

0101/215 0304/215
0103/215 0305/215
0105/215 0401/215
0106/215 0402/215
0202/215 0404/215
0301/215 0405/215
0302/215

SUPPORT SUBJECTS

June/July 2019

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

ARTISAN CERTIFICATE

GENERAL FITTER

MOTOR VEHICLE MECHANICS

AGRICULTURAL MECHANICS

WELDING AND FABRICATION

ELECTRICAL INSTALLATION

CARPENTRY AND JOINERY

PAINTING AND DECORATING

MASONRY

PLUMBING

GARMENT MAKING

FOOD AND BEVERAGE

PRODUCTION AND SERVICE

LEATHER WORK

GENERAL AGRICULTURE

SUPPORT SUBJECTS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Three answer booklets;

Mathematical tables;

Drawing instruments.

*This paper consists of **THREE** sections; A, B and C.*

*Each section **MUST** be answered in a separate answer booklet.*

*Answer **ALL** the questions in part I of each section, any **TWO** questions in part II of sections A and B and any **FIVE** questions from part II of section C.*

Maximum marks for each part of a question are indicated.

Candidates should answer the questions in English.

This paper consists of 8 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A: MATHEMATICS

PART I (24 marks)

Answer ALL the questions in this part.

- If 27 is added to -74 and 81 is added to -19 , determine the product of the two sums. (2 marks)
- A concrete mix contains 8 parts of ballast, 4 parts of sand and 1 part of cement. Determine the percentage of each constituent. (3 marks)
- Without using mathematical tables or calculator, approximate the value of
$$\frac{2.19 \times 203.6 \times 17.91}{12.1 \times 8.76}$$
 (2 marks)

- Figure 1 shows a triangular prism.

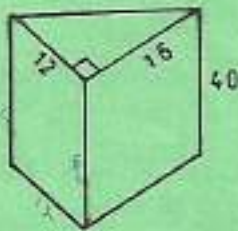


Fig. 1

Determine the:

- volume; (2 marks)
 - total surface area. (2 marks)
- Solve the equation $\frac{x}{3} - \frac{x}{5} = 2$. (3 marks)
 - Make a the subject of the formula $S = ut + \frac{1}{2}at$. (3 marks)
 - 3 new dumpers and 4 new mixers cost Ksh 9.77 millions. Also 5 new dumpers and 2 new mixers cost Ksh 10.31 millions. Determine the cost of a:
 - dumper; (4 marks)
 - mixer. (4 marks)
 - Determine the area of a circle whose circumference is 70 mm. (3 marks)

0101/215	0301/215	0402/215	2
0103/215	0302/215	0404/215	
0105/215	0304/215	0405/215	
0106/215	0305/215		
0202/215	0401/215		

PART II (16 marks)

Answer any TWO questions from this part.

9. (a) A solid has a semi circular base of diameter 7 cm and length 2 m. Determine the total surface area of the solid. (3 marks)
- (b) An electric post stands on a horizontal ground. At a point 80 m from the foot of the post, the angle of elevation to the top of the post is 23° . Calculate the height of the post. (3 marks)
- (c) A right cone has a base diameter of 5 cm and a vertical height of 12 cm. Determine the volume of the cone. (2 marks)
10. (a) Determine the mean, median and mode for the set $2, 3, 7, 5, 5, 13, 17, 4, 8, 3, 4, 3$. (5 marks)
- (b) Figure 2 shows a right angled triangle ABC. Determine $\cos \theta$. (3 marks)

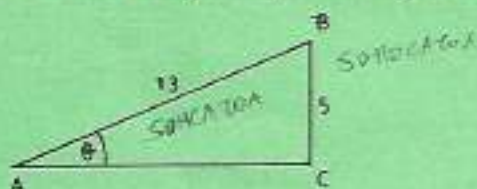


Fig. 2

11. (a) Determine the roots of $x^2 + 2x - 8 = 0$ by factorisation. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (3 marks)
- (b) If the gradient of a straight line graph is $-\frac{2}{9}$ and the y-axis intercept is $-\frac{1}{9}$, determine the equation of the straight line. (2 marks)
- (c) A plane travels due North for 1200 km then due West for 880 km. How far is the plane from the original position. (3 marks)

0101/215	0301/215	0402/215	3
0103/215	0302/215	0404/215	
0105/215	0304/215	0405/215	
0106/215	0305/215		
0202/215	0401/215		

Turn over

SECTION B: SCIENCE

PART I: (24 marks)

Answer ALL the questions in this part.

12. Convert 1.2 g/cm^3 to kg/m^3 . (1 mark)
13. Define sound and state how it is produced. (2 marks)
14. Figure 3 shows a pulley system used to raise a load of 100 N with an effort of 28 N.

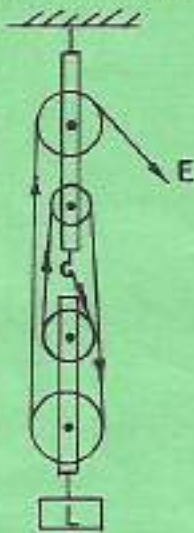


Fig. 3

Determine the:

- (i) velocity ratio;
- (ii) efficiency. (3 marks)
15. A body weighs 40 N in air and 30 N in water. Determine the upthrust force. (2 marks)

0101/215 0301/215 0402/215
0103/215 0302/215 0404/215
0105/215 0304/215 0405/215
0106/215 0305/215
0202/215 0401/215

16. Figure 4 shows a U tube manometer used to measure gas pressure. Determine the gas pressure if the atmospheric pressure is $1 \times 10^5 \text{ N/m}^2$. (3 marks)

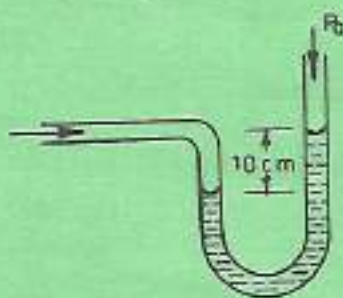


Fig. 4

17. Outline **two** factors that affect electrolysis. (2 marks)
18. Sketch and label the cross section of a dry cell. (3 marks)
19. State **two** situations that make friction a necessity. (2 marks)
20. With the aid of a sketch, outline an experiment that demonstrates that gases expand upon heating. (4 marks)
21. A bar magnet is placed below a plain paper. Iron fillings are scattered on the paper. Sketch what is observed on the paper. (2 marks)

PART II (16 marks)

Answer any **TWO** questions from this part.

22. (a) With the aid of a sketch, outline the theory of atomic structure. (4 marks)
- (b) State **two** properties of each of the following substances:
- (i) acids; 0, 1, 2, 3, 4, 6, 6, 7
- (ii) bases. (4 marks)
23. (a) Outline the process of extracting copper from the earth. (4 marks)
- (b) Differentiate between electromotive force and potential difference. (4 marks)

0101/215 0301/215 0402/215 5
 0103/215 0302/215 0404/215
 0105/215 0304/215 0405/215
 0106/215 0305/215
 0202/215 0401/215

Turn over

24. (a) (i) State the law of conservation of energy.
(ii) Outline the transformation of energy from the generation to the use of hydro-electric power. (3 marks)
- (b) With the aid of a sketch, explain the dispersion of white light. (3 marks)
- (c) A man runs 800 m due North followed by 400 m due South in 3 minutes. Determine the average velocity. (2 marks)

SECTION C: GENERAL STUDIES

PART I (20 marks)

Answer **BOTH** questions in this part.

25. Read the passage below and answer the questions that follow:

As the cooperative movement in Kenya marks 110 years since it was started, one major problem it is facing is low youth enrolment. This is worrying because the cooperative movement is considered as one of the most effective tools of improving individuals' livelihood and the country's economy as well. However, a study by KCA University researchers found that while Kenyan youths know about cooperative movements, many have shied away from joining them.

The cooperative movement plays very crucial roles in the economy. Employment creation is one such role. Currently, cooperative movements encourage savings thereby helping many people to mobilise money for projects, thus improving their living standards. Cooperative movements also contribute in developing infrastructure especially in rural areas. Further, they assist farmers in marketing their produce among other roles.

For cooperative movements to continue thriving, the youth should be encouraged to enrol. This can be done by teaching them the importance of adopting a saving culture early in life. Moreover, the youth who are financially stable should be mentored in order to teach them how to save money through cooperative societies. Finally, the youth should be encouraged to set their own objectives and form cooperative societies to enable them pool resources and work together for a common goal.

0101/215	0301/215	0402/215	6
0103/215	0302/215	0404/215	
0105/215	0304/215	0405/215	
0106/215	0305/215		
0202/215	0401/215		

June/July 2019

- (a) State, according to the passage, the meaning of the following words: (3 marks)
- (i) major;
 - (ii) crucial;
 - (iii) assist.
- (b) State, according to the passage, the roles played by the cooperative movement in Kenya. (4 marks)
- (c) State, according to the passage, how the youth can be encouraged to join cooperative societies. (3 marks)
26. (a) State **three** ways in which language can be a barrier to effective communication. (3 marks)
- (b) State **three** ways in which cultural beliefs contribute to rapid increase in population. (3 marks)
- (c) State **two** reasons why an organization should maintain good public relations. (2 marks)
- (d) List **two** types of markets which a company may sell its products to. (2 marks)

PART II (20 marks)

Answer any FIVE questions from this part.

27. (a) List **two** United Nations bodies that contribute to nation building. (2 marks)
- (b) State **two** roles of music in society. (2 marks)
28. (a) List **two** types of reports that may be written in an organisation. (2 marks)
- (b) Outline **two** factors that should be considered when choosing a profitable investment. (2 marks)
29. (a) List **two** methods of buying a product. (2 marks)
- (b) State **two** functions of the national government. (2 marks)
30. (a) List **two** benefits of using food processing technology. (2 marks)
- (b) List **two** reasons why people prefer mobile cash transfer as a payment method. (2 marks)

0101/215 0301/215 0402/215
 0103/215 0302/215 0404/215
 0105/215 0304/215 0405/215
 0106/215 0305/215
 0202/215 0401/215

31. (a) List **two** forms of written communication. (2 marks)
(b) List **two** family planning methods. (2 marks)
32. (a) State **two** social amenities that may be affected by overpopulation. (2 marks)
(b) List **two** effects of soil erosion. (2 marks)
33. (a) List **two** ways in which modernization influences marriage. (2 marks)
(b) List **two** reasons why a business should prepare a budget. (2 marks)
34. (a) List **two** factors that contribute to decline in traditional sports. (2 marks)
(b) List **two** ways of spending leisure time negatively. (2 marks)

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0101/215	0301/215	0402/215	8
0103/215	0302/215	0404/215	
0105/215	0304/215	0405/215	
0106/215	0305/215		
0202/215	0401/215		

June/July 2019