SET TWO

MOCKS EXAMINATIONS 2016

456/1 MATHEMATICS PAPER ONE

2 HOURS 30MINUTES

INSTRUCTIONS TO CANDIDATES

Answer all questions in section A and any **FIVE** questions from section B.

Any additional questions (s) answered from Section B will **NOT** be marked.

All necessary calculations must be done on the same page as the rest of the answer. No paper should be given for rough work.

Graph paper is provided.

Silent non-programmable calculators and mathematical tables may be used.

SECTION A : 40 Marks

ANSWER ALL QUESTIONS IN THIS SECITON

1. Without using tables or a calculator, evaluate :

$$\frac{75.86^2 - 24.14^2}{5.172}$$

4 marks

2. Factorise completely: $32m^3t - 4t$ 4 marks

3. Express 2.1666….. as a mixed number in its simplest form 4 marks

4. A and B are two sets such that n(Ɛ) = 52, n(A) = 23, n(B)=25 and $N(A^l \cap B^l)$=13.

   Find: (i) n (AnB)
   (ii) n (A^l) 4 marks

5. Determine the equation of the line passing through the point E (6,1) and perpendicular to the line joining the points K(3,0) and L(12,3). 4 marks.

6. Find $\sin\theta$ and $\tan\theta$ if $\cos\theta = \frac{5}{13}$ and $90^\circ \leq \theta \leq 270^\circ$ 4 marks

7. The following marks were obtained by 15 students in a mathematics test.
   15, 20,18, 17,16,18,20,13,18,11,19,17,16,12 and 10.

   Determine the:
   i. Mode
   ii. Median
   iii. Mean 4 marks

8. An object of area 5cm² is mapped onto its image of area 20cm² by a transformation given by matrix P= $\begin{pmatrix} 2 & 3 \\ 2 & n \end{pmatrix}$ Find the value n.

4 marks

9. A girl of height 1.35m is standing 20m from the foot of a tree. When she looks at the top of the tree, the angle of elevation is 35˚. Determine the height of the tree. **4marks**

10. Using matrix method to solve the simultaneous equations :

$$2x - y = 20$$
$$3y + x = 3$$ 4 marks.

SECTION B: (60 MARKS)
ANSWER ANY GIVE QUESTIONS FROM THIS SECTION

11. Using a ruler, pencil and a pair of compasses only, construct

(a). a triangle ABC in which $\overline{AB}$=9.5cm, $\overline{BC}$=10.7cm and angle BAC =60˚. Measure angle ACB.

(b) the perpendicular bisectors of $\overline{AC}$ and $\overline{BC}$ to meet at a point N.

(c). Hence draw a circumscribing circle to triangle ABC and measure the radius of the circle.

(d). Calculate the area of the circle (Take π=3.142) **12 marks**

12. (a) Jacob is now twice as old as his son. Twenty years ago, the product of their ages was 750. Determine the present age of Jacob and his son. **06 marks**

(b). Given that $R=\sqrt{\frac{Mb^3}{t}}$ make b the subject of the formula. Hence find the value of b when R=50, M=8 and t=0.4 . **06 marks**

13. The table below shows the marks obtained in a Mathematics test by 50 students of S.4 in Kiira View.

45	69	33	52	72	40	27	35	56	30
20	31	41	66	29	49	34	50	39	47
43	50	51	61	59	53	44	58	85	57
55	62	68	75	37	63	52	64	46	65
48	38	54	42	51	67	77	88	55	78

(a) Starting with the class of 20-29, 30-39 and so on, construct a frequency table. 2 marks

(b) Use your frequency table to:

i. Calculate the mean mark of the students in the class. 6 marks

ii. Draw a histogram and use it to estimate the modal mark. 4 marks

14. The triangle KLM has vertices K (4,8), L(8,4) and M(8,12). It is reflected in the line y=0 to give the image triangle $K^{l}L^{l}M^{l}$. The points $K^{l}L^{l}$ and M^{l} are then mapped onto the points K^{ll}, L^{ll} and M^{ll} respectively under an enlargement with scale factor ¯¼ and centre O (0, 0).

a) ……2 marks

(b). Determine the coordinates of:

i. $K^{l}L^{l}$ and M^{l} 3 marks

ii. K^{ll}, L^{ll} and M^{ll} 3 marks

(c) Find the single matrix of transformation which would map triangle KLM onto triangle K^{ll}, L^{ll} and M^{ll}. 2 marks

15. The seats in a video hall are graded as First, Second and Third classes. The categories of people who go to watch film shows in the Video Hall are adults and children. On one occasion of a popular film show, the seats were filled as follows:

First class seats were occupied by 130 adults and 50 children. Second class seats were occupied by 135 adults and 60 children while Third class seats were occupied by 125 adults and 100 children. The charges in the Video Hall were as follows: For First Class, adults are charged Sh. 5000 and children Shs. 3000. For Second Class, adults are charged Shs. 3000 and

children Sh. 2000. For third class, adults are charged 2000 and children Sh. 1000.

(a). From a 1x3 matrix showing how the three classes of seats were filed by

i. adults 1mark

ii. Children 1mark

(b) . Use matrix multiplication to obtain the collections of the Video Hall operators from:

i. adults only

ii. children only

(c). Hence obtain the total collections of the Video Hall operators from the film show. 2 marks

16. An army officer has to hire transport to take 100 tonnes of military equipment to reinforce soldiers fighting revels at a boarder on a certain day. The officer has two types of transport available.. S Scania lorry which can carry 10tonnes of military equipment per trip and a Fuso lorry which can carry 8 tonnes of military equipment per trip. Each trip of the scania lorry costs Sh. 350,000 while that of the Fuso lorry costs Shs. 210,000. The officer has only Sh. 3,360,000 available for transporting the military equipment. For much of the military equipment to reach the soldiers quickly, the Scania lorry must make more trips than the Fuso lorry because it has a bigger capacity and travels faster. If X and Y represent the number of trips made by the scania and fuso lories respectively:

a. Write down five inequalities representing the above situation
b. Plot the inequalities on the same axes
c. By shading the unwanted regions, show the region satisfying all the above inequalities.
d. Find the number of trips each vehicle should make so as to spend the least amount of money. Hence find the amount of money the officer saves.

12 marks.

17 (a). Copy and complete the table below in which $y=12x^2$ for $-4 \leq x \leq 4$

X	¯4	¯3	¯2	¯1	0	1	2	3	4
X^2				1					
$Y=12- X^2$				11					

4 marks

(a). Draw the graph of $y=12-x^2$ for $-4 \leq x \leq 4$ 2 marks

(b). Use your graph to solve the equation $12-x^2 = 0$ 2 marks

(c). On the same axes, draw the graph of $y= 2x+5$ 2 mark

(d).Use your graphs to solve the equation $x^2+2x-7=0$ 2 mark