

NAME..... INDEX
 NUMBER.....

CANDIDATE'S

SIGNATURE.....

DATE.....

121/1
 MATHEMATICS (ALT.1)
 PART 1
 2 1/2 HOURS

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)
 MATHEMATICS (Alt.1)
 PAPER 1
 2 1/2

Instructions to the candidates

- Write your name and index number in the spaces provided above
- Sign and write the date of the examination in the spaces provided above
- This paper contains two sections; **I** and **section II**.
- Answer **ALL** the questions in section **I** and any five questions from section **II**.
- All working and answers must be written on the question paper in the space provided below each question
- Show all the steps in your calculations, giving your answer at each stage in the spaces below each question
- Marks may be given for correct working even if the answer is wrong
- **Non Programmable** silent electronic calculator and **KNEC** mathematical may be used **EXCEPT** where stated otherwise.
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

For examiner's use only

SECTION I

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Marks																	

SECTION II

Question	17	18	19	20	21	22	23	24
Marks								

Grand
 Total

--

PAPER 1 SECTION I (*Answer all questions in this section in the spaces provided*)

1. Evaluate without using a calculator

(3 marks)

$$\frac{2\frac{3}{4} + 1\frac{1}{6} - 2\frac{5}{9}}{2\frac{3}{4} \text{ of } 1\frac{1}{6} : 2\frac{4}{9}}$$

2. Simplify

$$\frac{b}{a^2-ab} + \frac{a+b}{ab}$$

(3marks)

3. A train is supposed to start at 11: 58 p.m and to reach its destination at 1:49 p.m. if it starts 4 minutes late and arrives 18 minutes late, how long it takes to make the journey.

(2 marks)

4. A rectangular container measuring 15 cm by 12 cm contains water to a depth of 10cm. find the new height of water if 1.08 litres of water is drawn from the container.

(3 marks)

5. The angles of a pentagon are x , $1\frac{1}{2}x$, $2\frac{1}{2}x$, $X(x - 20)$ degrees. Find the value of x

(3 marks)

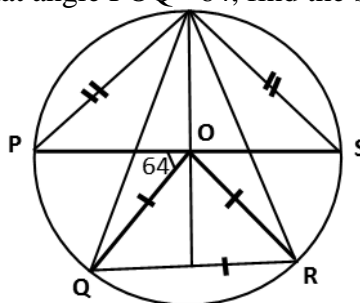
6. Solve for x in the equation
 $25^x + 5^{2x} = 50$

(3 marks)

7. Kamau bought two similar shirts at the same price each. He sold one shirt at Ksh 624 making a profit of $x\%$. He sold the other shirt at Ksh. 416 making a loss of $X\%$. Calculate the buying price of each shirt.

(3 marks)

8. The figure below shows a circle center O with POS as Diameter. QOR is equilateral triangle and $PT=ST$. given that angle $POQ = 64$, find the size of angle:



(i) $\angle PTQ$

(1 mark)

(ii) $\angle STR$

(2 marks)

9. Solve logarithms to evaluate

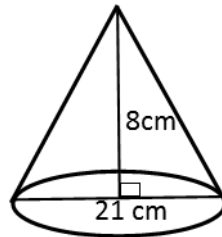
$$\frac{8.329 \times \sqrt[3]{0.07686}}{(0.09533)^2}$$

(4 marks)

10. Given the inequalities $-14 \leq 4 - 3x < 10$
Solve the inequalities and represent the solution on a number line

(3 marks)

11. **The figure below** shows a solid cone of diameter 21 cm and height 8cm. Calculate to decimal place.



- a) The slant height of the cone (2 marks)
b) The total surface area of the cone take $\pi = \frac{22}{7}$ (2 marks)

12. Factorise :- $12a^2b^2 + 11ab - 5$

(3 marks)

13. A school bought 40 text book at a total cost of ksh. 18,000. Some books cost ksh 400 each, while others cost ksh, 600 each. Find the number of text books which were bought at ksh. 400 each

(3 marks)

14. The coordinates of points A, B and C are A (-2, 4), B (3, 1) and C (13, -5) show that points A, B and C are collinear.

(3 marks)

15. The vertices of a rectangular pentagon lie on the circumference of a circle of radius 5 cm. calculate the length of a side of the pentagon.

(3marks)

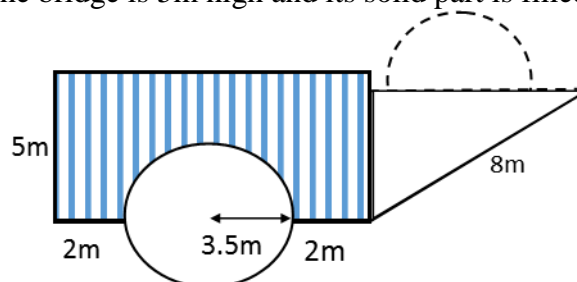
16. An employer increased the salaries of his employees in the ratio of 21: 20. Find the new salary of an employee who was receiving ksh 30,900.

(2 marks)

SECTION II

Answer any FIVE questions from this section

17. The diagram below represents the cross section of a bridge with a solid part and a tunnel through which a river flows. The tunnel is 8m long and its cross-section is a semi-circle of radius 3.5 m. The bridge is 5m high and its solid part is filled with concrete.

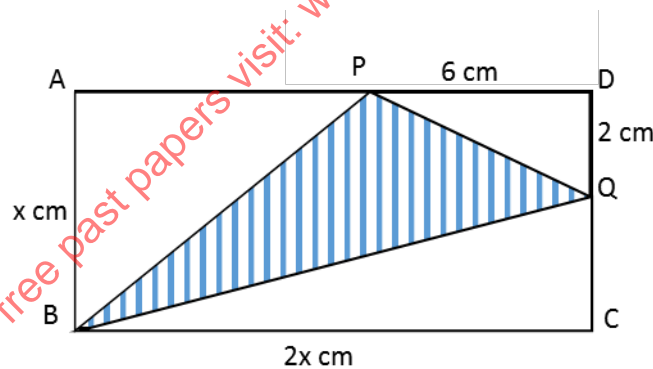


- a) Calculate
- The cross sectional area of the solid part (take $\pi = \frac{22}{7}$) (3 marks)
 - Volume of concrete used to fill the solid part (2 marks)
- b) Concrete is made by mixing gravel, sand and cement in the ratio 5:4:1 by mass. Given that the density of concrete is 1.8 g/cm^3 and one bag of cement has a mass of 50kg. Calculate
- Total mass of cement used (3 marks)
 - Number of bags of the cement used in constructing the bridge (2marks)

18. Plot the points A (0,2) B(2,3) C (2,1) and D (4,0) on the grid below and join them in the order ABCD. (2 marks)

- Reflect the figure in the y-axis (2 marks)
- Reflect the new figure in a) above (both object and its image) in the x-axis (2 marks)
- Show in your diagram the lines of symmetry of the figure (2 marks)
- What's the order of symmetry of figure formed in C above (2 marks)

19. The figure below shows a rectangle ABCD in which $AB = X \text{ cm}$ and $BC = 2x \text{ cm}$ point P and Q are on AD and CD respectively such that $PD = 6\text{cm}$ and $DQ = 2\text{cm}$.



- Find in terms of x
 - Area of triangle BCQ (1mark)
 - Area of triangle BAP (1mark)
 - Area of triangle BPQ (2 marks)
- Given that the area of triangle ABP is 40cm^2
 - Find the value of x (4 marks)
 - Find the area of the shaded region (2marks)

20. The mass of the number of form 2 students were measured to the nearest kilogram and recorded in the table below

40 39 37 41 43 41 43 38 40 43
 45 42 47 48 46 49 50 53 46 47
 39 44 48 51 46 46 54 45 44 46
 50 54 52 47 52 51 53 49 44 52
 46 43 50 49 48 47 46 48 51 41

a) Find the modal class (1 mark)

b) Use the above data to complete the frequency table below (5 marks)

Class (kg)	Frequency F	mid-point x	Deviation $D=x-44$	fd	Fd^2
37-39					
40-42					
43-45					
46-48					
49-51					
52-54					
	$\sum F=$			$\sum fd=$	$\sum Fd^2 =$

c) Use the completed table to calculate

i) The mean mass (2 marks)

ii) The standard deviation (2 marks)

21. After following his customer @ 5 % discount on the price marked a sales agent sold a second hand bus at ksh 1,140 ,000. The owner of the bus received ksh 1,003,200 from the sales agent after the agent deducted his commission.

a) Determine the marked price of the bus. (3 marks)

b) Calculate the percentage commission the agent received. (2 marks)

c) By selling the bus this way the owner incurred the loss of 25 % calculate the amount he had paid for the bus (3marks)

d) Calculate the price of a new bus given that the amount the owner received was only 30 % of the price of a new bus. (2 marks)

22. The figure below shows a sketch of the curve $y = -x^2 + 2x + 11$ and the line $y = 7-x$. the line cuts the curve at P and Q

DIAGRAM

a) Find the coordinates of P and Q (4 marks)

b) Calculate the area of trapezium PQRS (2 marks)

c) Use integration to find the area under the curve between P and Q (2 marks)

d) Hence find the area of the shaded (2marks)

23. A point P divides line AB internally in the ratio 2:1

a) given that the coordinates of A and B are (3,-6) and (6,9) respectively find the Coordinators of P

(3marks)

b) A point Q is on the y-axis such that PQ is perpendicular to AB. Find

i) The gradient of PQ

(2marks)

ii) The equation of line PQ

(2marks)

iii) Determine the coordinates of Q and hence the length of PQ

(3marks)

24. A school hired a number of buses and matatus to transport a group of students to Nairobi. The number of matatus was three times the number of buses. The hire charges were ksh. 3500 per matatu and ksh. 6500 per bus. The total cost of hiring the vehicles were ksh. 85000. Each matatu can carry 13 students while a bus can carry 65 students.

a) Determine the number:

i) of buses hired

(4 marks)

ii) of matatus hired

(1mark)

b) Calculate the number of students transported to Nairobi if each vehicle was filled to capacity and number of vehicles made a double trip

(3marks)

c) Each student contributed ksh. 85 towards the cost of the trip and the school paid the remaining amount. How much did the school pay?

(2marks)

for free past papers visit www.freekcsepastpapers.com

for free past papers visit: www.freekcsepastpapers.com