MANGU HIGH SCHOOL

121/2
MATHEMATICS
PAPER2
MARCH
TIME: 2½ HOURS

NAME: _____

ADM NO: _____ CLASS: _____

Kenya Certificate of Secondary Education
Pre Mock Examinations
Mathematics
Paper 2
2½ Hours.

INSTRUCTIONS TO CANDIDATES

- This paper contains two sections: section **I** and section **II**
- Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

For Examiner's Use only

Section I

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

Section II

17	18	19	20	21	22	23	24	Total

Grand Total | |

This paper consists of **14 printed pages.** Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

SECTION I (50 MARKS)

*Answer **all** questions in the spaces provided*

1. Evaluate (3mks)

$$\int_{-2}^{2} (4x^3 - 3x^2 + 2x - 2)dx$$

2. The point (9, 4) is the image of the point (1, 4) under a shear with x-axis invariant. Find the matrix of the shear. (2mks)

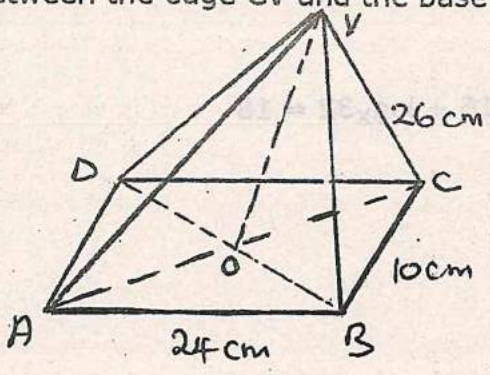
3. In vectors $\mathbf{a}=\begin{pmatrix}4\\-3\end{pmatrix}$, $\mathbf{b}=\begin{pmatrix}0\\1\end{pmatrix}$, , find x and y given that $\mathbf{ax} - \mathbf{by} = \begin{pmatrix}16\\11\end{pmatrix}$ (3mks)

4. Triangle ABC is such that AB =10cm, angle BAC=60° and angle ABC =30°

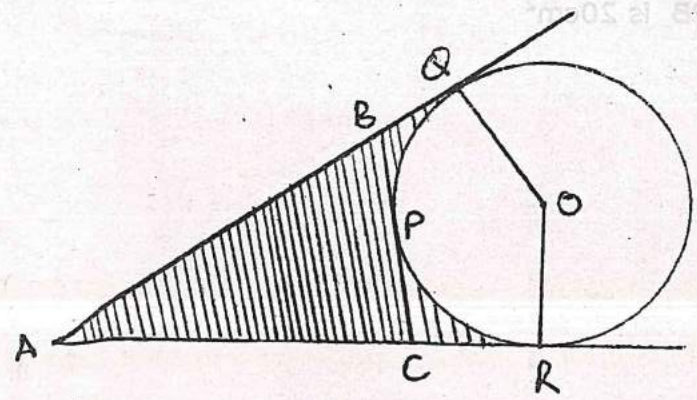
(i) construct triangle ABC and construct the locus of P such that the area of triangle APB is 20cm^2 (2mks)

(ii) Indicate the locus of Q such that Q is equidistant from CA and CB (2mks)

5. In the figure below, VABCD is a right pyramid on a rectangular base. Point O is vertically below the vertex V. AB=24cm, BC=10cm and CV=26cm
Calculate the angle between the edge CV and the base ABCD (2mks)



6. The escribed circle of triangle ABC touches BC at P, AB produced at Q, and AC produced at R. If AQ=10cm, AR=10cm and AO =12cm, find the length of OQ and shaded area (4mks)



7. Make K the subject at the formular (3mks)

$R=\sqrt{\frac{k^2+a^2}{hg}}$

8. Solve for x if $\log_x 16 + \log_x 32 = 18$ (3mks)

9. Simplify without using table leaving your answer in the form $a+ b\sqrt{c}$ (3mks)

$$\frac{1 + \cos 30^\circ \sin 45^\circ}{1 - \sin 60^\circ \cos 45^\circ}$$

10. Y varies inversely as the square of x. The difference between the values of y when x=6 and when x=10 is 6. Find x if y=4 (3mks)

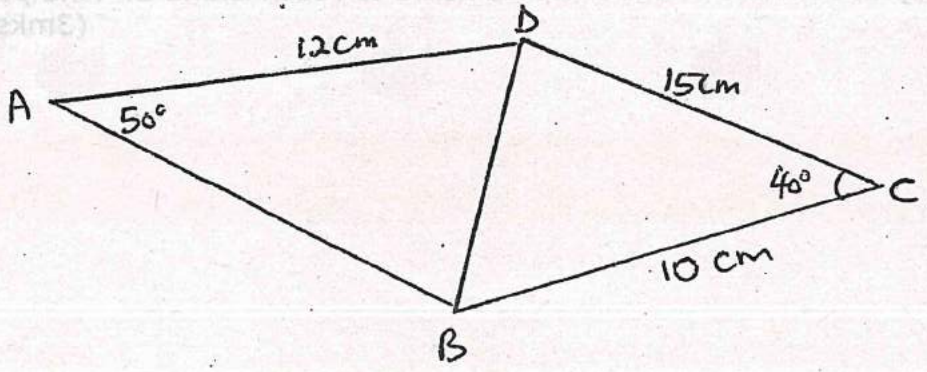
11. A ship sails due East from an island (48°N, 42°E) to another island B. The average speed of the ship is 30 knots and it takes 22 hours to reach island B. Find position of island B. (3mks)

12. Solve the equation $6\sin^2\theta - \cos\theta - 5 = 0$, where $360° \geq \theta \geq 0°$ (3mks)

13. Calculate the standard deviation of the following data. (3mks)

No of goals	0	1	2	3	4	5	6
No. of matches	11	2	5	8	3	2	1

14. The figure below shows a quadrilateral ABCD



Calculate the length of BD and AB (4mks)

15. Given that x=6.4 and y=5, find the correct to 1 decimal place, the percentage error in $\frac{xy}{x+y}$ (3mks)

16. The angle of elevation of the top of a flag post from a point A on a level ground is 23°. The angle of elevation of the top of the flag from another point B nearer the flag post and 100m from A is 40°. A, B and the bottom of the flag are collinear.

Calculate

(i) the distance from the point B to the top of the flag post (2mks)

(ii) the height of the flag post (2mks)

SECTION II (50 MARKS)

*Answer **all** questions in the spaces provided*

17. A community water tank is in the shape of a cuboid of base 6m by 5m and height of 4m. A feeder pipe of diameter 14cm supplies water to this tank at a flow of 40cm/s.

Calculate

(a) (i) the capacity of the tank is litres (2mks)

(ii) the amount of water, in litres, delivered to this tank in one hour (3mks)

(iii) the time taken for the tank to fill (2mks)

(b) The community consumes a full tank a day, with each family consuming an average of 150 litres per day. If each family pays a uniform rate of sh.350 per month, find the total amount of money due monthly (3mks)

18. In driving to work, Jane has to pass through three sets of traffic lights. The probability that she will have to sop at any of the lights is 3/5.

(a) Draw a tree diagram to represent the above information (2mks)

(b) Using the diagram, determine the probability that on any one journey, she will have to stop at

(i) all the three sets

(2mks)

(ii) only one of the sets

(2mks)

(iii) only two of the sets

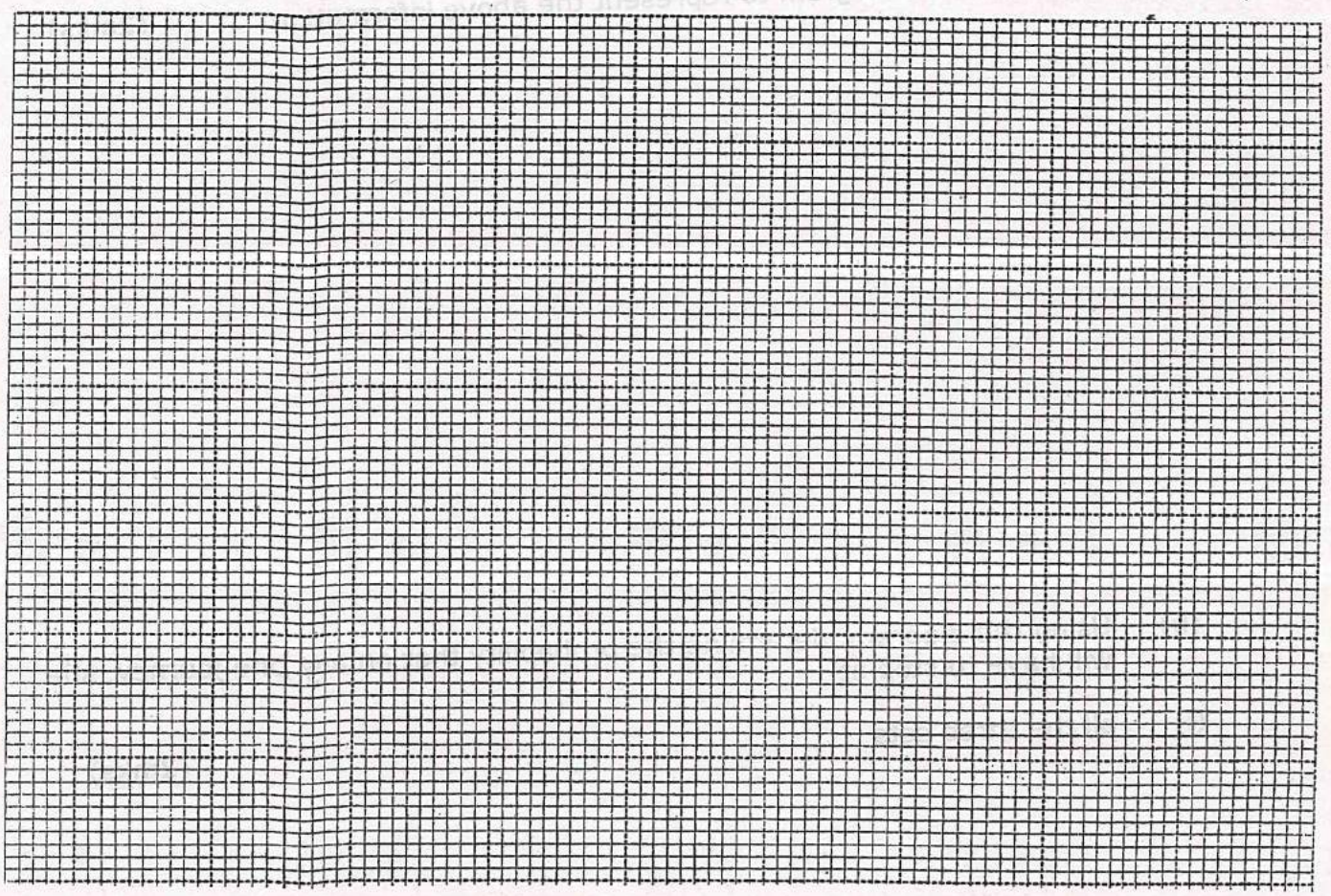
(2mks)

(iv) none of the sets

(2mks)

19. (a) On the grid provided, draw the graph of the functions $y = \frac{1}{2}x^2 - x + 3$ for $0 \leq x \leq 6$

(3Marks)



(b) Calculate the mid-ordinates for 5 strips between x=1 and x=6 and hence use the mid-ordinate rule to approximate the area under the curve between x=1, x=6 and the x-axis (3mks)

(c) Assuming that the area determined by integration to be the actual area. Calculate the percentage error in using the mid-ordinate rule. (4mks)

20. (a) Sketch the curve of $y=(x-3)(2x^2 - 3x + 1)$ (5mks)

(b) Given that a cone whose base radius and perpendicular height are rcm and hcm respectively. (1cm)

Determine

(i) the radius r in terms of h if the slant height is 10cm (1mk)

(ii) value of perpendicular height, H, which the volume of the cone is maximum and hence find the maximum possible volume (4mks)

21. A carpenter takes 4 hours to make a stool and 6 hours to make a chair. It takes the carpenter at least 144 hours to make x stools and y chairs. The labour cost of making a stool is ksh.100 and that of a chair is ksh.200. The total labour cost should not exceed ksh.4,800. The carpenter must make at least 16 stools and more than 10 chairs.

(a) Write down inequalities to represent the above information (3mks)

(b) Draw the inequalities in (a) above on the grid provided (4mks)

(c) The carpenter makes a profit of ksh.40 on a stool and ksh100 on a chair. Use the graph to determine the maximum profit the carpenter can make.

(3mks)

MANGU HIGH SCHOOL

Name_____Class_____Adm.No_____

231/1

Date_____

Biology

Paper One

Two Hours

Form Four.

Kenya Certificate Of Secondary Education.

Paper 1

Instructions to candidates.

1. Write your name, class Adm.NO. in the spaces provided above.
2. Answer **ALL** the questions in this paper.
3. All answers must be written in the spaces provided.
4. This paper consists of **10** printed pages. Every student **MUST** check the question paper to ascertain that **ALL** the pages are printed and that **NO** question is missing.

For Examiners use only.

Question number	Maximum Score	Candidates score
1-20	80	

1. During initial stages of respiration one molecule of glucose is split into two molecules each a 3-carbon compound. State;

i) The name given to this initial stage. 1mk

ii) The name of the 3-carbon compound formed. 1mk

iii) Where the initial stages occur in cells. 1mk

iv) The total number of ATP molecules formed during this initial stage. 1mk

2. Describe the events that lead to inhalation in fish. 4mks

3. What is meant by the following term?

a) Crenated cell. 1mk

b) Flaccid cell. 1mk

4. An individual is of blood group A positive.

a) Name the antigens in the individual's blood. 2mks

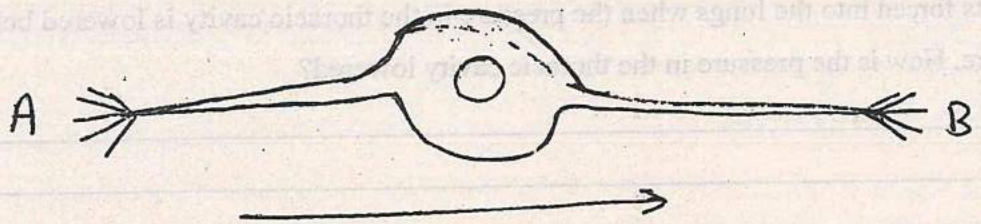
b) Give the reason why the individual cannot receive blood from a blood group B donor. 2mks

5. How is the human stomach adapted to;

i) Protein digestion? 2mks

ii) Churning? 2mks

6. The diagram below shows one of the nerve cells. Use it to answer the question that follow.



a) Identify the cell. 1mk

b) Name the cell that transmit impulse to part A. 1mk

c) State one structural difference between motor and sensory neurone. 1mk

7. a)During germination and early growth, dry weight of endosperm decreases while that of the embryo decreases. Explain. 2mks

b) State three internal conditions with seeds that are necessary for germination. 3mks

8. State three physiological mechanism of controlling the human body temperature during a hot day. 3mks

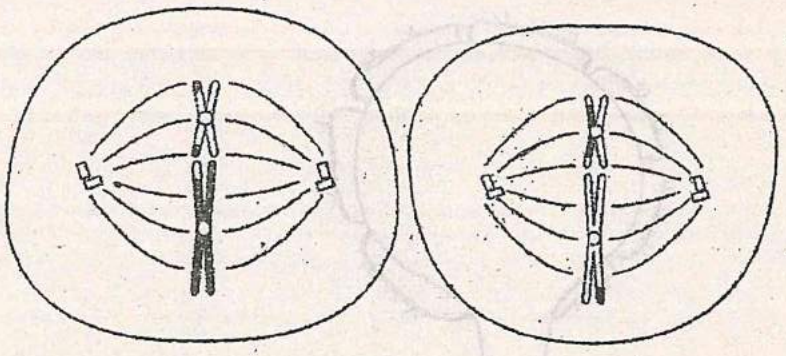
9. Air is forced into the lungs when the pressure in the thoracic cavity is lowered below the atmospheric pressure. How is the pressure in the thoracic cavity lowered? 3mks

10. a) Name a genetic mutation disorder that illustrates a case of incomplete dominance in human beings. 1mk

b) State the survival advantage associated with the trait named above. 1mk

11. Name two structures in a mammalian body with ciliated epithelial tissue. 2mks

12. The diagrams below represent results of an animal cell that has undergone meiosis I.



a) Name the stage of meiosis II represented by the above diagram. 1mk

b) Describe the next stage of meiosis II. 2mks

c) Describe events that occurred in meiosis I that lead to the reduction in the number of chromosomes by half. 3mks

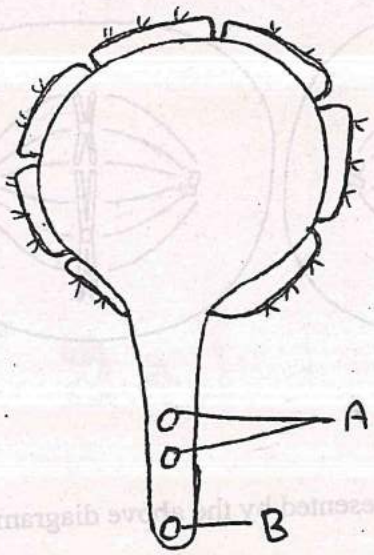
13. The paddles of whales and fins for fish adapt these organisms to aquatic habitat.

a) Name the evolutionary process that may have given rise to these structures. 1mk

b) What is the name given to such structure? 1mk

c) Give two examples of vestigial organs in man. 2mks

14. The diagram below illustrates germinated pollen grains.



a) Name the part labeled B. 1mk

b) Explain the role of part labeled A during fertilization. 2mks

c) State the structural difference between pollen grains produced by insect and wind pollinated flowers. 2mks

15. Using a simple but well labeled diagram illustrate the reflux arch during a knee jerk reflex which occurs when the knee is tapped below the knee. (6 mks)

16. State four structural differences between class arachnida and insect. (4 mks)

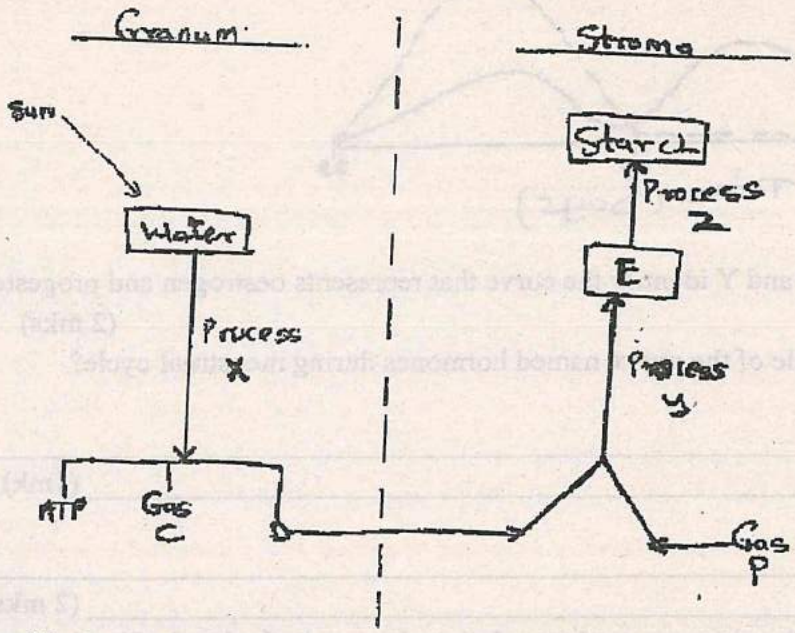
_____

_____

_____

_____

17. The chart is a summary of a certain process in plants. Study it and answer the questions that follow.



a) Identify the process and organelle in which it takes place (2 mks)

Process _____ Organelle _____

b) Identify the process X and Y (2 mks)

X _____ Y _____

c) Identify the gases C and P (2 mks)

C _____ P _____

d) What is the role of substance D in the process (1 mk)

_____

_____

e) Name the products E and process Z

E _____ Z _____

18. Name the fins in a bony fish which the following functions

i) Changing direction _____ (1 mk)

ii) Control pitching _____ (1 mk)

iii) Control yawing _____ (1 mk)

19. State three structural differences between DNA and RNA (3 mks)

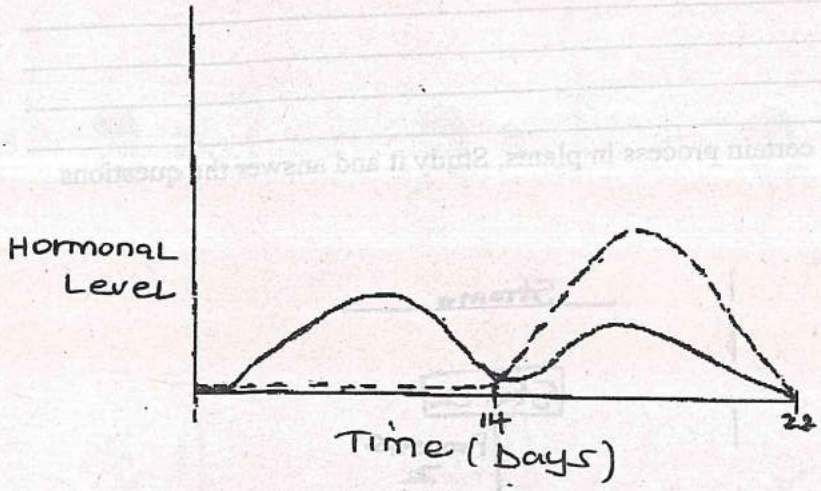
_____

_____

_____

_____

20. The graph below shows relative levels of hormones during human menstrual cycle.



a) By labeling P and Y identify the curve that represents oestrogen and progesterone respectively (2 mks)

b) What is the role of the above named hormones during menstrual cycle?

Progesterone

_____

_____ (1mk)

Oestrogen

_____

_____ (2 mks)

c) On the graph draw a curve to show relative changes in the level of luteinizing hormone. (1 mk)