## ANESTAR SCHOOLS MID TERM TWO EXAM 2017

## FORM FOUR MATHEMATICS

**NAME……ADM……CLASS……**

**SECTION I (attempt all questions in this section)**

1. Use logarithms to evaluate

$$\sqrt[3]{\frac{45.3\times 0.00697}{0.534}}$$

(4mks)

2.By rounding each number to the nearest tens, approximate the value of

$$\frac{2454\times 396}{66}$$

Hence,calculate the percentage error arising, from this approximation to 4 significant figures(3mks)

3.a) Write down the first five terms of the expansion of $(1-\frac{x}{3})^5$ (2 mks)

b. Using the first three terms of the expansion. Find the values of $(1.01)^5$ to 4dp. (2mks)

4 Find the equation of the tangent at point (3,1) to the curve $y= x^2 - 4x + 4$. (3 Marks)

5. A contractor employs 40 men to do a piece of work in 60 days each man working 9 hours a day. He is then requested to do the job in 48days. How many more men working l0 hours a day does he need to employ. (3 Marks)

6.A (50°S 20°E) and B(50°S I 60°W) are two points on the earth's surface. Calculate the distance between A and B in kilometer along the great circle. (take radius of the earth to be 6370km).(4 Marks)

7. A line segment joining two points P(0,7) and S (2, 3.8) is divided externally by point Q in the ratio 7:3. Find the co-ordinates of point Q.
(3mks)

8 A stone is thrown vertically upwards from point 0. After t seconds, the stone is S meters from 0 Given that $S= 29.4t - 4.9t^2$. Find the maximum height reached by the stone. (3marks)

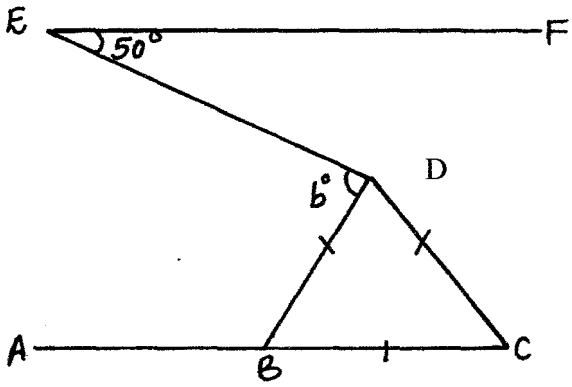
9. Find the value of m in the equation below $\left(\frac{1}{27}\right)^m \times (81)^{-1} = 243$ (3marks)

10. Solve the equation : $\log_2(2+3x) + 3\log_2 2 = 2 + \log_2{}^{(2x+6)}$ (3mks)

11. The area of triangle ABC is $42cm^2$. The triangle ABC is transformed using the matrix $\begin{pmatrix} 4 & X \\ \cdot & \cdot \end{pmatrix}$ to obtained the image triangle $A^1B^1C^1$ whose area is $168cm^2$. Determine the value of x. (2mks)

12. Given that p varies directly as the square of x and inversely as y and that y varies directly as the product of p and x. Determine how P varies with x. (3mks)

13. Giving reasons, find the angle marked b, given that EF is parallel to AC (2mks)




14.A rectangular plot of land measures 745 m by 230 m has two support posts on every corner.. A gate 5m wide With double posts on side is at one side of the plot. Find the number of posts required to fence the plot if they are placed 5m apart. (4 marks)

15.Evaluate using square root, cubes and reciprocal tables; (3 marks)

$$\frac{4}{\sqrt{0.07}} + \frac{1}{(134.67)^3}$$

16 The figure below shows a square based non- right pyramid ABCDV. Side BCV is an equilateral triangle of side 8 cm and is perpendicular to base ABCD. Calculate to4 s.f the volume of the pyramid.(3mks)

**SECTION II (attempt any five questions)**

17. Use the taxation rates in the table below to answer the questions that follow:

| 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 |

MrOkweba is a manager of a certain company who is entitled to a monthly personal relief of sh. 3000 and his tax (P.A.Y.E) is sh. 9000 per month and cooperative shares of sh. 1200 per month is contributed.
Calculate

(a) Mr. Okweba's total deductions per month from his earnings,
(2mks)

(b) Total tax per month without relief.
(1mk)

(c) Mr. Okweba's monthly basic salary in his monthly allowances amounted to sh. 12,000(7mks)

18. The probability that a pupil goes to school by a boda-boda is $\frac{2}{3}$ and by a matatuis ¼ .If he uses a boda-boda the probability that he is late to school is $\frac{2}{5}$ and if he uses a matatu the probability of being late is $\frac{3}{10}$. If he use other means of transport the probability of being late is $\frac{3}{20}$.

(a) Draw a tree diagram to represent this information.
(3mks)

(b) Find the probability that he will be late for school.
(3mks)

(c) Find the probability that he will be late for school if he does not use a matatu. (2mks)

(d) What is the probability that the will not be late to school
(2mks)

19. R1 denotes reflection along line x=14.R2 denotes reflection along line x =2.T denote translation vector $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$ A triangle ABC has vertices A (1,4), B (3,4) and C (3,6)

(a) Show the image $A^1B^1C^1$ under $R^1$
(2mks)

(b) Find and draw $A^{11}B^{11}C^{11}$ the image of $A^1B^1C^1$ under $R^2$.
(3mks)

(c) Find and draw $A^{11}B^{11}C^{11}$ the image of $A^{11}B^{11}C^{11}$ under T.
(3mks)

(d) Describe a single transformation which maps the object onto the final image. (2mks)

20. Use a ruler and compass ONLY for all constructions in this question.

(a) Construct a triangle ABC in which AB=6 cm, BC= 7 cm and angle ABC = $75^0$ (2 mks)

(b) Measure (i)the length of AC (1 mk

(ii)the angle A (1 mk)

(c) (i)Construct the locus of p such that BP = P (2 mk

(ii)Construct the locus of Q such that Q is on the opposite side of BC as A and angle BCQ = $30^0$. (1 mk)

(d) (i the locus of P and Q meet at X, mark X . (1 mk)

(ii)Construct the locus of R in which angle BRC = $120^0$. (2 mks

21. The quantity p and r are connected b the equation $p = kr^n$. The table of values of p and r is

Givenbelow.

| | | | | | | |
|---|---|---|---|---|---|---|
| P | 1.2 | 1.5 | 2.0 | 2.5 | 3.5 | 4.5 |
| R | 1.58 | 2.25 | 3.39 | 4.74 | 7.86 | 11.5 |

(a) State a linear equation connecting p and r.
(1mk)

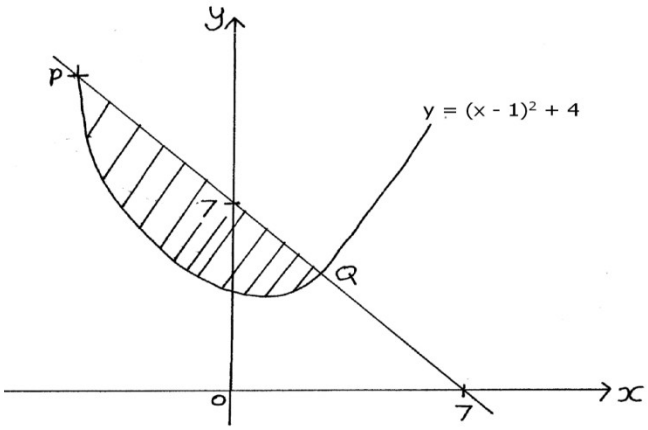
(b) Using the scale 2cm to represent 0.1 units on the y – axis and 1cm rep 0.1 units on the

x – axis, draw a suitable line graph on the grid provided.
(5mks)

(c) Hence estimate the value of k and n
(3mks)

(d) Find the law connecting p and r
(1mk)

22. The diagrambelow shows a straight line intersecting the curve $y = (x - 1)^2 + 4$ at the points P and Q
The line alsocuts the x – axis at (7, 0) and y – axis at (0, 7)




(a) Find the equation of the straight line in the form y = mx + c.
(2mks)

(b) Find the co-ordinates of P and Q
(4mks)

(c) Calculate the area of the shaded region.
(4mks)

23.The first three consecutive terms of a geometric progression are $3^{2x+1}$, $9^{x}$ and 81 respectively.

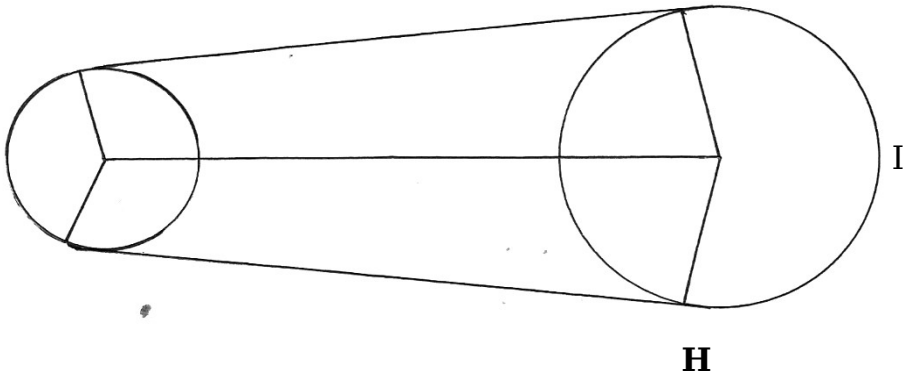
a) Calculate the value of x (3mks)

b) Find the common ratio of the series
(2mks)

c) Calculate the sum of the first 10 terms of this series
(2mks)

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

24. The diagram below shows a design model of a race course drawn to scale of 1:5000,000. It consists of two circles centre A and B radii 0.5cm and 0.8cm respectively and the distance between their centres is 3.0cm




Calculate in km:

(i) The length of leg CD (2mks)

(ii) The length of the leg DEG ($\pi$=3.142)
(2mks)

(iii) The length of the leg HIC ($\pi$=3.142)
(2mks)

(iv) During a race, the course is manned by race officials placed 500m apart and each is paid Kshs.2300/= per day. How much is needed to pay race officials for one day event (4mks)