NANDI EAST, NANDI SOUTH & TINDERET SUB-COUNTIES JOINT EVALUATION 2016

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MATHEMATICS ALT. A
PAPER 1
JULY / AUGUST 2016
TIME: 2½ HOURS

SECTION 1: (50 MARKS)
Answer ALL Questions in this section

1. Without using a calculator, evaluate:- (2mks)

$$\frac{-2(5+3)-8\div 2+5}{-3\times -5+-2\times 4}$$

2. Use mathematical tables to solve to 2 decimal places the value of: (3mks)

$$4.857^2-\frac{1}{0.3386}$$

3. The line which passes through the points P(4,a) and (2a,2) is parallel to line whose equation is 2y – 3x = 6). Find the value of a. (3mks)
4. A saleslady sold goods whose marked price was sh. 340,000 ata discount of 3%. She was paid sh. 16,490 as commission for the sale. Calculate the percentage rate of commission she was paid. (3mks)
5. Solve $2^2-5x-3=0$ using completion of squares method. (3mks)
6. A solid metal cuboid measuring 7.2cm long, 4.8cm wide and 2.4cm high is melted down and casted into a spherical ball. Calculate to 2 decimal places the radius of the ball. (Take π= 3.142) (4mks)
7. Simplify the ratio x:y = 2:3, find the ratio (5x-2y) : (x+y) (3mks)
8. Simplify the following expression by reducing into a single fraction. (3mks)

$$\frac{2x-3}{3}-\frac{x-2}{2}-\frac{1-x}{4}$$

9. Line AB = 7.2cm, $\angle AB_1B_2=30^0$ and $B_1B_2=9.7cm$. Using line AB, divide line B_1B_2 into six equal intervals and measure the length of 3 intervals (Use ruler and a pair of compass only). (3mks)
10. Solve the following simultaneous equation using matrix method. (4mks)
    3x – 56 = -9
    5x + 2y = 16
11. In a form one class there are 5 more boys than girls. On a certain day, one quarter of the boys and one fifth of the girls went for a science contest. If 8 students from this class went to the science contest, find the number of students in the class. (3mks)
12. Simplify: (3mks)

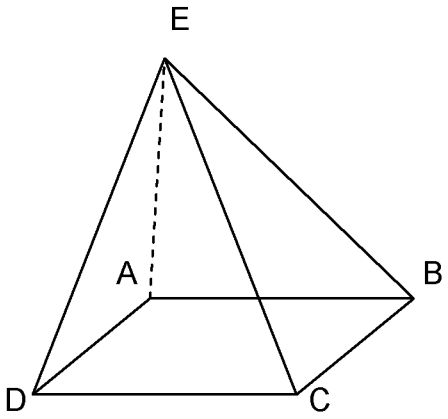
$$\frac{x-2}{x+2}-\frac{2x-4}{x^2-4}$$

13. Find the number of sides of a regular polygon whose interior angle is five times the exterior angle. (3mks)
14. Object A of area 10cm² is mapped onto image B of area 60cm² by a transformation matrix whose matrix is given by P = $\begin{pmatrix} x & 4 \\ 3 & x+3 \end{pmatrix}$ find the value of x. (3mks)
15. Find the integral values that satisfy the inequalities and represent it on the number line. (3mks)

$$4x-6\geq x-12$$

$$8-3x\geq 2x-7$$

16. Draw the net of the figure below. (3mks)
AB = BC = CD = AD = 4cm
AE = BE = CE = DE = 5cm



SECTION II (50 MARKS)
Answer any five questions in this section

17. A cylindrical container has a capacity of 1.12 litres. The container is designed such that the new container is similar to the old container and has a capacity of 3.78 litres.
(a) Determine in the simplest terms possible:-
(i) The volume scale factor of this enlargement. (2mks)
(ii) The linear scale factor. (2mks)
(iii) The area scale factor. (2mks)
(b) Calculate the height of the new container given the height of the old container is 15cm. (2mks)
(c) The surface area of the new container is 540cm^2. What is the surface area of the old container? (2mks)

18. The following measurements were recorded in a field book using XY as the base line. XY = 40m.

		Y		
C	60	340		
		300	120	D
		240	160	E
		220	160	F
B	100	140		
A	120	80		
		X		

(a) Using a scale of 1:4000, draw an accurate map of the farm. (4mks)
(b) Determine the actual area of the farm in hectares. (4mks)
(c) If the farm is on sale at sh. 80000 per hectare, find how much the farm costs. (2mks)

19. The angle of elevation of the top of a flagpole from a point A on a level ground is 13^0. The angle of elevation of the top of the flagpole from another point B nearer the pole and 12m from A is 30^0. Find:-
(a) (i) The height of the flagpole. (5mks)
(ii) The distance from point B to the top of the flagpole. (2mks)
(b) The distance from point A to the top of the flagpole. (3mks)

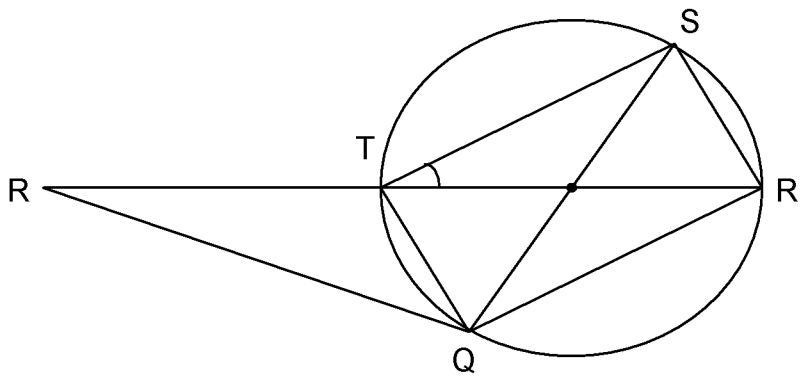
20. Forty students in form two class were weighed and their masses recorded to the nearest kilogram as shown below.

45	48	56	39	47	36	45	49	50	46
37	46	33	43	51	42	47	36	42	48
47	40	46	41	45	43	46	50	38	45
54	42	51	39	42	45	44	35	52	46

(a) Using class interval of 5kg, tabulate this data in a frequency table, the first class being 33 – 37. (3mks)
(b) Modify the table and use if to calculate mean mass of the students. (3mks)
(c) Estimate the median mass of the students. (4mks)

21. A Matatu and a Nissan left town A for town B 240km away at 8.00am travelling at a speed of 90km/hr and 120km/h respectively. After 20 minutes the Nissan had a puncture which took 30 minutes to mend.
(a) How far from town A did the Nissan catch up with the Matatu? (6mks)
(b) At what time did the Nissan catch up with the Matatu? (1mk)
(c) At what time did the Matatu reach town B? (3mks)

22. The diagram below shows a circle centre O. PQ is a tangent to the circle at Q and PTOR is a straight line QRST is a cyclic
quadrilateral in which angle RTS = 35^0 and RT and QS are diameters.



Giving reasons for your answer, find the size of:-
(a) Acute angle ROS. (2mks)
(b) Angle RQS. (2mks)
(c) Angle PQR. (2mks)
(d) Angle QPT. (2mks)
(e) Angle PQT. (2mks)

23. (a) Draw the graph of $y = 3x(4-x)$ for $x = 1$ to $x = 5$ (3mks)
(b) Hence use Trapezoidal rule to estimate the area bounded by the curve, the x-axis and the lines $x = 1$ and $x = 5$. (3mks)
(c) Find the exact area and use it to find the percentage error in the area. (4mks)

24. In a certain mathematical relationship, the values of P and Q are found to obey the relationship $Q = CP + KP^2$ where C and K are constans.

P	1	2	3	4	5	6
Q	3.2	6.75	10.8	15.1	20	25.2

(a) By drawing a suitable straight line graph, determine the values of C and K. (8mks)
(b) Hence write the relationship between P and Q. (1mk)
(c) Determine the value of Q when P = 7. (1mk)