Name …………………………………………………………………………………… Adm. No. ……………………………..

 Class …………………………………….

121/1

MATHEMATICS ALT 1

MARCH/APRIL 2015

2½ HRS

MWAKICAN(MJET) END OF TERM 1 EXAM

Instructions

(a) Write your name, class and admission number.

(b) Answer all the questions in section 1 and ONLY Five in section 11.

(c) Show all the calculations in the spaces provided

(d) KNEC mathematical tables and non-programmable calculators may be used.

For Examiners Use

Section 1

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

Section 11

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Total |
|  |  |  |  |  |  |  |  |  |

|  |
| --- |
| Grand total |
|  |

**SECTION 1 (50MKS)**

Q1 Evaluate without using a calculator.

 $ $ $\frac{1}{2}\left\{\left(\frac{3}{5}\right. + ¼(\frac{7}{3} – \frac{3}{7} ) of 1½ ÷\left.5\right)\right\}$ (3mks)

Q2 What must be added to the difference between 5½ and 3½ to get 18½. (2mks)

Q3 Use logarithms to evaluate

 $\sqrt[4]{\left(\frac{4.562 x 0.038}{0.82}\right)}$ (4mks)

Q4 Solve the inequality 3 – 5x < 2x + 17 $\leq x+22 $and write down the integral values of x. (3mks)

Q5 Line L1 passes through (1,2) and is perpendicular to L2. They meet at (4,17). Find the equation of L2 in the form y=mx + c. (4mks)

Q6 A metal bar with dimensions 168cm by 4.6cm by 2.8cm has a density of 8.5g/cm3,calculate its mass in kg. (2mks)

Q7 Four interior angles of a hexagon are 100o,140o,125o and 105o. The fifth interior angle is four times the sixth. Find the fifth interior angle. (3mks)

Q8 Kinjo,Muthii and Alex shared the profit of their business in the ratio 4:7:9 respectively. If Kinjo receives sh. 60,000

(a) How much profit did the business make? (2mks)

(b) Calculate Muthi’s share of the profit. (1mk)

Q9 Simplify $\frac{2(x^{2}- 36)}{\left(x-6\right)(2x+5)}$ $÷ \frac{x-4}{2x+5}$ (3mks)

Q10 Simplify $\frac{3a}{2b }$ + $\frac{4a}{3b}$ - $\frac{5c}{4b}$ (2mks)

Q11 A man was born in 1966. His father was born in 1928 and his mother three years later. If the man’s daughter was born in 1992 and his son 5 years earlier, find

(a) the difference between the age of the man’s mother and that of his son. (2mks)

(b) the sum of the ages of his father and his daughter in 2014. (2mks)

Q12 A right pyramind is made of a square base of side 3cm. The slant edges are 4cm each.

(a) draw an accurate net of the pyramid. (2mks)

(b) Find the area of one of the triangular faces using the net. (2mks)

Q13 Simplify ( $\frac{8}{27})^{-2/3}$$÷ \left(81\right.)^{¼}$

Q14 Find angles a,b,c and d in the figure below given that O is the centre of the circle.

 B

 a a=

 b=

 A 40o O30o c=

 C

 d=

 D

 (4mks)

Q15 Find the scalars m and n such that m$\left(\genfrac{}{}{0pt}{}{4}{3}\right)$ + n$\left(\genfrac{}{}{0pt}{}{-2}{1}\right)$ = $\left(\genfrac{}{}{0pt}{}{0}{-3}\right)$ (3mks)

Q16 Two spheres have surface areas of 36cm2 and 49cm2. If the smaller one has a volume of 20.2cm3,calculate the volume of the larger one. (3mks)

SECTION II (50MKS)

Answer only 5 questions in this section

Q17 The table below shows the masses to the nearest kg of 65 animals in a farm.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mass in kg | 26-30 | 31-35 | 36-40 | 41-45 | 46-50 | 51-55 |
| Frequency | 9 | 13 | 20 | 15 | 6 | 2 |

Use the table to find

(a) the modal class (1mk)

(b) mean of the data (3mks)

(c) the median mass (3mks)

(d) The percentage of animals with a mass of between 36kg and 45kg. (3mks)

Q18 A car in motion accelerates from an initial velocity of 10m/s to attain a velocity of 30m/s in 15 seconds. it maintains this speed for a further 30 seconds before decelerating to stop after another 10 seconds.

(a) Using a suitable scale,draw the velocity- time graph to represent the motion. (3mks)

(b) Use the graph to determine

 (i) total distance travelled by the car in that duration. (3mks)

(ii) the retardation/deceleration of the car. (2mks)

(iii) average speed of the car through the whole journey. (2mks)

Q19 A plane leaves airstrip L and flies on a bearing of 040o to airstrip M, 500km away. The plane then flies on a bearing of 316o to airstrip N which is 350o from L. The plane flies due south for 400km to airstrip Q before flying directly back to airstrip L.

(a) show by scale drawing the positions of all the airstrips. (3mks)

(b) Use the scale drawing to determine

(i) the distance between M and N (2mks)

(ii) the distance between L and N (2mks)

(iii) the bearing of L from Q (1mk)

(iv) the total distance travelled by the plane (2mks)

Q20(a) Using a pair of compasses and a ruler only,construct triangle ABC in which AB=4.6cm.BC=5.4cm and <ABC = 75o. Drop a perpendicular from B To meet AC at N. (4mks)

(b) measure (i) AC

 (II) BN (2mks)

(c) measure (i) <ACB (1mk)

 (II) <CAB (1mk)

(d) calculate area of $∆$ABC (2mks)

Q21 The diagram below shows a vertical section through a 30m long tunnel. The tunnel floor is 12m wide and the walls which are perpendicular to the floor are 4m high. The curved roof is an arc of a circle with its centre at the midpoint of the floor. Calculate

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4

 12

(a) the radius of the circle of which the roof is an arch (2mks)

(b) the area of the vertical cross section (6mks)

(c) the surface area of the curved roof of the tunnel (2mks)

Q22 Bundi bought 250 jackets at the cost of sh. 205 each. He sold 71 jackets at sh 240 each,85 jackets at sh.255 each,45 jackets at sh. 215 each,and the rest at sh 230 each. His transport expenses amounted to 20% of the cost price and the overheads were 80% of the transport expences.

 Calculate

(a) Bundi’s total expenses on transport and overheads. (4mks)

(b) Bundi’s net loss (4mks)

(c) The net loss as a percentage of the cost price to 1d.p. (2mks)

Q23 A car hire company worked out the charges of hiring a car for a day by using a basic charge and an extra charge for every kilometre travelled.

 Table of charges.

 No. of km x 40 60 80 100 120

 charges in sh y 700 850 1000 1150 1300

(a) Represent the information on a graph (3mks)

(b) Use the graph to find

 (i) cost per km (2mks)

 (ii) the basic charge (1mk)

 (iii) the equation of the graph (1mk)

(c) Find from the graph the total cost for hiring the car and travelling for 75km. (1mk)

(d) A customer paid sh 1900. Calculate the distance he travelled. (2mks)

Q24 The figure below represents a regular pentagon ABCDE in which AB=20cm,and O is the centre of the pentagon. BE meets AC and AD at F and a respectively.

A

20

 F G

E

B

 o

D

C

Calculate

(a) angles

(i) BAE (2mks)

(ii) ABE (1 mk)

(iii) FAG (2mks)

(b) the lengths

(i) BE (2mks)

(ii) AO (3mks)