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MATHEMATICS
PAPER 2
MARCH, 2016
TIME: 2hrs 30 mins.

ST. JOSEPH OF NAZARETH HIGH SCHOOL

PRE-REGISTRATION EXAMINATIONS, 2016

MATHEMATCIS

PAPER 2

2 Hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

- Answer **all** the questions in section **A** and any five questions from section **B.**
- Any additional question(s) will be marked.
- **All** working **must** be shown clearly.
- Silent non-programmable calculators and mathematical table with a list of formulae may be used.
- Attach the grid provided on the first page of your answer scripts, indicating the questions you have attempted. **Do not** hand in question paper.

SECTION A (40 MARKS)

1. Simplify $\frac{3x^2}{2y} \div \sqrt{\frac{81x^4}{16y^2}}$ (04 marks)

2. Find the equation of a straight line joining the points (1, 2) and (13, 6) (04 marks)

3. A map is drawn to a scale of 1:200,000. What area in km^2 is represented by a rectangle 2cm x 2.5cm. (04 marks)

4. Given that f(x) = $3x$ and g(x) = $1 - x^2$, find **f g** (-2) (04 marks)

5. If 30 chickens lay 72 eggs in 5 days. How many eggs would 50 chickens lay in 4 days?

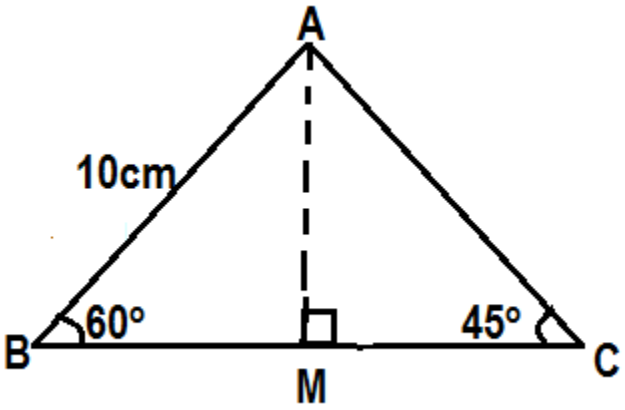
6. Given that $\underset{\sim}{a} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ *and* $\underset{\sim}{b} = \begin{pmatrix} -3 \\ 3 \end{pmatrix}$, find the length of $\underset{\sim}{\boldsymbol{a}} + 2\underset{\sim}{\boldsymbol{b}}$. (04 marks)

7. Simplify $\log_{10} 120 + \frac{1}{3} \log_{10} 27 \ - 2 \log_{10} 6$.

8. Amina bought a television set (TV) at a discount of 5%. The market price of the TV was sh.320, 000. How much did she buy the TV? (04 marks)

9. In a class of 15 students, 7 like Mathematics, 9like English and 3 like neither Mathematics nor English. Find the number of student of students who like mathematics and English. (04 marks)

10.



In the figure find the length of the side BC hence find the area of the triangle ABC. (04 marks)

SECTION B (60 marks)

11. Of the 35 senior four candidates, 13 offer Biology (B) 20 offer history (H) and 17 offer fine Art (A). 9 registered for both Biology and Fine Art
n(H∩ B) = 3, n(B∩H∩A) = 2, n(H∩A∩ B^1) = 8

(a) Represent the given information on a Venn diagram.
(b) Find the number of candidates who offer
  (i) History only
  (ii) atleast two of the subjects
(c) How many candidates did not offer any of the three subjects?
(d) Find the probability that a student picked at a random offers utmost **two** subjects. (12 marks)

12. (a) A mapping is defined by **f(x) = 3 + x – x^2.** Determine the range of the mapping whose domain is { **-3,0,1,2** } (05 marks)

(b) Given that **f(x) = 5 + 2x,** find the value of $f^{-1}(11)$ (04 marks)

(c) Given that h(x) = 3x – 5 and **hg(x) =** $3x^2 - 5$, find **g(-2)** (03 marks)

13. The distance from Kabale to Kampala is around 380km. A bus leaves Kabale at 7:30a.m and travels non-stop to Kampala, at **60kmh^{-1}.** At 8:50 a.m a Pajero car leaves Kampala and travels towards Kabale at a steady speed of **120kmh^{-1}.**

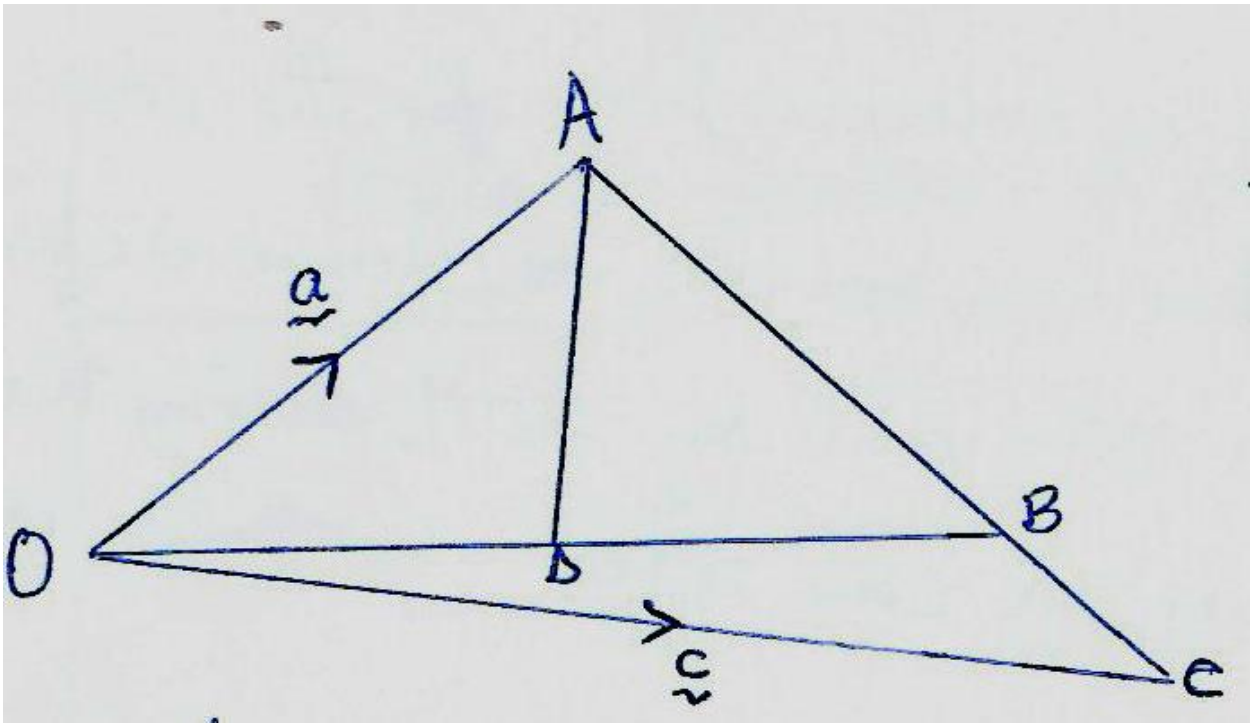
(a) On the same exes, draw distance –time graphs showing the journeys of both vehicles and use it to find.

(i) distance and time from Kabale where the two vehicles met. (08 marks)

(ii) The bus then increases its speed by 10kmh^{-1} after meeting the Pajero. Determine the difference in the times of arrival of the two vehicles.

(04marks)

14. In the diagram OA = $\underset{\sim}{a}$, $OC = \underset{\sim}{c}$, $AB = 3BC$ *and* $OD = DB$



(a) Express the following vectors in terms of $\underset{\sim}{a}$ *and* $\underset{\sim}{b}$

(i) CA (ii) CB (iii) OB (iv) OD (08 marks)

(ii) Show that AD = $\frac{1}{8}$ (3$\underset{\sim}{c}$ – 7$\underset{\sim}{a}$) (04 marks)

15. (a) Solve the equation $\log(3x-1) = \log(2x+1) - \log 4$ (04 marks)

(b) If $\log_{10} 2$ = 0.30103 and $\log_{10} 3$ = 0.47712, calculate without using tables, the value of $\log_{10} 60$ (04 marks)

(c) Use tables to evaluate

$$\frac{112\ X\ 0.0841}{0.557}$$ (04 marks)

16. (a) Find the equation of a line with gradient $\frac{1}{3}$ passing through the midpoint of the line AB with coordinates A(3,6) and B (11, -2) (06 marks)

(b) The brightness L of a light source Varies inversely as the square of the distance d from it. The brightness of a bulb is 1000 lumens per cm^2 from a distance of 2m.

(i) What will be the brightness from a distance of 20m?

(ii) From what distance would the brightness be 40 lumens per cm^2.

(06 marks)

17. In a showroom, the price of a car is given as 9,800,000/=. During a sale a discount of 15% is allowed.

(a) How much does a customer pay for the car. (04 marks)

(b) After the car has been bought, its value depreciates by 25% in the first year and by 20% during the second year.

Find the price of the car after

(i) one year

(ii) two years. (08 marks)

END