughly clean a water glass. (4marks)

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**SECTION C 40MKS**

**Choose only two questions in this section.**

19. a) Giving reasons, explain **five** rules to observe when removing stains. (10marks)

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b) Explain **five** precautions to be taken when handling kitchen equipment. (5marks)

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c) State **five** points to consider when selecting a toilet soap. (5marks)

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20. a) Describe the procedure for preparing gathers ready for attachment. (5marks)

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b) State and explain **four** factors that can affect the choice of personal clothes. (8marks)

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c) Discuss **seven** precautionary measures to take when using frying as a method of cooking. (7marks)

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21. a) Explain **five** reasons for the following faults in cake making

i) Cake sunk in the middle. (5marks)

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ii) Heavy and close texture. (5marks)

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b) Explain **three** qualities of a good advertisement. (6marks)

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c) Identify **four** factors that determine the quality of stitches when using a sewing machine. (4marks)

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# KIDATO CHA NNE

## Hati ya Kuhitimu Elimu ya Sekondari Kenya.( K.C.S.E)

**102/1**

**KISWAHILI**

**KARATASI YA 1**

**SAA 1 ¾**

1. **LAZIMA**

   Shirika la uchapishaji la Longhorn limetangaza nafasi ya kazi ya mhariri. Andika tawasifu utakayoiandaa ili kuipata kazi hii.

2. ‘Janga la ukame linaweza kuangamizwa nchini’ Jadili.

3. Ngozi ivute ili maji.

4. Andika insha itakayoanza kwa manaeno yafuatayo:

   Naikumbuka siku hiyo vizuri sana. Sijawahi fedheheka jinsi ile maishani mwangu…….

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# FORM 4 OPENER EXAM

***Hati ya kuhitimu kisomo cha sekondari Kenya (K.C.S.E)***

**102/2**
**KISWAHILI**
**KARATASI YA PILI**
**(LUGHA)**

**UFAHAMU (ALAMA 15)**
**Soma makala yafuatayo kisha ujibu maswali.**

Teknolojia mpya ni tawi la maarifa linalohusiana na sayansi kwa upande mmoja na uhandisis (uinjinia) kwa upande mwingine. Sayansi ni elimu inayotokana na uchunguzi na majaribio katika maabara. Nao uhandisi ni ujuzi wa kuunda mitambo. Maarifa ya sayansi yanapotumiwa kutengeneza vitu viwandani hali hii inakuwa teknolojia.

Zao mojawapo la teknolojia mpya ni simu tamba. Watu vijijini sasa wanawasiliana na jamaa zao walio mbali. Akina nyanya wanapopanda njugu, kupalilia migomba, kukama ngamia au kukuna nazi, wanaweza kuzungumza na wajukuu wao walio Uingereza, Uchina au kwingine kule.

Hakuna mahali ambapo hapajafikwa na teknolojia mpya. Tukitembelea baadhi ya nyumba tutaona vifaa kama vila tanuri la miale au maikrowevu ambalo linapika maharagwe yakaiva kwa dakika chache tu. Majokofu nayo yanatuwezesha kuhifadhi vyakula bila kuharibika. Hata maiti na mizoga inaweza kuhifadhiwa kwa miaka mingi kwa ajaili ya utafiti bila kuoza katika ufuo au mochari.

Kwa upande wa kilimo, tecknologia imefanya makubwa. La kustaajabisha ni mtu mmoja kulima eneo kubwa la shamba kwa trekta. Halafu akapanda kwa tandazi, kunyunyizia dawa, kunyausha magugu, akavuna na na kukoboa mahindi akiwa peke yake. Siku hizi inawezekana kukuza mimea na kufuga wanyama wanaokomaa kwa muda mfupi na kutoa mazao maradufu kwa sababu ya teknologia mpya.

Teknolojia imewezasha watu kuvumbua aina nyingi za nishati. Badala ya kutegemea umeme unaotokana na maji tu, sasa watu wanatumia mvuke, nguvu za upepo na nishati ya jua kupataumeme. Kwa sababu hii hata mababu zetu vijijini wanatazam televisheni bila shida wala wahka.

Kwa upande mwingine, teknolojia ina madhara yake. Kwa mfano, uundaji wa silaha kali unaendelea kuwaangamiza watu wengi. Mabomu ya kitonoradi yaliyoangushwa Hiroshima na Nagasaki Japan mwaka 1945 ni zao la kisayansi. Haya yaliwaua watu wengi na madhara yake bado yanadh ihirika hata leo katika maumbile ya watoto wanaozaliwa na upungufu . Tena magaidi na wahalifu wa kimataifa wanatumia teknolojia mpya kuimarisha mbinu zao za kutendamaovu. Isitoshe, inawezakana kutumia teknolojia kuagiza benki kutuma pesa nje ya nchi bila mwenye hazina kujua.

Wahalifu wanaweza kusikiza mawasiliano ya watu kwa simu hata ikiwa ni baina ya polisi. Vilivile matatizo mengi ya kiafya yasemekana yanatookana na vyakula vilivyokuzwa kwa kutumia teknolojia mpya.

Katika usafiri, Kuna garimoshi lenye kutumia stima badala ya makaa. Hili ni zao la teknolojia mpya vilevile. Ingawa mwendo wake ni wa kasi, kasi hiyo na stima huweza kusababisha ajali mbaya mno.

Ingawa madhara yapo lakini manufaa ya teknologia ni mengi zaidi kuliko madhara yenyewe. Faida ni kuwa teknologia hurahisisha shughuli za watu kama vile kufua na kusafiri. Pia hufanya matokeo ya

shughuli kuwa bora zaidi. Kazi iliyopigwa chapa kwa kompyuta huwa safi na bora. Vile vile vitu vinavyotengenezwa siku hizi ni vidogo na vyepesi lakini ni bora zaidi. Tukichukua mfano wa magari tunaona kuwa ni madogo lakini yenye muundo wa kuvutia. Tatizo tu ni ile kasi kubwa ambayo ni moja ya mambo yanayosababisha ajali nyingi.

Gharama ya vitu vinavyotengenezwa kutumia teknolojia mpya ni nafuu. Teknologia hii inatumia malighafi ya kisasa na hivyo kuhifadhi madini yetu. Pia huunda vitu ambavyo matumizi yake hayadhuru mazingira.

Tusisahau kuwa hata hapa kwetu matekinia wa jua kali wanapiga hatua. Wanajitahidi usiku na mchana kuunda vitu vya kutuuzia kwa gharama nafuu. Mitambo ya kusukuma maji sasa inapatikana. Vyombo vya kusafirisha mizigo, vifaa vya kunyunyuzia maji, tanuri ya kuoka inayohifadhi nishati na vingine vingi, sasa vinaundwa ili kuimarisha sekta hii. Ikiimarika, Kenya inaweza kuwa nchi yenye uwezo wa viwanda.

**MASWALI**

a) Toa anwani mwafaka ya taarifa hii. (alama 1)

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b) Eleza umuhimu wa teknologia mpya kwa zaraa. (alama 2)

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c) “Kwa hakika uhandisi umepiga hatua.” Thibitisha kauli hii kulingana na taarifa. ( alama 2)

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d) “ Hakuna mahali ambapo hapajafikiwa na teknolojia.“ Unga mkono kauli hii. (alama 2)

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e) Uvumbuzi wa kiteknolojia umesaidiaje ulimwengu kupunguza gharama ya uzalishaji wa bidhaa? (alama 3)

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f) Taja athari zozote mbili za kughasi za uvumbuzi. (Alama 2)

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g) Taja jambo lolote linaloonyesha jinsi uvumbuzi umeibuka na anasa ya kipekee. (Alama 1)

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h) Eleza maana ya msamiati huu kama ulivyotumia kwenye taarifa . (alama 2)
i) Malighafi

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ii) Matekinia

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**UFUPISHO (ALAMA 15)**
**Soma taarifa ifuatayo kisha ujibu maswali kulingana na maagizo**
Imesemwa na kurudiwa kwamba, iwapo tuna maono ya kujiondoa katika umasakini wa kupindukia, ni lazima tukipe kilimo umuhimu. Zaidi ya Wakenya milioni kumi wamo katika hatari ya kufa njaa katika maeneo mbalimbali kwa sasa kufuatia uhaba wa chakula nchini.

Kiini kikubwa cha njaa hiyo ni mapuuza ya muda mrefu katika sekta ya kilimo. Imesahaulika kuwa karibu asilimia sabini na tano ya wakenya wanategemea kilimo kwa chakula na mapato ya kifedha kila siku. Kilimo hutoa karibu robo tatu ya nafasi za kazi kwa mwananchi na pia kuletea serikali karibu robo ya mapato yake kutokana na mauzo ya mazao katika mataifa ya nje.

Wataalamu wa maswala ya zaraa wanaeleza kuwa pato la nch i linalotokana na kilimo huangamiza njaa mara zaidi ya mapato yanayotokana na shighuli nyinginezo za kiuchumi. Hiyo ni kwa sababu shughuli za kilimo hulenga kuzalisha vyakula moja kwa moja.

Imebainika kuwa mataifa mengi yanayostawi, asilimia sabini na tano ya wananchi huishi katika maeneo ya mashambani na idadi hii hutegemea kilimo kujimudu kimaisha ilhali hapa kenya ni asilimia nne pekee ya bajeti inayowekezwa katika kilimo. Kwa wakati huo, ushuru unaotozwa bidhaa za kilimo katika maeneo haya umebainika kuwa mkubwa. Hii imepelekea uwekezaji katika kilimo kupungua na hivyo kuchangia kukithiri kwa baala njaa.

Wakati umewadia kwa serikali za Afrika na wapangaji wa masuala ya uchumi kuweka juhudi maradufu katika kushabikia kilimo ili kumaliza njaa na umaskini. Kuna haja ya kuwajulisha, kuwahimiza na kuwaelimisha wakulima wa mashamba madogo madogo kuhusu mihimili ya zaraa kama vile uzalishaji wa matunda na mboga ufugaji wa ndege, samaki na ng‘ombe mbali na kuweka mikakati ya kuanzisha nafasi za kazi katika sekta ya kilimo.

Serikali itafikia lengo hili iwapo itaanza kufadhili kilimo, Kupunguza ghrama za pembejeo za kilimo. Kuweka sera zinazodhibiti uuzaji na ununuzi wa vyakula hasa baina ya mataifa na kuongeza sehemu ya bajeti inayotengewa kilimo. Bila hilo hatutakuwa na lingine bali na kukimbilia mataifa yaliyostawi kuomba misaada ili kuwanusuru raia wetu kutokana na ghadhabu ya njaa.

**MASWALI**
a) Fupisha aya mbili za mwanzo kwa maneno 50-55. (Alama 6)

Matayarisho

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Jibu

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b) Bila kubadili maana, fupisha aya mbili za mwisho. (maneno 55-60)

Matayarisho

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**MATUMIZI YA LUGHA (ALAMA 40)**

a) Taja sauti zifuatazo (alama 2)

i) Irabu ya chini wastani

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ii) Kipasuo sighuna cha kaaka laini

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b) Unda maneno yenye miundo ya silabi ifuatayo . (alama 2)

i) KKVKKV

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ii) KVKKKV

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c) Andika sentensi ifuatayo katika wingi (alama 2)

Ukimwona mwanafunzi mzembe nijulishe mara moja.

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d) Iandike sentensi hii upya kwa kutumia *ȯ*- ote‘ (alama 2)

Kila mchezaji anapaswa kufanya bidii.

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e) Eleza jinsi neno kwake lilivyotumika katika sentensi zifuatazo: (alama 3)

i) Kwake kumefagiliwa vizuri

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ii) Kuimba kwake kulipendeza san

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iii) Mwalimu ameingia kwake.

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f) Andika katika hali ya udogo (alama 2)

Mbuzi aliyechinjwa jana kwa kisu alikuwa mtamu.

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g) Yakinisha sentensi hii kwa njia mbili tofauti (alama2)

Hachezi mpira wa kandanda.

.....

.....

h) Andika kinyume cha sentensi hii. (alama 2)

Mvulana aliyekwea mlima alisifiwa na wananchi.

.....

.....

i) Baianisha maneno katika senternsi hii. (alama 3)

Mimi na dadangu tulisimama kando ya barabara

.....

.....

j) Unda nomino dhahania kutokana na vitenzi vifuatavyo. (alama 2)

i) Ogopa

.....

.....

ii) –la

.....

.....

k) Andika sentensi hii ifuatayo kwa usemi halisi. (alama 3)

Mhubiri alitaka kujua iwapo waumini walikuwa wameelewa mahubiri ya siku hiyo.

.....

.....

l) Andika sentensi hii upya kwa kutumia ‘o’ rejeshi ili kuleta dhana ya hali ya mazoea. (alama 2)

Jembe wanalolimia lina makali.

.....

.....

m) Eleza matumizi ya viambishi vilivyopigiwa mistari (alama2)

i) Chezeni

.....

.....

ii) Afanyiapo

.....

.....

iii) Nitakupiga

.....

.....

iv) Afanyapo

.....

.....

n) Changanua sentensi hii kwa kielelezo cha mishale . (alama 4)
Timu yetu ilicheza vizuri lakini haikushinda.

.....

.....

o) Andika visawe vya maneno haya. (Alama 2)
i) Ufizi

.....

.....

ii) Damu

.....

.....

p) Eleza maana za neno : beberu (alama 2)

.....

.....

q) Tambua tamathali za usemi zilizotumika katika sentensi zifuatazo. (Alama 2)
i) Tuondoke sasa bwana, giza limepiga hodi.

.....

.....

ii) Watu wengi walihudhuria sherehe hizo, si watoto, si vijana, si watu wazima.

.....

.....

r) Bainisha kirai kilichopigiwa mstari (alama 1)
Alisimama mbele ya hadhira kutoa hotuba yake.

.....

.....

4. **Isimu jamii** (alama 10)

**Soma kifungu hiki kisha ujibu maswali**

Anageuka, kushaoto kulia……amepiga ile ngoma kwa Aucho…… Aucho……. Chenga moja mbili. Hatari ! Hatari ! Lakini bado ! Bahati haisimami ! Lo Lahaula la kwata !…….Goalless

a) Hii ni sajili gani (alama 2)

b) Eleza sifa nane za sajili hii (alama 8)

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# FORM 4 OPENER EXAM

## KISWAHILI PP3
## KIDATO CHA NNE

**1.SEHEMU A: USHAIRI (LAZIMA)**

Eti
Mimi niondoke hapa
Niondoke hapa kwangu
Nimesaki, licha ya risasi
Vitisho na mauaji, siondoki

Mimi
Siondoki
Siondoki siondoki
Niondoke hapa kwangu!
Kwa mateke hata na mikuki
Marungu na bunduki, siondoki

Hapa
Siondoki
Mimi ni Pahame!
Niondoke hapa kwangu!
Fujo na ghasia zikizuka
Na kani ya waporaji, siondoki

Haki
Siondoki
Kwangu siondoki
Niondoke hapa kwangu!
Nawaje; waje wanaokuja
Mabepari wadhalimu, siondoki

Kamwe
Siondoki
Ng'oo hapa kwangu!
Katizame chini mti ule!
Walizikwa babu zangu, siondoki

Sendi
Nende wapi?
Si hapa kitovu changu
Niondoke hapa kwangu
Wangawa na vijikaratasi
Si kwamba hapa si kwangu, siondoki

Katu

Siondoki
Sihitaji karatasi
Niondoke hapa kwangu
Yangu mimi ni ardhi hii
Wala si makaratasi, siondoki

**Maswali**

a) Shairi hili ni la aina gani? Kwa nini (alama 2)

b) Taja masaibu anayopitia mzungumzaji (alama 4)

c) Eleza toni ya shairi hili (alama 2)

d) Eleza muundo wa shairi hili (alama 3)

e) Tambua matumizi ya mbinu ya usambamba (alama 2)

f) Andika ubeti wa tano kwa lugha nathari (alama 4)
g) Tambua idhini moja ya mtunzi (alama 1)
h) Eleza maana ya maneno yafuatayo kama yalivyotumika katika shairi (alama 3)
(i) Karatasi
(ii) Nimesaki
(iii)kitovu

**2<u>SEHEMU B TAMTHILIA YA KIGOGO</u>**

2.Uliona nini kwa huyo zebe wako ? Eti mapenzi!
a. Eleza muktadha wa dondoo. (al. 4)
b. Andika mbinu za lugha zinazojitokeza kwenye dondoo hili (al. 4)
c. Taja hulka za mnenaji unajitokeza katika dondoo. (al. 2)
d. Mwanamke ni kiumbe wa kukandamizwa. Thibitisha kauli hii ukirekjelea tamthilia. (al. 10)

3.wa kurejelea tamthlia ya 'Kigogo ya Pauline Kea, onyesha jinsi ambavyo viongozi wengi katika nchi za kiafrika wamejawa na tamaa. (alama 20)

**SEHEMUC.RIWAYA YA CHOZI LA HERI(ASSUMPTA MATEI)**

4.“ Kwa kweli ni hali ngumu hii”
Weka dondoo katika muktadha wake. (alama4)
Ni hali gani yamsemewa inayorejelewa kwenye dondoo. (alama16)

5) Ukabila ni tatizo sugu katika nchi nyingi za Kiafrika. Tetea kauli hii ukilejelea Chozi la Heri ( al. 20)

**Alifa Chokocho na Dumu Kayanda: Tumbo Lisiloshiba na Hadithi nyingine**
**jibu swali la 6 au la 7**

6.Ukirejelea hadithi zifuatazo, eleza jinsi maudhui ya mapenzi na asasi ya ndoa yanavyojitokeza.
(alama20
a) Mapenzi ya kifaurongo
b) Masharti ya kisasa

c) Ndoto ya Mashaka
d) Mtihani wa maisha
Au

**Shibe inatumaliza : Salma Omar Hamad**

7."Hiyo ni dharau ndugu yangu. Kwa nini kila siku tunakula sisi kwa niaba ya wengine ?"

a) Eleza muktadha wa dondoo hili. (alama 4)
b)Eleza sifa za msemaji. (alama 6)
c) Eleza jinsi viongozi wanavyokuwa wabadhirifu. (alama 10)

**SEHEMU YA E: FASIHI SIMULIZI**

8a) Fafanua mchakato/fomula ya uwasilishaji wa vitendawili. (alama4)
b) Linganisha naulinganue vitendawili na methali. (alama10)
c) Toa sababu sita za kudidimia

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E.)

**121/1**
**MATHEMATICS**
**Paper 1**
**2½ hours**

**SECTION I (50 MARKS)**
**Answer ALL the questions in this section**

1. Without using a calculator (3 marks)
   Evaluate $\frac{42 \div -6+14\ x\ 5-7\ x\ 3}{23+\ -4+(-3-\ -5)}$

2. Five people can build 3 huts in 21 days. Find the number of people, working at the same rate that will build 6 similar huts in 15 days (3 marks)

3. Evaluate without using a calculator. (3 marks)

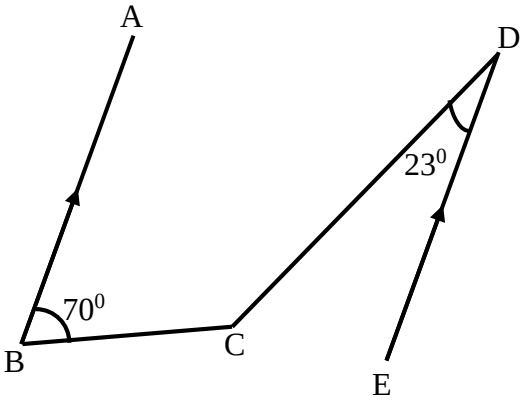
$$\frac{\frac{2}{7}+3\frac{1}{5}\ of\frac{7}{8}\div\frac{6}{11}-\left(5\frac{1}{3}+\frac{9}{10}\right)}{\frac{3}{4}+1\frac{5}{7}\div\frac{4}{7}\ of\ 2\frac{1}{3}}$$

4. A commercial bank buys and sells Japanese Yen in Kenya shillings at the rate shown below.

   | Buying | Selling |
   |---|---|
   | KSh. 0.5024 | KSh. 0.5440 |

   A Japanese tourist at the end of his tour in Kenya was left with Sh. 40,000 which he converted to JapaneseYen through the commercial bank. How many Japanese Yen did he get? (2 marks)

5. In the figure below AB//DE, $\angle ABC = 70^0$ and $\angle CDE = 23^0$. Find $\angle BCD$. (3 marks)



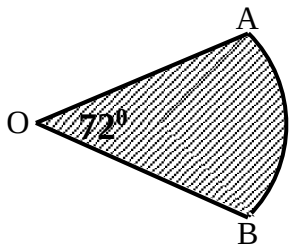

6. A perpendicular is drawn from a point (3,5) to the line 2y + x = 3. Find the equation of the perpendicular. (3 marks)

7. Find the value of x if (3 marks)

$$\left(\frac{1}{8}\right)^{2x-9} = 4^{-\frac{3}{2}x}$$

8. Onyango bought 4 TV sets and 2 tablets for KSh. 108000. Mueni bought 3 TV sets and 5 tablets from the same shop for KSh. 193,000. How much will Janet pay for one tablet and 2 TV sets. (4 marks)

9. The figure below shows a sector of a circle. If the area of the sector is 30.8cm2, calculate the length of the arc. (Take $\pi \; to \frac{22}{7}$)



10. Simplify the expression (3 marks)

$$\frac{b^4 - c^4}{b^3 - bc^2}$$

11. Given that $\overrightarrow{OP}$ = 2i + 3j and $\overrightarrow{OQ}$ = 3i – 2j. Find the magnitude of PQ correct to three decimal spaces. (3 marks)

12. Solve the inequality (3 marks)

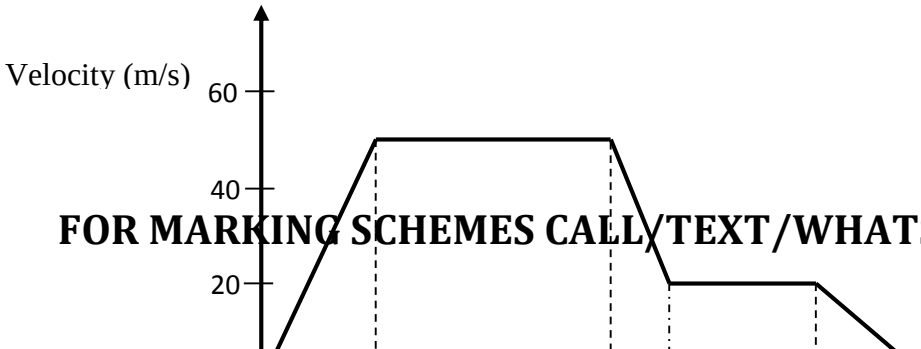
$$\frac{x-2}{4} + \frac{x+5}{2} \geq \frac{4x-6}{8} - 1$$

13. A and B are two matrices. If A = $\begin{pmatrix} 1 & 2 \\ 4 & 3 \end{pmatrix}$, find B given that $A^2 = A + B$. (3 marks)

14. A number is formed by finding the sum of the product of prime numbers between 1 and 15 and that of prime numbers between 50 and 60.
    (a) Find the number. (2 marks)

    (b) What is the total value of the second digit in the number formed. (1 mark)

15. The figure below shows a velocity – time graph of a matatu.



(a) Find the total distance covered by the matatu. (2 marks)

(b) Calculate the acceleration of the matatu (2 marks)

16. A cylindrical piece of wood of radius 9.8cm and length 2m is cut length wise into two equal pieces. Calculate the total surface area of one piece. (Take $\pi = \frac{22}{7}$)

## SECTION II (50 MARKS)

**Answer any five questions in this section in the spaces provided.**

17. (a) Three towns X, Y and Z are such that Y is 5km on a bearing of $030^0$ from X, Z is 6km on a bearing of $120^0$ from Y.

(i) Using a scale of 1cm to represent 0.5km draw a diagram to show the relative positions of the towns X, Y and Z. (4 marks)

(ii) Find the distance and bearing of town X from Z. (3 marks)

(iii) A straight main road runs from town X to Z. Find the length of the shortest path from town Y to the main road (3 marks)

18. The table below shows heights of 50 students.

| Height (cm) | Frequency |
|---|---|
| 140 – 144 | 3 |
| 145-149 | 15 |
| 150-154 | 19 |
| 155-159 | 11 |
| 160-164 | 2 |

(a) State the modal class. (1 mark)

(b) Calculate the mean height. (4 marks)

(c) Calculate the difference between the median height and the mean height. (5 marks)

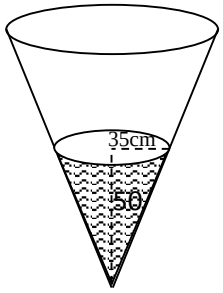
19. A bus left Nakuru for Mombasa at an average speed of 80km/h. After 1 ½ hours a car left Nakuru and travelled along the same route at an average speed of 120km/h. If the distance between Nakuru and Mombasa is 750km, determine

(a) (i) the distance of the bus from Mombasa when the car took off (2 marks)

(ii) the distance the car travelled to catch up with the bus. (4 marks)

(b) Immediately the car caught up with the bus, the car stopped for 30 minutes. Find the new average speed at which the car travelled in order to reach Mombasa at the same time as the bus (4 marks)

20. The figure shows a water vessel.




(a) Calculate the volume of the water in the vessel (2 marks)

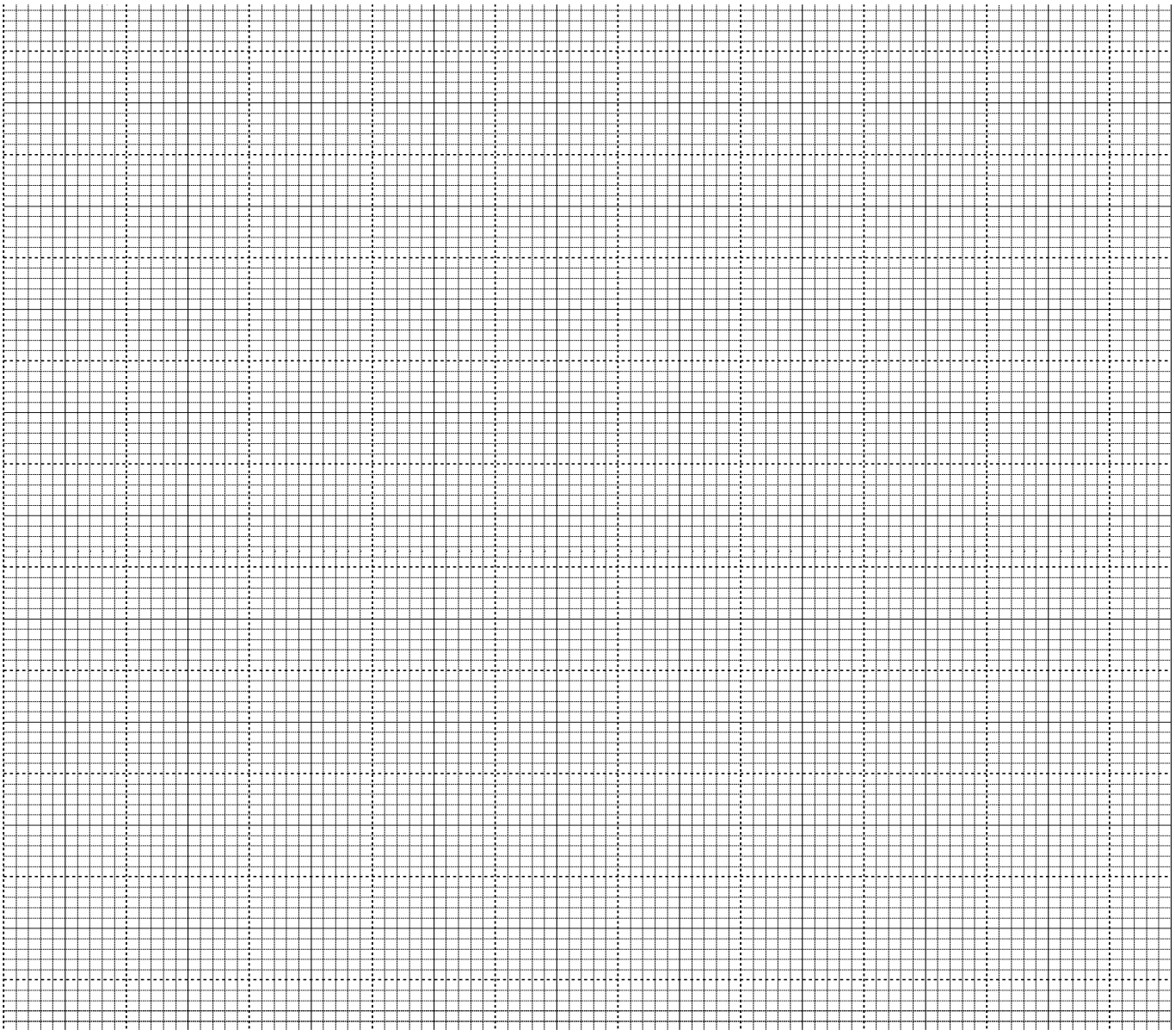
(b) When a solid sphere is completely submerged into the water, the level of the water rose by 5cm. Calculate

(i) the radius of the new water surface (2 marks)

(ii) the volume of the sphere (to 4 sf) (2 marks)

(iii) the number of spheres that can be submerged into the water before it ever flows from the vessel if its length is 75cm (4 marks)

21. The vertices of a triangle are A (1, 2), B (7, 2) and C (5, 4).
    (a) Draw on the same grid
        (i) triangle ABC and its image $A^IB^IC^I$ under a rotation of $-90^0$ about the origin (4 marks)
        (ii) triangle $A^{II}B^{II}C^{II}$ the image of ABC under a reflection in the line x = 0. State the co-ordinates of $A^{II}B^{II}C^{II}D^{II}$. (2 marks)
    (b) $A^{III}B^{III}C^{III}$ is the image of $A^{II}B^{II}C^{II}$ under a reflection in the line y = 0. Draw the image $A^{III}B^{III}C^{III}$ and state its co-ordinates. (2 marks)
    (c) Describe a single transformation which maps $A^{III}B^{III}C^{III}$ onto ABC (2 marks)



22. In triangle OAB, $\overrightarrow{OA}$ = $\underset{\sim}{a}$, $\overrightarrow{OB}$ = $\underset{\sim}{b}$ and p lies on $\overrightarrow{AB}$ such that AP:PB = 3:5

(a) Find in terms of $\underset{\sim}{a}$ and $\underset{\sim}{b}$ the vectors

(i) $\overrightarrow{AB}$

(ii) $\overrightarrow{AP}$

(iii) $\overrightarrow{BP}$

(iv) $\overrightarrow{OP}$

(b) Point Q is on OP such that AQ = $-\frac{5}{8}\underset{\sim}{a} + \frac{9}{40}\underset{\sim}{b}$. Find the ratio OQ: QP.

23. (a) Given that $y = -2x^2 + 3x + 7$

Complete the table below.

| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|
| $-2x^2$ | -18 | -8 | -2 | 0 | | | -18 | -32 | -50 |
| 3x + 7 | -2 | 1 | 4 | | 10 | 13 | | 19 | 22 |
| y | -20 | | | 7 | | | | | -28 |

(b) On the grid provided and using a suitable scale.
draw the graph of $y = -2x^2 + 3x + 7$

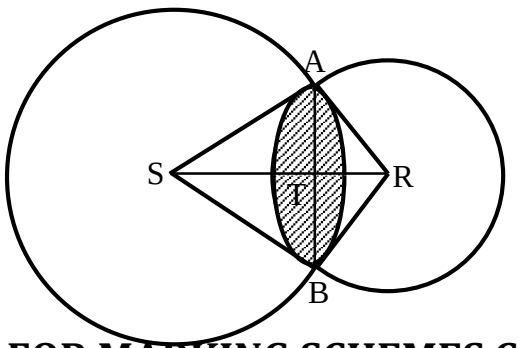
(c) On the same grid draw the straight line y = 4 – x (2 marks)

(d) Use the graph to solve the equation.

(i) $2x^2 - 4x - 3 = 0$ (2 marks)

(ii) $-2x^2 + 3x + 7 = 0$ (1mark)

24.



Two intersecting circles centres R and S have radii 7.2cm and 10cm respectively. The centres R and S are 12cm apart and ST:TR = 2:1.

(a) (i) Calculate (i) ∠ASB (2 marks)

(ii) ∠ARB (2 marks)

(b) Calculate the area of the shaded region (6 marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E.)

**121/2**
**MATHEMATICS**
**Paper 2**
**2½ hours**

**SECTION 1 (50 MARKS)**

**Answer all the questions to evaluate**

1. Use logarithms to evaluate (4 Marks)

$$\left(\frac{6.79\ x\ 0.3911}{Log\ 5}\right)^{\frac{3}{4}}$$

2. Solve the equation cos y = Sin $(\frac{1}{2}y - 30^0)$ for $0 \leq y \leq 90^0$ (2 marks)

3. Given the matrices A = $\begin{pmatrix} 2 & -1 \\ -3 & 1 \end{pmatrix}$ and B $\begin{pmatrix} -3 & 4 \\ -2 & -1 \end{pmatrix}$ and that C = $A^2$ – B, write down the inverse of C (4 marks)

4. Make y the subject of the formula (3 marks)
   y $+\sqrt{km+y^2} = 2x$

5. Expand $(3 - t)^7$ upto the term containing $t^4$. Hence find the approximate value of $(2.8)^7$ (3 marks)

6. Without using a calculator or mathematical tables, express
   $\frac{\sqrt{3}}{1-Cos\ 30^0}$ in surd form and simplify. (3 marks)

7. A sum of Sh. 6000 is invested at 8% p.a compound interest. After how long will this sum amount to Sh. 9250? (Give your to the nearest month) (3 marks)

8. Evaluate $log_2^x + log_x^2 = 3$ (4 marks)

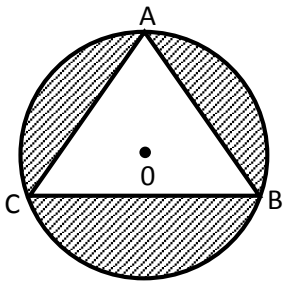
9. The parallel sides of a trapezium are given as 6.0cm and 4.5cm while the shortest distance between them is given as 3.2cm. Calculate the percentage error in the area of the trapezium. (4 marks)

10. The prefects body of a certain school consists of 7 boys and 5 girls. Three prefects are to be chosen at random to represent the school at a certain function at Nairobi. Find the probability that the chosen prefects are boys (2 marks)

11. Determine the radius and the co-ordinate of the centre of a circle whose equation is $y^2 + x^2 + 6y - 16 = 0$ (3 marks)

12. Six interior angles of a hexagon form an arithmetic progression. If the largest angle is $150^0$, find the size of the smallest angle. (3 marks)

13. In the figure below O is the centre of the circle and ABC is a triangle with AB = 5cm, AC = 7cm, BC = 6cm and $\angle ACB = 30^0$. Find the area of the shaded region. (3 marks)




14. Vector OP = 6i + j and OQ = 2i + 5j. A point N divides PQ internally in the ratio 3:1. Find PN in terms of i and j (3 marks)

15. Use matrix method to determine the co-ordinates of the point of intersection of the two lines below.
    $3x - 2y = 13$ and $2y + x + 1 = 0$ (3 marks)

16. A group of 10 soldiers set off with enough food to last 7 days. After 4 days, 4 soldiers were killed. How many days will the food last the remaining soldiers (3 marks)

**SECTION II (50 Marks)**

**Attempt any five questions in this section**

17. Three business ladies Mwende, Njeri and Adhiambo contributed a capital of KSh. 90,000, KSh 120,000 and KSh 80,000 respectively to start a business. The agreed to share their profits as follows: 15% equally, 60% in the ratio of their contributions and the rest was saved for the running of the business. During a certain year, they made a profit of Sh. 87,000.
    Determine
    (a) the amount shared equally (2 marks)

    (b) the amount shared according to the ratio of their contribution (2 marks)

(c) the amount they saved (2 marks)

(d) the share Mwende and Adhiambo got (4 marks)

18. The table below gives the income tax rates in a certain year.

| Taxable income in K£ p.a | Rate (%) |
|---|---|
| 1 – 4500 | 10 |
| 4501-7,500 | 15 |
| 7501 – 10,500 | 20 |
| 10501 – 13,500 | 25 |
| 13,501 – 16,500 | 30 |
| Over 16,500 | 35 |

Mr. Mwamba is a manager in a certain bank. He is entitled to a monthly personal relief of Sh. 3,000 and his tax (PAYE) is Sh. 9000 per month and cooperative shares of Sh.1200 per month is contributed. Calculate

(a) Mr. Mwamba total deductions per month from his earnings. (2 manks)

(b) total tax per month without relief. (1 mark)

(c) Mr. Mwamba's monthly basic salary if his monthly allowances amounted to Sh. 12,000 (7 marks)

19. A bag contains 10 similar pens of which 6 are red and the rest blue in colour. Three pens are picked at random, one at a time from bag without replacement.

(a) Draw a tree diagram to show the various outcomes. (2 marks)

(b) Find the probability that

(i) none of the pens picked is red (2 marks)

(ii) at least one of the pens picked is red (2 marks)

(iii) only one blue pen is picked (2 marks)

(iv) the first two pens picked are of the same colour (2 marks)

20. Three consecutive terms of a geometric progression are $3^{2t+1}$, $9^{t}$ and 81 respectively.

(a) Calculate the value of t (3 marks)

(b) Find the common ratio of the series (1 mark)

(c) Calculate the sum of the first 10 terms of this series to 2 d.p (3 marks)

(d) Given that the fifth and seventh terms of the G.P from the first two consecutive terms of an arithmetic sequence, calculate the sum of the first 20 terms of this sequence (3 marks)

21. (a) Three quantities f, g and h are such that the square root of g varies directly as f and inversely as h. Find the percentage change in h if f decreases in the ratio 4:5 and g increases by 44%. (5 marks)

(b) If g varies as the square root of f and the sum of the value of g when f = 4 and g = 100 is 2:
(i) Find g in terms of f (3 marks)

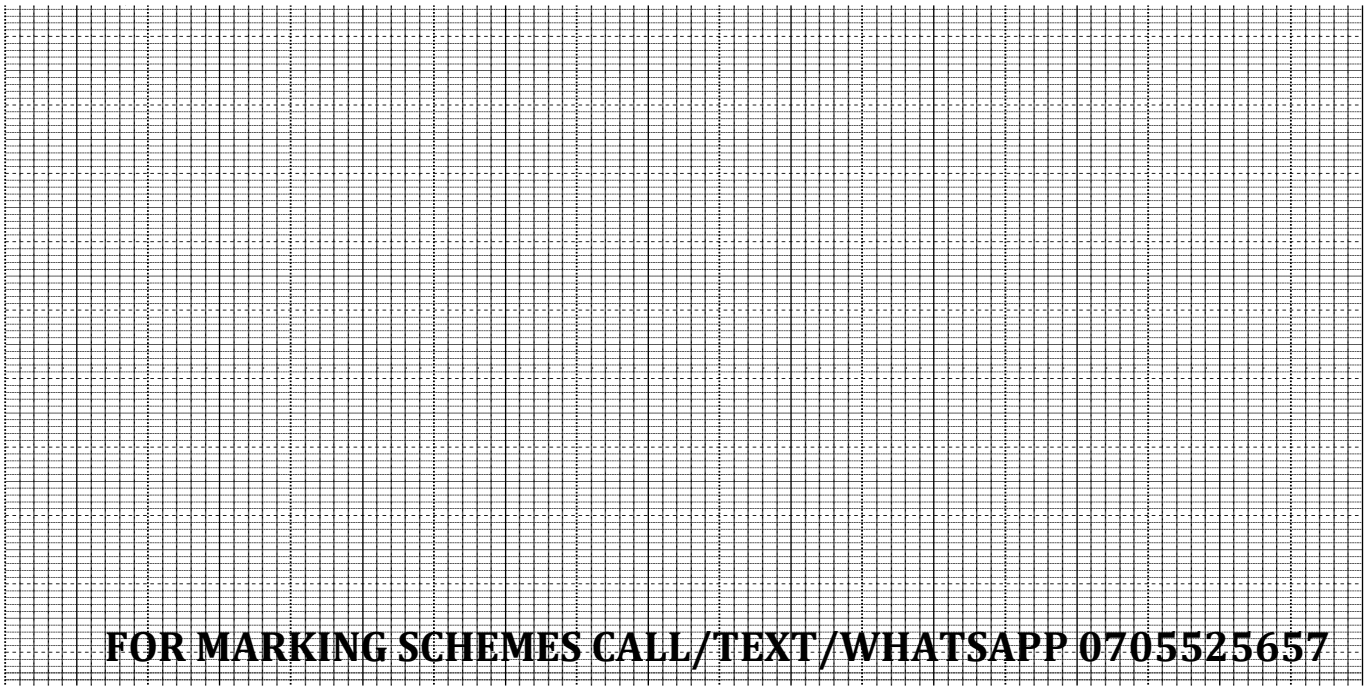
(ii) Find f correct to one decimal place when g = 14 (2 marks)

22. The table below shows values of x and some values of y for the function.
$y = -x^3 - 3x^2 + 4x + 12$ in the range $-4 \leq x \leq 2$.Complete the table by filling in the missing values of y correct 1 d.p (2 marks)

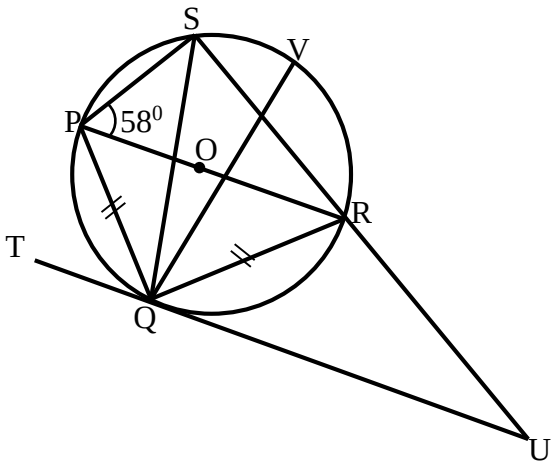
| x | -4.0 | -3.5 | -3.0 | -2.5 | -2.0 | -1.5 | -1.0 | -0.5 | 0 | 0.5 | 1.0 | 1.5 | 2.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| y | 12 | | 0 | -1.1 | 0 | | 6 | | 12 | 13.1 | | | 0 |

(a) On the grid provided draw the graph of $y = -x^3 - 3x^2 + 4x + 12$ for $-4 \leq x \leq 2$
Scale: Horizontal axis : 2cm for 1 unit
Vertical axis : 2cm for 4 units

(b) Use the graph to solve the equations (1 mark)
(i) $x^3 + 3x^2 - 4x - 12 = 0$
(ii) $x^3 + 3x^2 - 5x - 6 = 0$ (4 marks)



23. In the figure below POR is the diameter of the circle O, PQ = QR and angle SPR = $58^0$. TQU is a tangent to the circle at Q. V is a point on the minor arc SR.




(a) Calculate the size of the following angles giving reasons for your answer.

(i) ∠QPS (2 marks)

(ii) Reflex $Q\hat{O}S$ (2 marks)

(iii) ∠QVS (2 marks)

(iv) ∠QVR (2 marks)

(b) Given that SR = 5cm and RU = 4cm, find UQ (2 marks)

24. Two tanks of equal volume are connected in such a way than one tank can be filled by pipe X in 1 hour 20 minutes. Pipe Y can drain one tank in 3 hours 36 minutes but pipe T alone can drain both tanks in 9 hours.
Calculate
(a) The fraction of one tank that can be filled by pipe X in one hour (2 marks)

(b) The fraction of one tank than can be drained by both pipes Y and T in one hour. (4 marks)

(c) Pipe X closes automatically one both tanks are filled. If initially both tanks are empty and all pipes are opened at once, calculate how long it takes before X closes. (4 marks)

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# FORM 4 OPENER EXAM

## Kenya Certificate of Secondary Education (K.C.S.E.)

**232/1**
**PHYSICS**

2 hours

## SECTION A: 25 MARKS

1. The diameter of a ball bearing of mass 0.045kg is measured using a micrometer screw gauge as shown in figure 1 below. (1 mark)

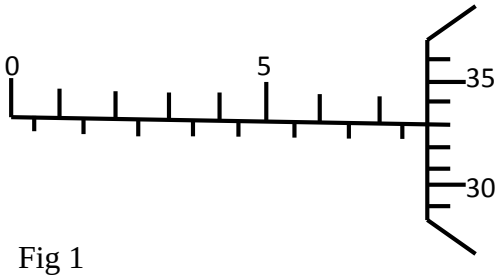


Fig 1

a) Determine the radius of the ball bearing. (1mark)

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b) Determine the density of the ball bearing. (Take Pi = 3.142) (2 marks)

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2. Makau drew the graph below. (2 marks)

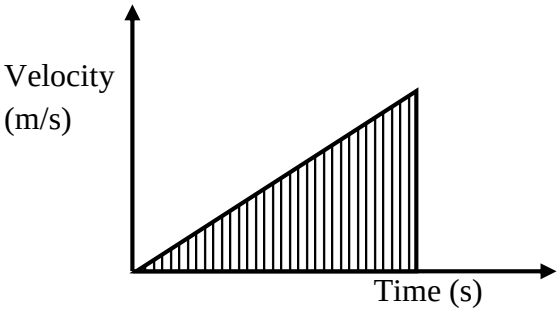


Figure 2

He then worked out the area of the shaded part. State what he was determining. (1 mark)

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3. Give a reason why heat transfer by radiation is faster than heat transfer by conduction. (1 mark)

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4. In smoke cell experiment explain why smoke is preferred. (1mark)

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5. Explain why a river, even on a horizontal ground is faster in some places and slower in others (2marks)

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6. A meter rule of mass 60g is balanced by masses of 24g and 16g suspended from its ends find the position of its pivot from 24g mass. (3marks)

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7. The figure 3 below shows a bimetallic strip with a wooden handle suspended horizontally using a thin thread.

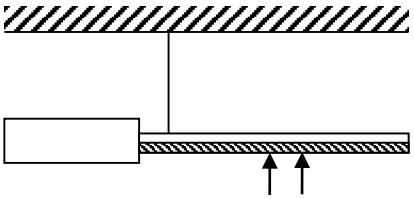

Figure 3

The strip is heated at the point as shown. State and explain the observation made (2marks)

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8. The height of mercury column in a barometer at a place is 64cm what would be the height of a column of paraffin in barometer at the same place. Given that the density of mercury is 13600 kg/m$^3$ and that of paraffin is 800kg/m$^3$. (3marks)

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9. State three effect of force ( 3 marks)

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10. Which of the two empty flask placed on a bench is moist stable. Give a reason for your choice.(2 marks)

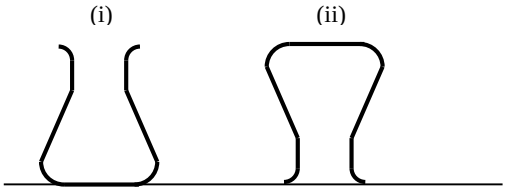


**Figure 4**

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11. The figure 5 below shows two identical springs A and B each of spring constant of 5N/M supporting a load 50N.

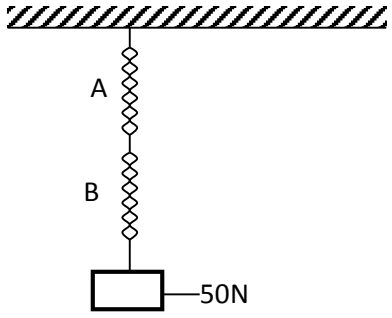


**Figure 5**

Determine the work done by the load on the springs (ignore the weight of the spring). (3marks)

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12. Give a reason why a drop of methylated spirit placed at the back of the hand feels colder than a drop of water at the same temperature. (2 marks)

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13. a) The figure 6 below shows a velocity time graph for the motion of a certain body.

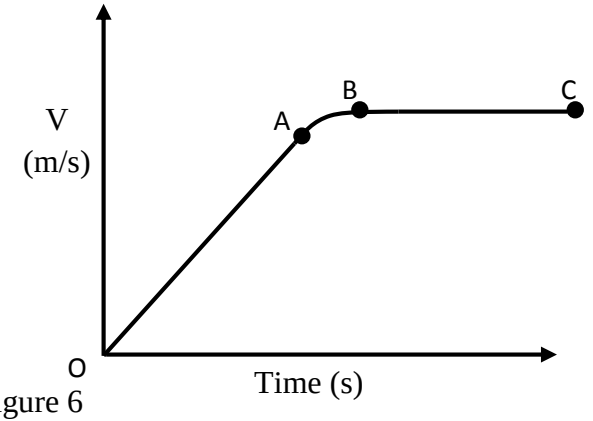


Figure 6

Describe the motion of the body in the region.

i) OA (1 mark)

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ii) AB (1 mark)

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iii) BC (1 mark)

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b) A car moving initially at 10m/s decelerates at 2.5m/s$^2$. Determine:

i) its velocity after 1.5 s (2marks)

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ii) the distance moved in 1.5 seconds (2 mark)

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iii) the time taken for the car to stop. (2 mark)

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14. A lead ball is placed on the surface of a viscous oil and released.

i) State the three forces acting on the ball as it falls through the oil (3 marks)

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ii) State which force varies during the fall and explain why. (2 marks)

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iii) Sketch a graph showing the variation of velocity of the ball with the time from the moment it was released. (2marks)

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iv) From the above graph in (iii) mark the terminal velocity. (1 mark)

v) State the necessary condition to attain terminal velocity in part (IV). (1 marks)

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vi) A car of mass 2000kg is moving at 20m/s. calculate the force needed to reduce the speed to 10m/s over a distance of 20m. (4 marks)

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15. The figure 7 below shows an incline plane, a trolley of mass 60 kgs being pulled up the slope by a force of 200N parallel to the slope. The trolley is moved from point X to Y.

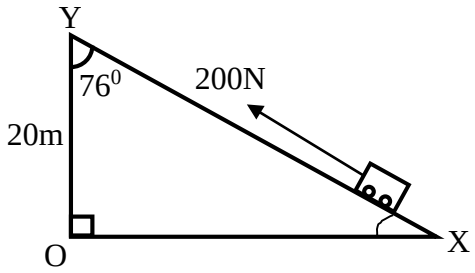


Figure 7

i) Determine work out put (3 marks)

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ii) Work-in put (2 marks)

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iii) Frictional force between the trolley and the inclined plane ( 2mark)

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iv) The efficiency of the system ( 3marks)

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v) Velocity ratio of the system (2 marks)

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16. Water of mass 3 kg initially at 20°C is heated in an electric kettle rated 3.0KW. the water is heated until it boils at 100°C (Take specific heat capacity of water = 4200Jkg$^{-1}$K$^{-1}$, heat capacity of the kettle = 450JK$^{-1}$ and specific latent heat of vaporization of water = 2.3 x 10$^{6}$ J/kg).
Determine

a) i) Heat absorbed by water (2 marks)

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ii) The heat absorbed by the electric kettle (2 marks)

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iii) Time taken by the water to boil (2 marks)

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iv) How much longer it will take to vaporize all the water (2marks)

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b) Explain why it's advisable to use pressure cooker at high attitudes. (2 mark)

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17. a) Using the kinetic theory of gases explain how a raise in temperature of a gas causes a raise in the volume of the gas if the pressure is kept constant. (3 marks)

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b) The figure 8 below shows a set-up that may be used to verify pressure law.

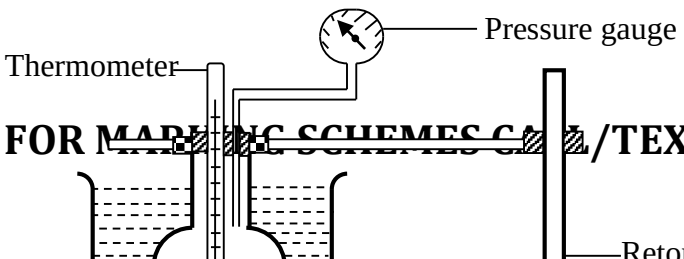

Figure 8

i) State the measurements that should be taken in the experiment. ( 2marks)

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ii) Explain how the measurements taken in (i) above may be used to verify pressure law. (3 marks)

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c) A certain mass of nitrogen gas occupies a volume of $3.6m^3$ at a pressure of $2.0 \times 10^5$ pascals and temperature of $22^oC$. Determine its volume when pressure is reduced to $1.2 \times 10^5$ pa at temperature of $22^oC$. (3 marks)

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# FORM 4 OPENER EXAM

**PHYSICS**

Paper 2

**Time: 2 Hours**

**SECTION A (25 MARKS)**

1. Explain how polarization in a simple cell can be minimized. (1 mark)

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2. Figure 1 below shows the image of an object in a plane mirror.

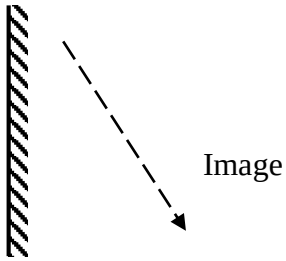


   Figure 1

   Sketch the object as seen in the mirror. (1 mark)

3. Recharging is one of the practices of maintenance of accumulators. State one measurement which used to be taken to help in deciding when the accumulator is due for recharging. (1mark)

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4. Figure 2 shows one ray of light incident normally on face PQ of a glass prism, whose critical angle is 42°.

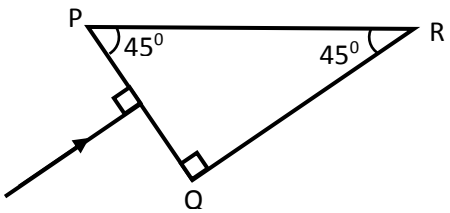


   Figure 2

   Complete the diagram to show the path of the ray as it passes through the prism. (2marks)

5. Figure 3 shows a wave form.

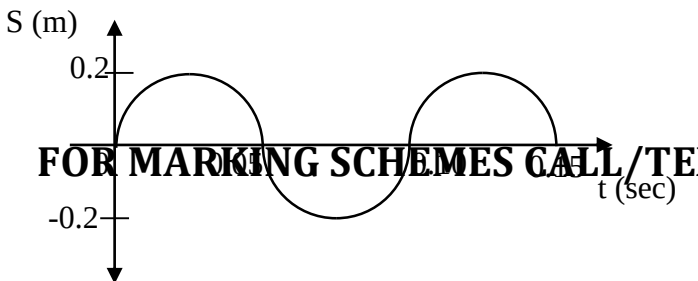

Figure 3

a) State the amplitude of the wave (1 mark)

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b) Calculate the frequency of the wave produced. ( 3marks)

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6. Figure 4 shows two magnets X and Y with steel pins attached freely.

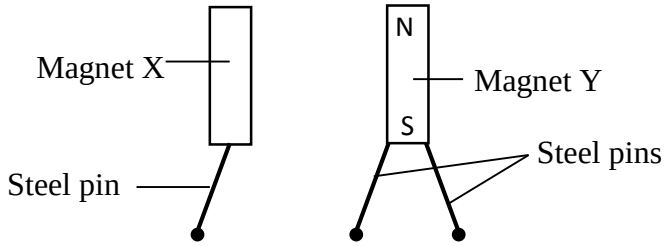


Figure 4

Indicate the poles of magnet X. (1 mark)

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7. Give the difference between hard and soft magnetic materials. Give an example of each. (3 marks)

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8. Figure 8 shows a soft iron rod bend into a U-shaped and an insulated copper wire wound and dc voltage connected.

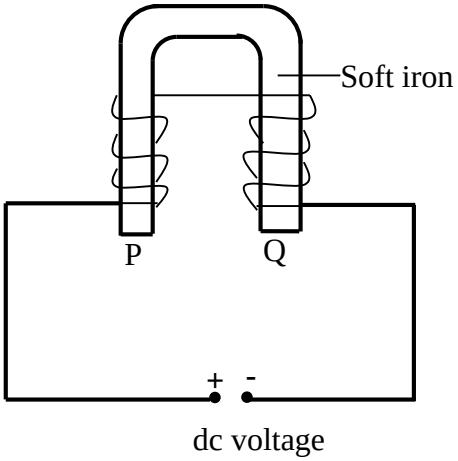


Figure 5

a) Indicate the polarities of ends P and Q (1mark)

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b) Draw the magnetic field pattern between ends P and Q. (3marks)

9. Explain what happens when a positively charged electroscope is touched with a finger. (2marks)

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10. Why are theatre halls covered with spongy materials? (1 mark)

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11. State and explain the effect of enlarging the hole of a pin-hole camera on the image formed (2marks)

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12. Figure 6 below shows a ray of light incident on a plane mirror, M.

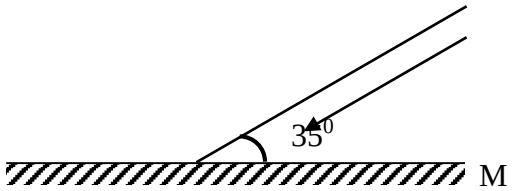


Figure 6

State the angle of reflection (1 mark)

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13. A 10Ω resistor is connected to a battery of e.m.f 8 volts and negligible internal resistance. Calculate the power dissipated by the resistor. (2 marks)

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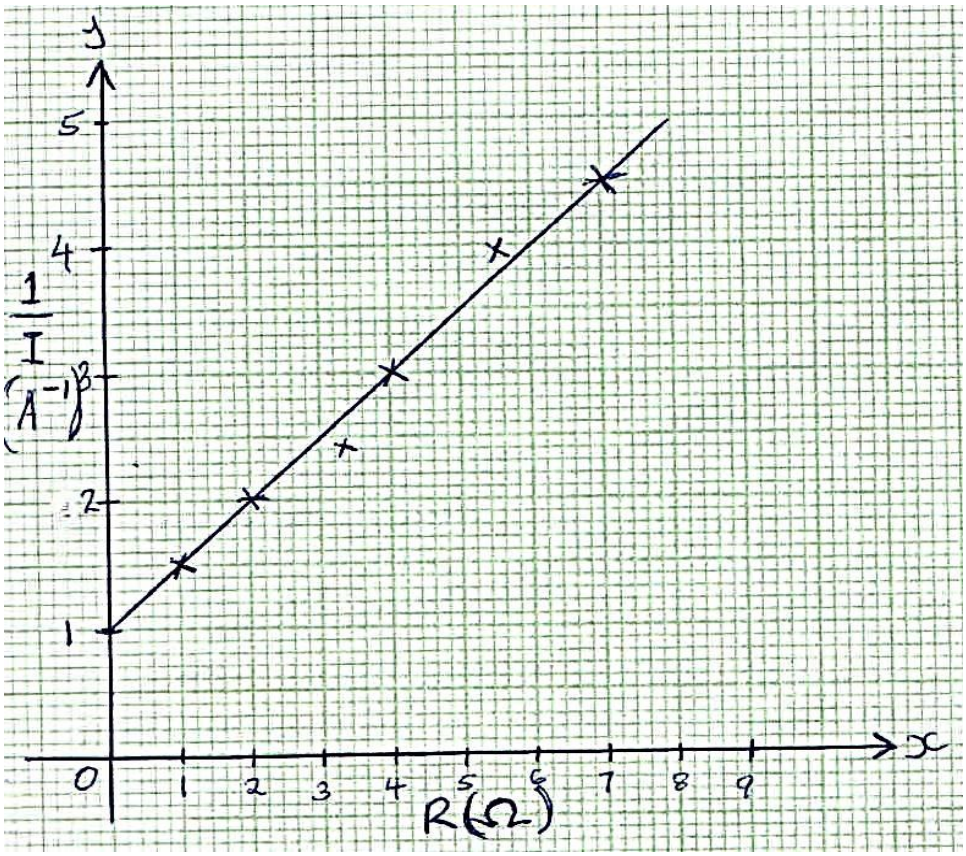
**SECTION B (55 MARKS)**

***Answer all the questions***

14. a) The graph below was plotted by a student. Study it and use it to answer the questions that follow:




i) Determine the slope S, of the graph (3marks)

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ii) Given that the graph obeys the equation $\frac{1}{I} = \frac{R}{E} + \frac{r}{E}$

Determine;

i) The value of E (2marks)

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ii) The value of r (2 marks)

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b) The figure 7 below shows a battery with resistor connected across its terminals. The e.m.f of the battery is 6.0V.

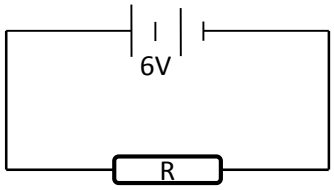


**Figure 7**

The battery causes 90 coulombs of charge to flow through the circuit in 45 seconds; calculate;

i) the current in the circuit (3marks)

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ii) the resistance (R) of the circuit (2 marks)

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iii) the electrical energy transformed in the circuit in 45 seconds. (3marks)

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15. a) i) Give one difference between transverse and longitudinal waves (1 mark)

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ii) A radio station transmits waves at a frequency of 10Mhz. calculate the wave length of the transmitted waves. (take speed of light in vacuum = $3.0 \times 10^8$ m/s (3marks)

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b) i) The refractive index of water is $^4/_3$. Determine the speed of light in water given that speed of light in air is $3.0 \times 10^8$m/s. (3 marks)

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ii) Given that the critical angle of glass is $42^o$, calculate the refractive index of glass. (3 marks)

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iii) Figure 8 shows an object O at the base of a beaker full of a liquid. An observer above the beaker sees its image at point Y inside the liquid.

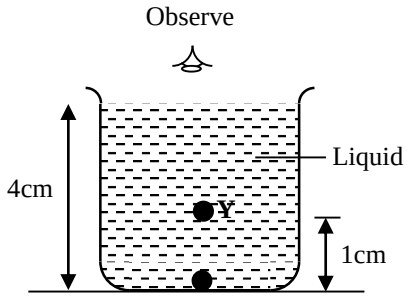


Figure 8

Determine the refractive index of the liquid (3 marks)

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16. Figure 9 below shows a circuit where a battery of 4.5volts, switches A and B, two capacitors $C_1 = 3\mu f$ and $C_2 = 5\mu F$ and a voltmeter, V are connected.

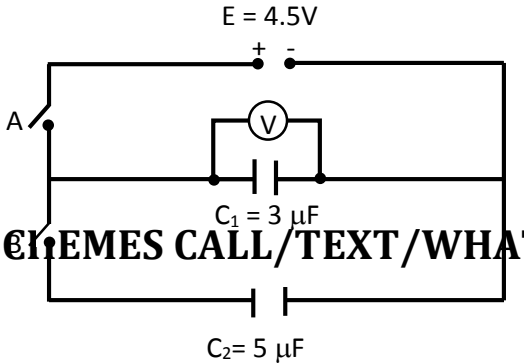

Figure 9

a) Determine the amount of charge on $C_1$ when only switch A is closed. (3 marks)

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b) Calculate the effective capacitance of the two capacitors (3marks)

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c) State what would happen on the voltmeter when;

i) Switch A is closed while switch B remains open. (1 mark)

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ii) Switch A is now opened and switch B (1 mark)

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iii) Explain the observation in (ii) above (2 mark)

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17. a) Define focal length and radius of curvature as applied in concave mirrors (2 marks)

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b) The figure 10 below shows a set up used to determine the focal length of a concave mirror by method of no parallax.

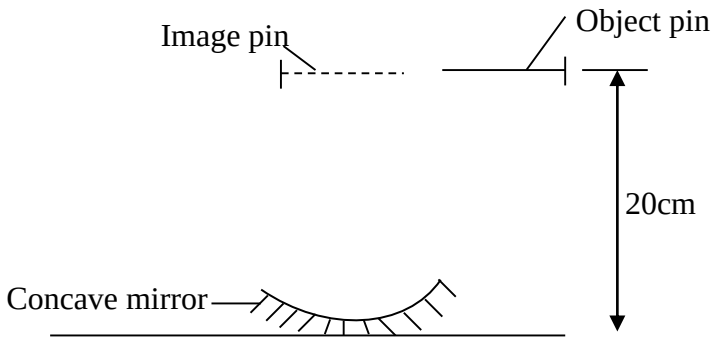


Figure 10

(i) Determine the focal length of the mirror (1mark)

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(ii) Explain why convex mirrors are preferred as driving mirrors to plane mirrors. (1 mark)

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(iii) State two characteristics of images formed in a convex mirror. (2marks)

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c) The graph below shows the variation of $\frac{1}{u}$ against $\frac{1}{v}$ for an experiment used to determine the focal length of a concave mirror.

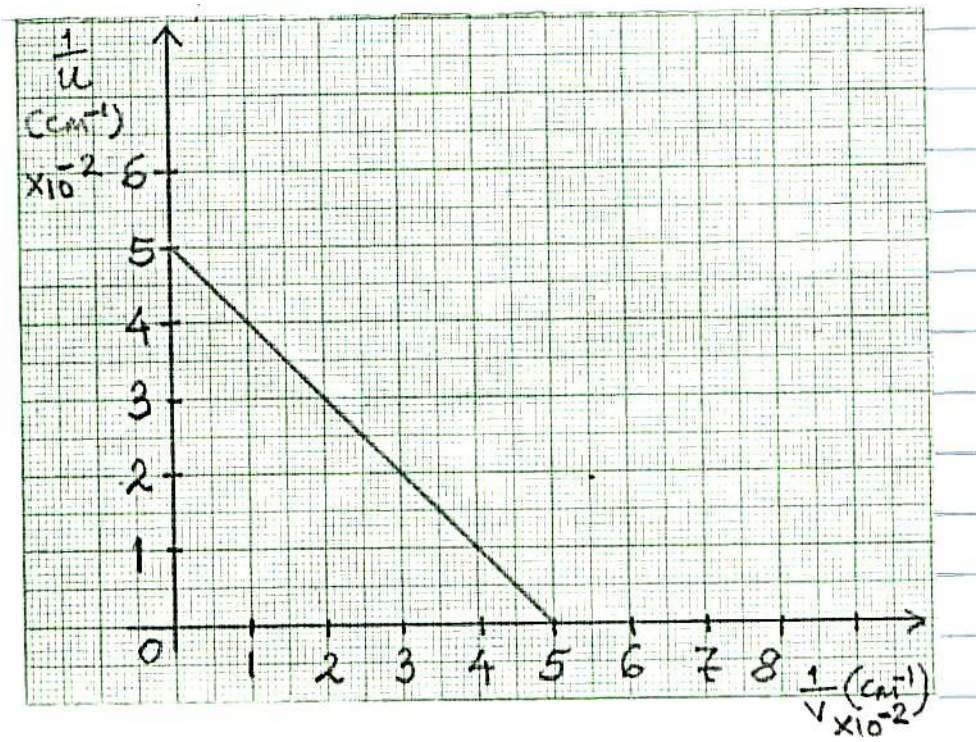

Figure 10

Use the graph to determine the focal length of the mirror. (2 marks)

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18. The figure 11 below shows a transverse wave travelling in water in a tray from shallow end to deep end.

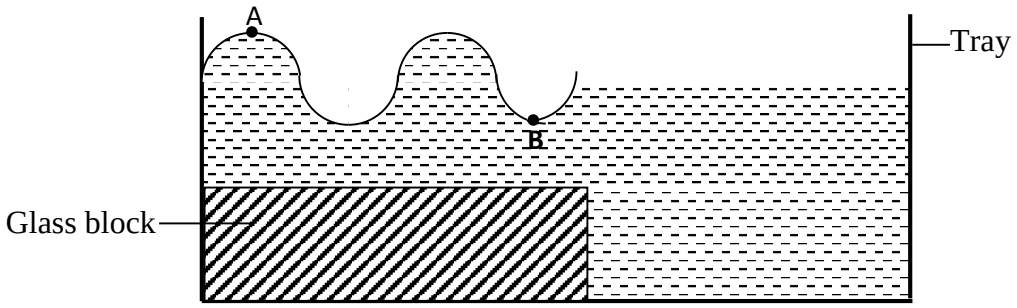


Figure 11

a) Complete the diagram to show the wave as it travel across the tray. (2 marks)

b) State what would happen as the wave travel into the deep end on

(i) Frequency of wave (1 mark)

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(ii) Speed of wave (1 mark)

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(iii) Wavelength of the wave (1 mark)

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c) If the distance between points A and B on the wave is 6m, find the wavelength of the wave. (2 marks)

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d) The figure 12 below shows plane waves incident on a slits.

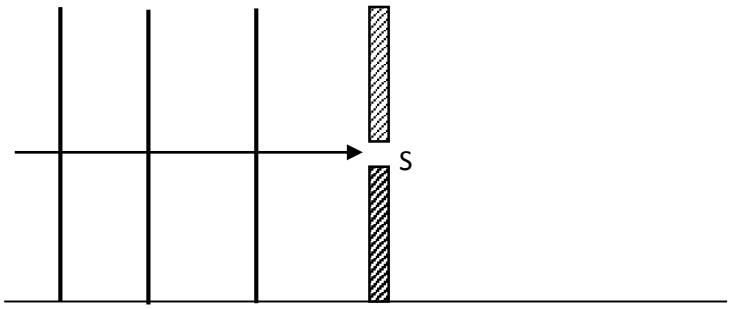


Figure 12

(i) Complete the diagram to show how the waves appear past the slits (1 mark)

(ii) Explain your diagram in d(i) above (1 mark)

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