

2 ¹/₂ HOURS

Instructions to candidates

- 1. Write your name and index number in the spaces provided above.
- 2. Answer ALL questions in section 1 and only five questions in sec II
- 3. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- 4. Marks may be given for correct working even if the answer is wrong.
- 5. Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

For examiners use only

Section 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Section II																
17	18	19	2	20	21	22	23	24	To	tal	Grand	1				
											Total					

SECTION I (50MARKS)

1. Evaluate without using calculator or mathematical tables leaving your answer as a

SECTION I (50MARKS)
Attempt ALL questions from this section
1. Evaluate without using calculator or mathematical tables leaving your answer as simplified fraction.

$$\frac{4}{16} e^{\frac{1}{20}} \left(\frac{3}{4} - \frac{1}{20}\right) \qquad (2mks)$$

2. What is the exact value of $\frac{2W(x-2)^2}{y+1}$ if x=3, y=x+3 and w=2x+y (2mks)

3. Simiyu and Nasike each collected a number of stones in an arithmetic lesson. If Simiyu gave Nasike 5 stones, Nasike would have twice as many stones as Simiyu. If initially Simiyu had five stones less than Nasike, how many stones did each have? (3mks)

4. The figure below shows vectors *a* and *b*. Construct on the same grid, *c* given that c = 2a - b(3mks) GRAPH GRAPH GRAPH GRAPH GRAPH

A cylinder of radius 14cm contains water. A metal solid hemisphere of radius 6.8cm is submerged into the water in the cylinder. Find the change in height of the water in the cylinder. (4mks)

6. At 90km/h, a car takes 2 hours to cover a distance A to B. How long would it take to cover the same distance if the car was travelling at 120km/h? (2mks)

7. Solve for x and y in the equation

 $36^{x}(24)^{y} = 192$

(4mks)

Papers Visit www.freekcsepastpapers.com 8. A sales man earns a basic wage of Ksh 1,500 per week. In addition , he is paid For More Free Commission per week as follows:

Commission
0%
2%
$2 \frac{1}{2} \frac{9}{0}$
5%

During that week, he sold goods worth Ksh 115,000.What was his total pay for that week? (4mks)

- 9. The coordinates of the points P and Q are (1, -2) and (4, 10) respectively. A point T divides the line PQ in the ratio 2:1
 - a) Determine the coordinates of T (2mks)

b) Find the equation of the line perpendicular to PQ and passing through T. visit www.freekcsepat

(2mks)

10. For the quadrilateral ABCD given below, find its image under reflection in the line y=0 followed by reflection in the line y= -x (3mks) FOT NOTE FTEE GST NOTE

11. The figure below shows an arc ACE of a circle with centre O and radius 6cm. If BC=CD=4cm, calculate the area of the shaded region if DE=AB =1.53cm. (4mks)



12. The diagram below shows part of the quadrilateral PQRS.

Q

R

Given that 2RS=RQ and that PQRS is a cyclic quadrilateral, complete the diagram. (3mks)

- 13.A poultry farmer has twenty times as many hens as turkeys and three quarters as many ducks as turkeys.
 - a) If there are t, turkeys, write down a simplified expression in terms of t for the total number of birds on the farm. (1mk)

b) Given that he has 72 ducks, calculate as a percentage the sum of turkeys and ducks to the number of hens on the farm. (3mks)

- 14. The sum of angles of a triangle is given by the expression (2a+b)⁰ while that of a quadrilateral is given by (13a-). Calculate the values of a and b. (3mks) Visit www.freek
- 15. The table below represents the marks scored by form 4 students in an end of term examination.

0	Marks	6 - 10	11 -20	21 - 35	36 - 55	56 - 65	66 -70
A.L.	Frequency	3	5	8	10	8	6
FOR MORE	Calculate the	e upper quar	tile.	(2mks)			

16. Determine the inequalities that represent and satisfy the unshaded region below. GRAPH (3mks)

SECTION II (50MARKS)

Attempt only FIVE questions from this section.

17. The figure below shows a pertable Kennel.



a) Calculate

i) The total surface area of the walls and the floor. (2mks)

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- ii) The total area of the roof. (2mks)
- b) The cost of roofing is Ksh 500 per square meter and that of making walls and floor is Ksh 600 per m². Find the cost of making the Kennel. (2mks)
- c) Find the cost of roofing another Kennel whose dimensions are 50% more than those of the given Kennel. (2mks)

d) Calculate the volume of air inside the Kennel in cm³.

(2mks)

Visit www.freekcset 18. Given the coordinates of the points A, B and C as (3,-2); (6, 4) and (9, 3) respectively. a) Express the following vectors in terms of i and jFOR NOTE Free KCSE i) AB (1mk)

b) Calculate the magnitude from A to C through B. (3mks)

- c) Determine the coordinates of the mid point of AC. (2mks)
- d) If R divides AC externally in the ratio 3:1, determine the coordinates of R. (3mks)

19.A flag post 12m long is fixed on top of a tower. From a point on horizontal ground, the angles of elevation of the top and bottom of the flag post are 46° and 33° sibit www.freekc respectively.

Calculate

Q

a) The korizontal distance from the point on the ground to the base of the tower. FOT NOTE Free KCSB Past

(4mks)

- b) The total height of the tower and the flag. (2mks)
- c) The shortest distances from the point on the ground to i) The top of the flag post. (2mks)
 - ii) The top of the tower.

(2mks)

20. Four towns P, Q, R and S are such that town Q is 120km due east of town P. Town R is 160km due north of town Q, town S is on a bearing of 330° from P and on a bearing of 300⁰ from R.

rs.com

a) Using ruler and compasses only, show the relative positions of towns P,Q,R and S. Take a scale of 1cm rep 50km. (5mks)For wore Free KCSB past papers

1 \	D
b)	Determine
,	

i) The distance SP in km ii) The bearing of S from Q

(2mks)(1mk)

iii) How far north, S is, from line QP produced. (2mks) 21. The figure below shows two intersecting circles of centres C and D radii 16cm and 20cm respectively. The two circles subtend angles θ_1 and θ_2 at their centres respectively and intersect at P and Q as shown.



a) Given that the area of triangle PCQ is 80.14cm²,calculate the size of i) The angle marked θ_1 (2mks)

ii) The angle marked θ_2

(3mks)

b) Calculate the area of the shaded region. (5mks)

FOR NOTE Free

- ers.com 22. A private farmer in Mwea produced 14,400bags of rice in 2008. This was a decrease of 20% over the production in 2007. In 2009 he increased production by 30%. In 2010, he managed to produce 12,000 bags of rice.
 - a) Find the number of bags of rice he produced in;



- b) What was the percentage decrease in production in 2010 over that of previous year? (2mks)
- c) Calculate the percentage decrease in production in 2010 over that in 2007 (2mks)

d) The price per bag of rice was Ksh 3500 in 2010, how much did he get if he sold 65% of the produce in that year. (2mks)

23. The diagram below (not drawn to scale) shows the position of a harbor H and three islands A,B and C. C is due North of H. The bearing of A from H is 0620 and angle HAB=128° HA=54km and B=31km.

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a) Calculate the distance HB

(3mks)

(1mk)

b) Find the bearing of B from A

c) Given that the bearing of A from C is 133⁰, calculate AC (3mks)

d) A light ship L is positioned due North of H and equidistant from A and H. Calculate HL. (3mks) 24. The table below gives some of the values of x and y for the function $y = \frac{1}{2}x^2 + 2x + 1$ in the interval $0 \le x \le 6$.

_				<u>_</u>					
	X	0	1	2	3	4	5	6	
	у	1	t. X.	7			23.5		
-									

Complete the values in the table above. a)

Use the values in the table to draw the graph of the function on the grid provided Þ) below. (2mks)

GRAPH

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(1mk)

c) Using the graph and the mid- ordinate rule with 6 strips, estimate the area bounded by the curve, the x eaxis, the y-axis and the line x=6 (3mks)

Using integration, calculate the exact area and hence find the percentage error made when mid-ordinate rule is used . Give your answer correct to 2d.p. (4mks) hote