Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FROM SIX MID TERM TEST

ADVANCED MATHEMATICS (PCM/PGM/EGM)

PAPER 1

Time 2:00 Hours **Combination:** **May, 2020**

INSTRUCTIONS

1. This paper consists of **ten (10)** questions, each carrying ten **(10) Marks.**
2. Answer **ALL** question.
3. **ALL** necessary working and answers of each question must be shown clearly.
4. Write your examination number on every page of your answer booklet(s).
5. Cellular phones and any unauthorized materials are strictly not allowed in the examination.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10		
TOTAL		

This paper consists of five (5) printed pages.

1. (a) By using non-programmable calculatory compute the following to six decimal place.

   i. $\dfrac{(4.2)^{3/4} - \tan\left(Co\sec^{-1}(2)\right)}{4Cos53^{o}46' + 5Sin^{3} + 18^{o}20'}$

   ii. $\dfrac{Sin - 1(0.8667) \times \log 3^{6} \pm e\sqrt{In^{3}}}{\dfrac{41}{31} + \dfrac{4p^{3}}{4C_{3}}}$

   (b) By using calculator calculate the (i) mean (ii) Standard deviation of the following given distribution table below into 3 decimal places.

Class mark interval	33-26	37-40	41-44	45-48	49-52
Frequency	15	17	21	22	25

   (c) If $M\dfrac{2}{3} = \dfrac{\sqrt[3]{6z2 + 7\sqrt{W}}}{62 \times \log_{3} 2 + Sin^{-1}(z)}$

   Z= 0.3679 and $W = \dfrac{x}{Sinx}$ limit $X \to 0$

   Find M to four (4) decimal places.

2. (a) i. Prove that tan $h^{-1}(x) = \dfrac{1}{2} In \dfrac{1+x}{1-x}$

   ii. Find the minimum value of $5\,Coshx + Sinhx$.

   (b) i. Sketch on the same axes, the graph of:

   $f(x) = \{Coshx,\ EXIR,\ X \geq 0\}$ and

   $f(x) = \{Cosh^{-1}x,\ EXIR,\ X \geq 0\}$

   ii. Solve the equation $2\,Cosh\,2x + 10\,Sinhx = 2$

   (c) If $Sinh^{-1}(x) = Sech^{-1}(x)$

   Prove that $X = \sqrt{\dfrac{\sqrt{5} + -1}{2}}$

3. (a) Define the following terms;
   i. Optimal value
   ii. Decision variable
   iii. Optimization problem

(b) Juma rides his motor cycle at 35km/hour, he had to spend 2 Tsh. Per km on petrol. If he rides a at faster speed of 40km/hour the petrol cost increases at 5 Tsh. Per km. Her has 100 Tsh. To spend on petrol and wishes to find what the maximum distance he can travel within one hour. Express this as a linear programming problem and solve it graphically.

4. (a) The following data relates size of shoes sold at Ngudu store during a certain week.

Size	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7	$7\frac{1}{2}$	8	$8\frac{1}{2}$	9	$9\frac{1}{2}$
No. of shoes	2	5	15	30	60	4	23	11	4	1

Find (i) Position Q_1, Q_2 and Q_3

ii. Q_1,Q_2 and Q_3

(b) Using the coding method, compute the mean and standard deviation from the distribution below, if the assumed mean is at 70-79.99.

CLASS	FREQUENCY
50-59.99	8
60-69.99	10
70-79.99	16
80-89.99	14
90-99.99	10
100-109.99	5
110-119.99	2

5. (a) By using the laws simplify the following sets:

i. $(A \cup B)' \cap (A \cap B)'$

ii. $A \cap (A' \cup B) \cap (A' \cup B')$

(b) i. If $A = \{4, 5, 6\}$ and $B = \{4, 5, 8, 9\}$ then find the number of elements in AX $(A \cap B)$

ii. Prove that:

$$\cap(A \cup B \cup C) = \cap(A \cap B) + \cap(B' \cap A) + \cap(B' \cap C) - \cap(A \cap C) + \cap(A \cap B \cap C).$$

(c) In a competition a school awarded medals in different categories. 36 medals in dance, 12 medals in dramatic and 18 medals in music. If these medals went to a total of 45 person and only 4 persons got medals in all of the three categories. How many received medals in exctly two of these categories?

6. (a) If $g(x) = \{(9,2)(2,3)(3,4),(4,5),(8,6)\}$ and
$f(x) = \{(3,8),(4,9),(5,10),(1,4),\}$
   i. fog ii. $gof(x)$

   (b) If $f(x) = x^2 - 3x + 4,$ then find the value of x that satidfying the equation $f(x) = f(2x+1).$

   (c)Sketch and state the range of: $f(x) = \dfrac{(x-3)^2}{(x-1)(x-9)}$

7. (a) Show that $f(x) = 2^x - x^3$.
   i. Show that a root of the equation lies in the interval $1.3 < x1.4$
   ii. Taking 1.37 as your starting value, apply Newton- Raphson procedure, with one iteration to obtain the approximate to this root
   Give your answer to four (4) decimal places.

   (b) Use the secant formula, with two iteration to approximate the solution to the equation.
   $x = 0.5 + Sinx,$ starting with $x_o = 1.4,$ and $x_1 = 1.5.$

   (c) Evaluate $\int_0^1 \times e^{-x^2}\, dx$ using.
   i. Integral
   ii. Simpson's one third rule of 11 ordinates
   iii. Trapezium method with 11 ordinates
   iv. Compare (ii) and (iii) from (i) to show the best method.

8. (a) Find the equation of the line passing through the intersection of $5x - 3y = 1$ and $2x + 3y - 23 = 0$ and perendicular to the line whose equation is $5x - 3y - 1 = 0$.
   (b) Find the locus of a point which moves so that it is equdistant from the point (a,0) and the line $x = -a.$
   (c) Find the equation of the circle having AB as a chord, where A is the point (3,4),B is the point (6,1) and the tangent to the circle at point A is the line $2y = x + 5.$

9. (a) Solve the following integral of:
   i. $\int \dfrac{6x-1}{x^2+4x+8}\, dx$
   ii. $\int \dfrac{xe^x}{(x+1)^2}\, dx$

(b) Show that $\int_0^{\frac{\pi}{2}} \frac{Cos\theta}{1+Cos\theta+Sin\theta} d\theta = \frac{\pi}{4} - \frac{1}{2} In2$

(c) i. Find the length of the arc of the curve $6xy = 3 + x^4$ betweem the points whose abscissa are 1 and 4.

ii. Find the volume of the solid generated by rotating about y-axis, the area in the first quadrant enclosed by $y = x^2$, $y = 1$, $y = 4$ and $y = axis$.

10. (a) Differentiate $y = \frac{Sinx}{x}$ by first principle.

(b) i. Find $\frac{dy}{dx}$ of y= $y = (Sinx)^{Cosx-1}$

ii. If $f = x^2 \tan^{-1}\left(\frac{y}{x}\right)$, find f_{xy} at $(1,1)$

(c) Find the first four terms in the expansion $\log_x Sin(x+h)$ in ascending powers of h. Hence find the value of $\log_x Sin\ 31^o$ to four decimal places, given

$$\log_x^2 = 0.69315$$

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FROM SIX MID TERM TEST

ADVANCED MATHEMATICS (PCM/PGM/EGM)

PAPER 2

Time 2:00 Hours **Combination:** **May, 2020**

INSTRUCTIONS

1. This paper consists of **eight (8)** questions.
2. Attempt **all** questions in section **A** and **two (2)** questions from section **B**.
3. All work done in answering each question must be shown clearly.
4. Mathematical tables and non – programmable calculators may be used.
5. Cellular phones are not allowed in the examination room.
6. Write your examination number on every page of your answer booklet(s).

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
TOTAL		

This paper consists of four (4) printed pages.

SECTION A: (60 Marks)
Answer all questions in this section

1. (a) In how many ways can 15 objects be split into two groups containing 8 and 7 objects respectively?

   (b) A box containing 5 white and 6 blue balls. Two balls are drawn successively from the box without replacement and it is noted that the second one is white. What is the probability that the first is also white?

   (c) The number of cars arriving at Mombasa harbor in 10 minutes intervals has the following probability distribution table;

Number of cars	0	1	2	3	4	5	6
Probability	0.05	0.10	0.15	0.25	0.30	1.10	0.05

   (i) Calculate the expected number of cars arriving per hour and the standard deviation of the distribution (giving your answer correct to four decimal places)

   (ii) If a fee of 4000/= is charged per car, what is the expected amount of fee will be collected in seven days? (Mombasa harbor operates 12 hours a day).

2. (a) Use the law of algebra of proposition to simplify:-
   (i) $p \rightarrow (\sim p \rightarrow q)$
   (ii) $p \wedge (q \rightarrow p)$

   (b) Test the validity of the following argument.

   On my daughter's birthday I bring her flowers. Either it is my daughter's birthday or I work late. I did not bring my daughter flowers today. Therefore today I worked late.

   (c) Determine whether or not $[(\sim p \wedge q) \wedge r] \rightarrow (p \wedge q)$ is a tautology

(d) Draw a simpler electrical network equivalent to the following proposition $(p \wedge q) \vee [(r \wedge s \wedge t) \wedge (\sim r \vee \sim s \vee \sim t)]$

3. (a) Show that the vectors $a = \underline{i} + \underline{j} + \underline{k}$ *and* $b = 2\underline{i} + 2\underline{j} + 2\underline{k}$ are parallel.

(b) Find the volume of the parallelepiped with $a = 2\underline{i} + \underline{k}, b = 3\underline{i} + 3\underline{j} - 2\underline{k}$ and $c = -\underline{i} + 2\underline{j} + 3\underline{k}$ as adjacent sides.

(c) If the position vectors of A and B are $\underline{i} + 2\underline{j} + \underline{k}$ *and* $2\underline{i} + 3\underline{j} + 5\underline{k}$. Find the position vector of a point C, such that, it divides AB in ratio 2:3. Find also the midpoint of AB

4. (a) Show that the locus of $|z-4| = 2|z-2|$ is a circle

(b) Find z such that
$z\bar{z} + 3(z - \bar{z}) = 13 + 12i$ *where* $z = x + iy$

(c) One root of the equation $z^3 - 17z^2 + 17z + k = 0$, where k is a real number is *2 – i*. Find the value of *k* and hence the other two roots given that one root of them is real.

(d) Given $z_1 = r_1[\cos\theta_1 + \sin\theta_1]$ *and* $z_2 = r_2[\cos\theta_2 + i\sin\theta_2]$ show that

(i) $\left|\frac{z_1}{z_2}\right| = \frac{r_1}{r_2}$

(ii) $\arg\frac{z_1}{z_2} = \theta_1 - \theta_2$

SECTION B
Answer any two (2) questions from this section
Extra question will not be marked

5. (a) Prove that $\frac{\sin A + \sin 2A}{1 + \cos A + \cos 2A} = \tan A$

(b) Solve the trigonometrically equation $\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$

(c) Prove that in a triangle ABC, $\frac{b-c}{b+c} = \tan\frac{B+C}{2}\cot\frac{B+C}{2}$

(d) Find all values of *x* for $-180° \le x \le 180°$ which satisfy the equation $\cos 3x + 2\cos x = 0$

6. (a) When $(1+ax)^n$ is expanded in ascending powers of x, the series expansion is $1+2x+\frac{15}{8}x^2+\text{K}$ find the value of *a* and *n*

(b) Solve for *x* and *y* if $5^{x+2}+7^{y+1}=3468$ and $7^y = 5^{xx} - 76$

(c) Prove that if the function *f(x)* is apolynomial in *x* then when divided by *x*, the remainder is constant.

(d) Express $\frac{5x^2-2x-2}{(x+1)(x^2+1)}$ in partial faction

(e) Solve the equation $\alpha+\beta+\gamma=4,\ \alpha^2+\gamma^2=66\ and\ \alpha^3+\beta^3+\gamma^3=280$

7. (a) Solve the differential equation $\frac{1}{x}\frac{dy}{dx} = \frac{In\,x}{\sin y}$

(b) Solve the differential equation $\frac{d^2x}{dt^2}+2\frac{dy}{dx}-3x = 2\cos t - 4\sin t$

(c) Solve the differential equation $\frac{d^2x}{dx} = \frac{y+\sqrt{x^2+y^2}}{x}$ if $y(1)=0$

(d) Use the substitution to transform the differential equation $2y\frac{dy}{dx}+y^2 = x$ into one relating z and x. Given that $y=0\ when\ x=0$

8. (a) Find the equation of tangent to standard hyperbola at point (x_1, y_1) in standard form.

(b) Show that $A(2,-4)$ lie on the equation $y^2 - 8x = 0$, then find the equation of a normal to the equation at point A.

(c) Find the Cartesian equation of the ellipse having the distance between the foci equals to 6 and the length of the major axis equal to 10. The ellipse is symmetrical about y – axis. Also find the eccentricity and directrices.

Candidate's .....

ST.AUGUSTINE TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

BASIC APPLIED MATHEMATICS (BAM)

Time: 2:00Hours Combination PCB, HGE May, 2020

Instructions

1. This paper consists of ten **(10)** compulsory questions.
2. Each question carries **ten (10)** marks.
3. **ALL** working and answers must be shown clearly.
4. Mathematics tables and non-programmable calculators may be used.
5. Attempt **ALL** questions you know and not otherwise.
6. Any authorized materials are not allowed in the examination room.
7. Write your **name** on every page of your answer sheet(s) provided.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		

This paper consists of four (4) printed pages

1. Use a non-programmable calculator to:

a)Compute the value of : $\dfrac{Sin^{-1}\left(\dfrac{2}{3}\right)}{7.4\left(In\,3\sqrt{87}\right)\div 2817\log 6289}$ **(03marks)**

b)Evaluate: $\int_0^{\pi} x^2 Cos\ x\ dx$ **(02marks)**

c)Evaluate: $\begin{vmatrix} 1 & \begin{pmatrix} 1 & 1 \\ -2 & -1 \\ 3 & -2 \end{pmatrix} \\ 2 & \\ 1 & \end{vmatrix}$ **(02marks)**

d) Compute the value of: $\dfrac{0.95In[\,fo\,](arc\ Sin\ 0.5)}{9.1245}$ **(03marks)**

2. a) A function is defined by the equation $f(x)=ax^2+bx+c.$ If $f(2)=7, f(0=3)$ and $f(1)=2.$

i) Determine the values of a ,b and c **(03marks)**

ii) Find the domain and range of $f(x)$ **(02marks**

b) i) Sketch the graph of the rational function $f(x)\dfrac{1}{4x-8}$ **(04marks)**

ii) What are the values of x and y for which $g(x)$ is defined? **(01mark)**

3. a) Solve the following simultaneous equations by substitution method.

$\begin{cases} xy=16 \\ x^2+y^2=32 \end{cases}$ **(03marks)**

b) Mr .Otieno divided 30 books to his children Saphy,Yona and Zabron in the ratio 1: 2: 2. What was the share of the three children? **(03marks)**

c) If Y is directly proportional to Zand is inversely proportional to X Given that y=3 when x=2 and z=1

i) Deduce the equation connecting x ,y and z .**(02marks)**

ii) Write y as a function x when z=20 **(02marks)**

4. a)Differentiate the function y= $\sqrt{2x+4}$ by using first principles (03marks)

b) Find $\frac{dy}{dx}$ in the following equations.

i) y= $In(Sin\,3x)$ **(02marks)**

ii) $x^2Siny - yCosx = 0$ **(02marks)**

c) An open carboard box with a square base is required to hold 108c m^3.What should be the dimensions if the area of carboard used is a small as possible .

(03marks)

5. a)Find the integrals of the following expressions .

i) $Sin\,x\sqrt{Cos\,x}$ **(02marks)**

ii) $5x^4 1x^5$ **(02marks)**

b) i) Calculate the area of the region bounded by the curve $y = x^2 + 3x - 18$ and the line y=0 **(04marks)**

ii) The marginal cost of producing x units of a product is given by the equation $C'(x) = 0.6x^2 + 4x.$ If the fixed cost is 30,000/ =, find the cost function. **(02marks)**

6. a) Given the distribution 8, 5, 3, 4, 7, 6, 2, 9. Find

i. Mode
ii. Median
iii. Semi inter quartile range

b) Given the following distributions:

Class intervals	14.5-19.5	19.5-24.5	24.5-29.5	29.5-34.5	34.5-39.5	39.5-44.5	44.5-49.5
Frequencies	9	27	43	55	63	68	69

Find (i) Lower and Upper quartiles

(ii) 25^{th} and 75^{th} percentiles.

7. a) Define the following terms as used in probability.

i) Mutually exclusive events **(01mark)**

ii) Samples pace **(01mark)**

b)The probability that Sir Ndembo teaches Chemistry in any day is 0.6,the probability that he coaches Volley ball is 0.15.What is the probability that

i) He teaches both Chemistry and volleyball? (Give reason) **(02marks)**
ii) He teaches either Chemistry or volleyball? **(03marks)**

c) Prove that the probability of event does not exceed one. **(03marks)**

8. a) i) Eliminate θ from the equation x=1+Sin θ and y=1-Cos θ. **(2Marks)**

ii)Without using calculate or find the value of $Cos15^o$. **(2Marks)**

b) i) Sketch the graph off $f(x) = Sin\ x$, where $-2\pi \le x \le 2\pi$ **(3Marks)**

ii) Solve the equation $Cos2x + Sin^2 x = 0$, where $0^o \le x \le 360^o$. **(3Marks)**

9. a)If f (M)=M^2-4M-K, find f(M) when

$K = \begin{bmatrix} 11 & -5 \\ -4 & 12 \end{bmatrix}$ and $M = \begin{bmatrix} 2 & 5 \\ 3 & 1 \end{bmatrix}$ **(03marks)**

b) Show whether the following system of equations has a

common solution or not . $\begin{cases} 7x - 3y - 3z = 7 \\ 2x + 4y + z = 0 \\ -2y - z = 0 \end{cases}$ UJ **(03marks)**

c)The results of three soccer teams Simba (s), Yanga (Y) and Mtibwa (M) are shown in matrix R and the points awarded for each team in matrix P.

W D L Points

$R = \begin{matrix} S \\ Y \\ M \end{matrix} \begin{bmatrix} 6 & 2 & 4 \\ 4 & 3 & 1 \\ 7 & 1 & 4 \end{bmatrix} \quad P = \begin{bmatrix} W & 5 \\ D & I \\ L & O \end{bmatrix}$

Multiply the matrices and hence state which team has many points. **(04marks)**

10. a)Give the meaning of the following as used in linear programming

(i)Programming

(ii)Linear

b) A company manufactures two types of toys A and B. Type A requires 5 minutes each for cutting and 10 minutes for assembling. Type B requires 8 Minutes each for cutting and 8minutes each for assembling. There are 3hours available for cutting and 4hours available for assembling in a day. The profit is 50Tshs each on type A and 60Tshs on type B. How many toys each type the company **.**

Candidate's .....

ST.AUGUSTINE TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

CHEMISTRY PAPER 2

Time: 2:00 Hours Combination: May, 2020

INSTRUCTIONS

8. Answer all questions.
9. Write your **name** on every page of your answer sheet(s) provided.
10. The following constants may be used
11. Constants:
    - $Atomic\ masses: S = 32,\ C = 12, O = 16,\ H = 1$

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL (100%)		

This paper consists of three (03) printed pages.

SECTION A: (40 Marks)

1. (a) Explain the working mechanism of dry cell.

   (b) (i) Give reason to why HCl acid and HNO_3 acid are not used in acidfying $KMnO_4$ during redox titrations

   (ii) Write half reduction, oxidation and overall redox equation for the reaction between $KMnO_4$ solution and $H_2C_2O_2$ acid.

   (c) In the presence of 2M H_2SO_4, H_2O_2 reacted with 0.2M KI to liberate $I_{2(g)}$. The liberated I_2 was titrated against 0.1M $Na_2S_2O_3$ using starch indicator. H_2O_2 solution was prepared by dissolving $5cm^3$ in $200cm^3$ solution. $25cm^3$ of Iodine solution required $24.60cm^3$ of thiosulphate.

   i. Calculate number of moles of H_2O_2 in $200cm^3$ solution.
   ii. Calculate molarity of the original H_2O_2
   iii. Hence determine volume strength.

2. (a) Methanoic acid HCOOH has $ka = 1.78 \times 10^{-4} \text{mol}dm^{-3}$. Calculate the hydronium ion concentration and the pH of 0.1M solution of methanoic acid.

   (b) Show Ph of acidic buffer solution is given by:

   $$PH = PKa + \log \frac{[SALT]}{[ACID]}$$

   (c) A solution has 0.05M Mg^{2+} and 0.05M NH_3. Calculate the concentration of NH_4Cl required to prevent the formation of $Mg(OH)_2$ in this solution.
   Ksp of $Mg(OH)_2 = 9.0 \times 10^{-12}$ and Kb of $NH_3 = 1.8 \times 10^{-5}$

3. (a) Give two differences between voltaic cell and electrolytic cell.

   (b) (i) Explain on how a iron nail can be protected from rusting through sacrificial protection using Magnesium metal.

   (ii) Determine concentration equilibrium constant for Daniel cell given that: $E^{\theta}_{Zn/Zn^{2+}} = -0.76V$ and $E^{\theta}_{Cu^{2+}/Cu} = -0.346V$

   (c) An equilibrium mixture at 300K contains N_2O_4 and NO_2 at 0.28 and 1.1 atm pressure respectively. If the volume of the container is doubled, calculate the new equilibrium pressure of the two gases:

   $$N_2O_4 \rightleftharpoons 2NO_{2(g)}$$

4. (a) Using IUPAC system, name the following compounds:

(i) $CH_3\underset{\displaystyle CH_3}{\underset{|}{C}}HCHNH_2$

(ii) $C_6H_5(CH_2)_3NH_2$

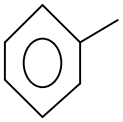
(iii) $CH_3CH=CH-NH_2$

(c) Complete the following reactions:

(i) $CH_3CH_2NH_2 + HNO_2 \rightarrow$

(ii) $CH_3CH_2NH_2 + HCl \rightarrow$

(iii)  $NH_2 + HCl \rightarrow$

(iv)  $NH_2 + \dfrac{HNO_3}{H_2SO_4} \rightarrow$

5. (a) Explain four measures which can be adopted to control land pollution.

(b) With one example per each explain on how the following methods are used in chemical treatment of sewage.

i. Redox method
ii. Acid-base neutralization
iii. Chemical precipitation manufacture in a day to maximum.

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

CHEMISTRY 1

Time:2 Hours Combination May ,2020

INSTRUCTIONS:

1. Answer **ALL** questions in each sections **A** and **B** and **C.**
2. Write your name on every page of your answer sheets
3. The following constants may be used
   - Atomic masses
   - Planke's constant (h)=$6.62 \times 10^{-34} Js$
   - Rydberg's constant (RH)=$1.097 \times 10^{7} M^{-1}$
   - Velocity of light (C)= $3 \times 10^{8} ms^{-1}$
   - GAS Constant (R)= $0.0821\ atmdm^{3}mol^{-1}K^{-1}$

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
TOTAL		

This paper consists of Four (04) printed pages

SECTION A (40 Marks)

1. (a) (i) State four assumptions of kinetic theory of gases.
   (ii) Using kinetic gas equation: $PV = \frac{1}{3}nmC^2$. Show that average kinetic energy of a gas is $\frac{3RT}{2}$
   (b) Calculate the wavelength of radiation emitted when an electron in a hydrogen atom makes transition from an energy level with n=3 to a level with n=2. Predict the colour of radiation emitted. Given that: $E_n = \frac{-1312}{n^2} KJmol^{-1}$
2. (a) State two assumptions that leads to real gas to deviate from ideal gas. A t what conditions when real gas deviates positively from ideal gas?
   (b) Briefly explain two factors that determines liquefaction of gases
   (c) Using van der waal's equation, calculate the constant "a" when two moles of a gas confined in a 4L flask exerts a pressure of 11.0 atm a temperature of 300K. The value of "b" is $0.05Lmol^{-1}$

3. (a) Give two differences between real solution and ideal solution.
   (b) 7.6g of KBr in $1250cm^3$ of solution was found to have osmotic pressure of 1.804 atm at 27℃. Find the osmotic pressure, vant hoff's factor and degree of dissociation.
   (c) The vapour pressure of pure water at 95℃ is 84700Pa. Water and insoluble liquid × of relative molecular mass of 160, distilled at 95℃ under atmospheric pressure of 1013100Pa. Calculate weight weight of water if the weight of × is 10g.

4. (a) What will be the pressure exerted by a mixture of 3.2g of methane and 4.4g of carbondioxide contained in $9dm^3$ flask at 27℃ ?
   (b) The pressure exerted 12g of an ideal gas at temperature t℃ in a vessel of volume Vlitres is one atmosphere when the temperature is increased by 10℃ at the same volume, the pressure increased by 10%. Calculate the temperature t and volume V molecular mass of the gas=120u

SECTION B: (30 Marks)

5. (a) Define the term partition coefficient. A compound Z has a partition coefficient of 4.00 between ethoxyethane and water. Calculate the mass of Z extracted from $100cm^3$ aqueous solution of 4.00g of Z by two successive extractions with $50cm^3$ of ethoxythane.

(b) (i) What are colligative properties?

(ii) A solution of urea boils at 100.18℃ at the atmospheric pressure. If K_f and K_b for water are 1.86 and 0.512℃$kgmol^{-1}$respectively. Find the freezing point of the solution.

6. (a) State the following:
   i. Enthalpy change of atomization
   ii. Enthalpy change of neutralization
   iii. Lattice energy

   (b) Given the following information

   $Ca_{(s)} \rightarrow Ca_{(g)}\ \Delta H = +190KJmol^{-1}$

   - $Ca_{(g)} \rightarrow Ca^{2+}{}_{(g)} + 2e \qquad \Delta H = +1730KJmol^{-1}$
   - $\frac{1}{2}Cl_{2(g)} \rightarrow Cl_{(g)} \qquad \Delta H = +122KJmol^{-1}$
   - $Ca^{2+}{}_{(g)} + 2Cl^{-}{}_{(g)} \rightarrow CaCl_{2(s)} \qquad \Delta H = -2184KJmol^{-1}$
   - $Ca_{(s)} + Cl_{2(g)} \rightarrow CaCl_{2(s)} \qquad \Delta H = -795KJmol^{-1}$

   i. Use standard enthalpy change to calculate the electron affinity of chlorine through Born haber cycle.

   ii. If: $Ca^{+}{}_{(g)} + Cl^{-}{}_{(g)} \rightarrow CaCl_{(s)} \qquad \Delta H = -760KJmol^{-1}$. Explain which crystal is stable $CaCl\ or\ CaCl_2$?

7. (a) Briefly explain the following terms and give one example per each case:
   i. Nucleophilic substitution reaction bimolecular (SN^2)
   ii. Elimination reaction bimolecular (EN^2)

   (b) A hydrocarbon contain 10.5g of carbon per gram of nitrogen 1litre vapour of hydrocarbon at 27℃ and 1 atm pressure weighs 2.8g. Find the molecular formular.

SECTION C: (30 Marks)

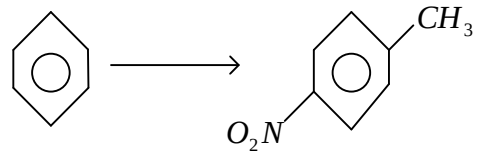
8. (a) Briefly explain the following observations:
   i. Lithium ion (Li^+) has small ionic size than K^+. However in aqueous solution, Li^+ moves less rapid than K^+.
   ii. The bond angle in NH_4^+ is higher than that in NH_3
   iii. $BeCO_3$ is less stable than $MgCO_3$
   iv. Bond dissociation energy of F_2 is less than that of Cl_2

   (b) Write any two differences between ionic bond and covalent bond.

   (c) Define the following terms:
   i. Polarizability
   ii. Hybridization of orbitals.

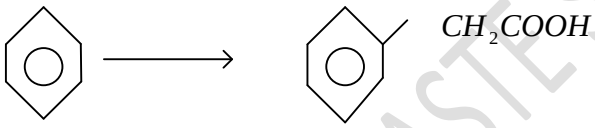
9. (a) A primary alkylhalide, A(C_4H_9Cl) reacted with alcoholic potassium hydroxide to give compound B. Compound B reacted with HCl to give compound C which is an isomer of A. When C (in ether solution) reacted with sodium metal, it gave compound D (C_8H_{18}).
   i. Give the structure of A
   ii. Write chemical equations for all the reactions.

   (b) With aid of chemical equation show how the following conversions can be done:

   i. 

   ii. $CH_3CH_3 \rightarrow CH_3CH_2CH_3$

   iii. $CH_2 = CH_2 \rightarrow C_6H_5CO_2H$

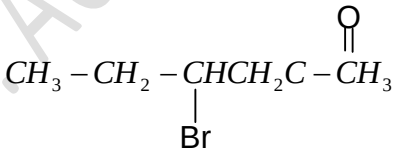
   iv. 

10. (a) With aid of one example, briefly explain to why nucleophilic substitution Reaction bimolecular (SN^2) of alcohols with hydrogen halide decreases from primary alcohol to tertiary alcohols.

    (b) Name the following compounds by using IUPAC names

    i. 

    ii. $HOOC - CH = CH - COOH$

    iii. 

    iv. $OHC - CH_2CH = CHCHO$

    (c) Explain simple tests for distinguishing CH_3CH_2OH from ze the prof

Candidate's .....

ST. AUGUSTINE - TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

ECONOMICS II

Time: 2:00 Hours **Combination** **May,2020**

INSTRUCTIONS

1. This paper consist **EIGHT (8)** questions.
2. Answer **SIX (6)** questions.
3. Each question carries **twenty (20)** marks in Section B and C except in Section A
4. **All** writing must be in blue or black ink **except** drawings which must be in pencil.
5. Write your **Name** and **Stream** at the top of every page.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
7		
8		
TOTAL		

This paper consists of Three (03) printed pages

SECTION A (20 MARKS)
Answer all questions from this section.

1. (a) Define the following as applied in the field of national income.
   i. Multiplier
   ii. Accelerator principle
   iii. Income disparity

   (b) The hypothetical developed economy, which is a closed economy is given as;

   $Y = C + I + G$

   $C = 1100 + 0.6Y$, $I = 350$ and $G = 800$

   i. Find change in national income, when investment decreases by 100.
   ii. Find investment multiplier and interpret the results.

   NOTE: All the figures are in billions.
2. Write short notes on the following concepts as used in economics;
   i. Recurrent expenditure
   ii. Taxation
   iii. Tax avoidance
   iv. Subsidization
   v. Balanced budget

SECTION B (40 MARKS)

Answer any two questions from this section

3. (a) Discuss five contribution of the Bank of Tanzania (BOT) to the economic development of the country.

   (b) Evaluate five roles of non – banking financial institutions in the economic growth and development of the Tanzania economy.
4. (a) Discuss five hindrances facing agricultural and marketing cooperatives (AMCOS) in rural area, taking case study of cashew nuts production.

   (b) Explain any five advantages of private crop buyer.
5. Study the data given in the table below and answer questions that following;

COUNTRIES	Commodities (tons per hour)	
	TEA (tons)	SISAL (tons)
Tanzania	18	12
Kenya	9	4

   i. Which country has got absolute advantage in the production of tea? Why?
   ii. Which country has got absolute advantage in the production of sisal? Why?
   iii. Which country has got comparative advantage in the production of tea? Why?
   iv. Which country has got comparative advantage in the production of sisal? Why?
   v. How should the countries specialize in order to gain from trade

SECTION C (40 MARKS)

Answer any two questions from this section

6. (a) Critically analyze five steps that should be followed on the establishment of a project proposal.

(b) Explain five objectives of the East Africa Community (EAC) to the member countries of this economic block.

7. (a) Explain the roles played by small scale industries towards promoting economic development in the country.
   (b) Why is it necessary to improve agricultural sectors in Tanzania while the target is to attain industrial economy by 2025?
8. (a) Account for the cost of economic growth (five points)
   (b) Account for the low level of economic development in Less Developed Countries (LDCs).

Candidate's .....

ST. AUGUSTINE - TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

ECONOMICS 1

Time :2:00 Hours **Combination** **May, 2020**

INSTRUCTIONS

1. This paper consist **EIGHT (8)** questions.
2. Answer SIX **(6)** questions.
3. Each question carries **twenty (20)** marks in section B and C, ten marks in section A
4. **All** writing must be in blue or black ink **except** drawings which must be in pencil.
5. Write your **Name** and **Stream** at the top of every page.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
9		
10		
11		
12		
13		
14		
15		
16		
TOTAL		

This paper consists of Three (03) printed pages

SECTION A (20 Marks)
Answer all questions from this section.

1. Write short notes on the following economic concepts
   i. Production possibility frontier
   ii. Negative consumption externalities
   iii. Negative production externalities
   iv. Normative statement
   v. Human wants
2. State five advantages of large scale production.

SECTION B 40 (MARKS)
Answer any two (02) questions from this section

3. (a) Given the demand curve for maize represented by equation P = 300 – 15Q and the supply curve represented by P = 120 + 30Q.
   Where; P = Price on TSH
   Q = Quantity in Kgs
   Find equilibrium price and Quantity.
   (b) By illustration distinguish between movement along the supply curve and shift of supply curve.
   (c) Outline six factors which influences elasticity of supply
4. (a) Explain why economic activities or business activities in a country is no stable (three points).
   (b) Monopoly firm exists because of unstuffy competition from weak competitive firms explain, any three reasons for existence of monopoly existence.
   (c) Critically elaborate four arguments for the policy proposal for **cost sharing** in advanced level and tertiary education and health institutions in your country.
5. You are given the short run cost function as TC = 200 +5Q + $2Q^2$ and revenue function as TR 500Q – $5Q^2$.
   Where; TC = Total cost
   TR = Total Revenue
   Q = Quantity of output
   i. Determine the level of output which maximizes total revenue
   ii. Calculate optimum level of output
   iii. Work out for total profit
   iv. What are the total fixed cost
   v. What are the total variable costs at output that maximize profits?

SECTION C (40 MARKS)
Answer any two (02) questions from this section

6. (a) what are the effects of inflation on Wage – Earners, Fixed income people, Debtors and Creditors, Producers and Government
   (b) State Fisher equation of exchange. Critically analyze the assumptions of the quantity theory of money.
7. (a)Evaluate five policies which can be employed to reduce population growth rate in your country.
   (b) "Population census in a country is socially and economically desirable" justify this statement by providing five points.
8. Despite the efforts made by the government of Tanzania, unemployment rate is still rising tremendously and unstoppable. Accounts for eight reasons why unemployment has been so difficult to reduce in our country.

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

ENGLISH LANGUAGE 1

Time: 2:00 Hours **Combination** **May, 2020**

Instructions

1. This paper consists of **two (2)** sections **A** and **B** with a total number of **eight (8)** questions.
2. Answer **seven (7)** questions; **four (4)** from **section A**, **three (3)** from **section B**. Questions number **five (5)** and **six (6)** are compulsory.
3. Write your **FULL NAMES** on every page of your answer sheet (s).

SECTION A (40 Marks)

SHORT ANSWER QUESTIONS

1. a) Differentiate language from a language.
   b) Mention six socio-linguistic impacts of language contact.

2. a) Write short notes on the following lexical terms.
      i. Morph
      ii. Allomorph
      iii. Morpheme
   b) Write short notes on the following concepts;
      i. Clipping
      ii. Neologism
      iii. Blending
      iv. Coinage
3. a) List down three significances of effective listening.
   b) Draw a table showing the place of articulation and manner of articulation. Label all the sounds as required.

4. a) Differentiate active articulators from passive articulators.
   b) With the aid of diagram, describe speech organs.

SECTION B (60 Marks)
ESSAY TYPE QUESTION

5. Describe eight functions of language.

6. In eight points explain how language can be unifying and dividing factor.

7. Explain the difference between language learning and language acquisition.

8. Explain eight purposes of writing.

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

ENGLISH LANGUAGE 2

Time: 2:00 Hours **Combination** **May, 2020**

Instructions

4. This paper consists of **two (2)** sections **A** and **B** with a total number of **eight (8)** questions.
5. Answer **seven (7)** questions; **four (4)** from **section A**, **three (3)** from **section B**. Questions number **five (5)** and **six (6)** are compulsory.
6. Write your **FULL NAMES** on every page of your answer sheet (s).

SECTION A (40 Marks)

SHORT ANSWER QUESTIONS

1. (a) What is stylistic?
   (b) Mention four factors for dialect formation.
   (c) Write short notes on the following;
   i. Discourse
   ii. Province
   iii. Tenor
   iv. Modality
   v. Setting

2. (a) List down five grammatical features of language of newspaper reporting.
   (b) Differentiate style from variety.
   (c) Study the following text and analyze it stylistically.

   A. Well, GEE…….yeah, I mean, I'd sure like the HELP, I mean ……I WISH I could give you a lift, but I haven't gotten any gas in my automobile right now. Er, gee, I guess you would take a CAB

   Questions
   i) What is the province of the text?
   ii) What is the mode of discourse of the text?
   iii) What is the tenor of the text?
   iv) Mention four general stylistic features of the text.

3. Read the following text careful, and answer the questions that follows.
   Gerson to Pele; a brilliant pass, that. And the score still 4-1. The ball in field to …….oh, but beautifully cut off and ……

   Questions.
   i) What is the province of the text?
   ii) Explain the mode of discourse of the text.
   iii) What type of writing is the above text?
   iv) What is the mode of discourse of the above text?
   v) Mention six general stylistic features for the above text

4. a) What is the relationship between literature and language.
   b) Describe five elements of form. Give examples to each

SECTION B (60 Marks)
ESSAY TYPE QUESTION

5. Using any two plays you have read under this program, discuss the relevance of the messages to the society.

6. Using any two novels you have read, choose two characters and describe whether you admire or sympathize them.

7. Describe eight functions of literature. Provides any many examples as possible.

8. Using four poems you have read under this program, discuss the importance of using figurative language in any artistic work.

Candidate's .....

ST. AUGUSTINE - TAGASTE SECONDARY SCHOOL
FORM SIX MID-TERM TEST

BIOLOGY 1

Time 2:00 Hours **Combination** **May, 2020**

INSTRUCTIONS

1. This paper consists of sections **A** and **B** with a total of **ten (10)** questions.
2. Answer **all** questions in section **A** and **two (2)** questions from section **B**.
3. Except for diagrams that must be drawn in pencil, all writing should be in blue or black ink.
4. Write your **name** on every page of your answer sheet.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
TOTAL		

This paper consists of two (2) printed pages

SECTION A (70 Marks)

Answer **all** questions in this section. Each question carries **10** marks.

1. (a) Explain the differences between foetal and adult blood circulation.
   (b) Outline the mechanism of stomata opening and closing (basing on osmotic pressure difference theory)

2. (a) Define the following terms;
   (i) Photophosphorylation
   (ii) C_4 plants
   (b) Explain the meaning of dark reaction and the events which take place during dark reaction

3. (a) What is R.Q?
   (b) Describe the fate of pyruvic acid under aerobic and anaerobic respiration

4. (a) Write short notes on:
   (i) Double fertilization
   (ii) Metamorphosis
   (iii) Alternation of generation.
   (b) Explain the embryonic membranes and their roles

5. (a) Explain the concept of cell differentiation and its significance.
   (b) Outline three advantages of presence of membranes in cell organelles.
6. (a) What do you understand by the term taxonomic keys as used in biology?
   (b) Prepare a dichotomous key using the following organisms; Lizard, bean plant, frog, moss plant, grass hopper, fern plant, bird and fish.
7. Elaborate the mechanism of hearing in mammals.

SECTION B (30 Marks)

Answer **two (2)** questions from this section.
Each question carries **fifteen (15)** marks.

8. (a) Explain the roles for lipids in organisms.
   (b) Categorize enzymes on the basis of nature of substrates and type of reaction catalysed.
9. Describe the structure of the retina and the physiology of seeing.

10. (a) Outline the ways in which oxygen and carbon dioxide are transported in the body of vertebrates
    (b) State types of respiratory substrates and their energy values

Candidate's .....

ST. AUGUSTINE - TAGASTE SECONDARY SCHOOL
FORM SIX MID-TERM TEST

BIOLOGY 2

Time 2:00 Hours **Combination** **May, 2020**

INSTRUCTIONS

5. This paper consists of **six (6)** questions.
6. Answer only **five (5)** questions.
7. Each question carries **twenty (20)** marks.
8. Except for diagrams that must be drawn in pencil, all writing should be in blue or black ink.
9. Write your **name** on every page of your answer sheet.

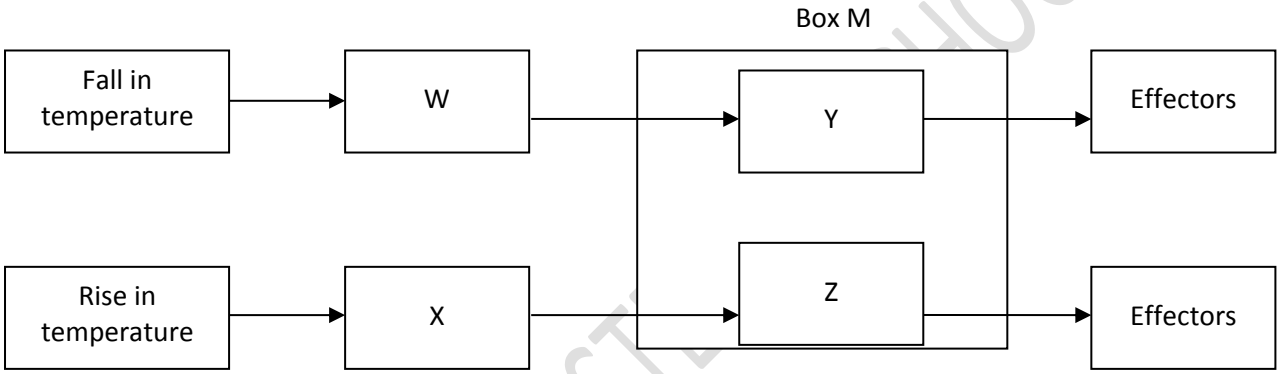
FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
27		
28		
29		
30		
31		
32		
TOTAL		

This paper consists of two (2) printed pages

1. (a) Compare the life cycles of mosses and ferns.
2. (a) Compare the life cycles of mosses and ferns.
   (b) With examples, briefly explain how parasites are adapted to their mode of life.

3. (a) Briefly explain how insulin hormone used for treatment of diabetes is obtained based on modern technology.
   (b) Using examples explain types of variation.

4. (a) Explain why the concentration of glucagon in the blood raises during exercise while that of insulin falls.
   (b) Study the diagram, than answer the questions which follow:



   (i) Which part of the body is represented by box M?
   (ii) How does box Z control he effectors in regulation of body temperature?
   (iii) With illustration, explain how blood vessels can act as effectors in regulation of body temperature.
   (iv) Label part W, X, Y and Z.

5. (a) (i) Briefly explain the physiology of germination.
   (ii) Draw bacterial growth curve and give an account for the shape of the graph.
   (b) Give comparison between mitosis in plants and in animals.

6. (a) Discuss the concept of ecological succession.
   (b) Explain the factors which regulate the size of population.

7. (a) Explain four (4) evidences which support organic evolution.
   (b) Discuss any four (4) theories which explain the origin of life on earth.

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

GENERAL STUDIES

Time: 2:00 Hours **Combination** **May, 2020**

INSTRUCTIONS

1. This paper consists of **seven (7)** questions.
2. Answer only **five (5)** questions, considering question number one (1) which is compulsory.
3. Each question carries **twenty (20)** marks.
4. Cellular phone are not allowed in examination rooms.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
TOTAL		

This paper consists of two (2) printed pages

1. From 1990's Tanzania diverted her philosophical foundation from socialism to the liberal philosophy" By providing six points analyse the reasons for development of liberal philosophical ideas in Tanzania.

2. As an expert in general studies, use the knowledge you have to educate the society on the subject in a level secondary schools. (Give six points)

3. Examine social – economic impacts of COVID -19 worldwide. (Give six points).

4. Suggest six measures to be taken to prevent and combat terrorism.

5. "Africa's conflict are diverse complex and intractable and it's difficult to generalize about them". What do you think are causes of conflicts in Africa? (Give six points)

6. Give six advantages of a person being an entrepreneur.

7. What are the consequences of erosion moral values in the society? (Give six points?

Candidate's .....

ST. AUGUSTINE – TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

GEOGRAPHY

Time: 2:00Hours Combination May, 2020

INSTRUCTIONS

1. This paper consists of sections **A** and **B** with a total of **seven (7)** questions.
2. Answer a total of **five (5)** questions, **two (2)** questions from section A and three questions from section **B**. Question number **one (1)** is Compulsory.
3. In section A, question **ONE (1)** carries **25** marks and the rest I5 marks, while in section **B**, each question carries **20 marks.**
4. Map extract of **HANANG** (Sheet 84/4) is provided for question number one (1).
5. Non programmable calculators may be used.
6. Write your **Name** on every page of your answer sheet(s).

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
33		
34		
35		
36		
37		
38		
39		
TOTAL		

This paper consists of two (2) printed pages

SECTION A: (40 Marks)

Attempt only **two (2)** questions from this section**.**
Question number **ONE (1) is** compulsory**.**

1. Study carefully the map extract of HANANG (Sheet 84/4) provided then answer the following questions.

   (a) Calculate the area covered by Lake Balangida in square Kilometer.
   (b) Explain five (5) land uses in the mapped area.
   (c) A farmer was at grid reference 680160. He saw fire in the North East (4.2 Kilometer).
      i) Find the grid reference position of the fire.
      ii) Name the physical obstacle which the farmer will face if he walks in a straight line to the position of the fire.

   (d) What are the three indicators of climate in the area? Give evidence.
   (e) Express the scale of map into statement scale
   (f) Measure the length of all weather roads from grid reference 680264 to 747299 in kilometer.

2. (a) Describe the following terms.
      (i) Dot maps
      (ii) Isopleth maps
      (iii) Choropleth maps
      (iv) Flow line maps

   (b) Describe the contents of topographical maps
   (c) (i) Define Map projection
      (ii) Describe three types of map projection.

SECTION B: (60 Marks)

Answer **three (3)** questions from this section.

3. Using concrete examples, explain how faulting has been responsible.
4. "Plate tectonic theory is a new version of continental drift theory" Elaborate causes of continental drift and its evidence. Use five points at each.
5. Examine eight methods to use in soil conservation in order to improve agricultural production in Tanzania.
6. Examine four layers of the atmosphere and in each give three characteristics.
7. Describe all processes of chemical weathering.

Candidate's .....

ST.AUGUSTINE TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TERT

GEOGRAPHY-2

HUMAN AND WORLD ECONOMIC GEOGRAPHY

Time: 2:00 Hours **Combination** **May, 2020**

Instructions

1. This paper consists of sections **A** and **B** with a total of **eight (8)** questions.
2. Answer **five (5)** questions, choosing **two (2)** questions from section **A** and **three (3)** questions from section **B**.
3. Each question carries **twenty (20)** marks.
4. Cellular phones and any unauthorized materials are not allowed in the examination room.
5. Write your **name** on every page of your answer booklet(s).

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
7		
8		
TOTAL		

This paper consists of two (2) printed pages.

SECTION A (40 Marks)
POPULATION AND DEVELOPMENT

Answer **two (2)** questions from this section.

1. (a) Define the following terms related to demography:
   i. Crude death rate
   ii. Crude birth rate
   iii. Total fertility rate
   iv. Population pressure

   (b) Explain the socio, economic and cultural factors influencing mortality rate in Tanzania.

2. Justify that population policy in Tanzania is not effective. Give eight points.
3. Analyze seven measures to be taken in checking the fast growing fertility rate in Africa.

SECTION B (60 Marks)

REGIONAL FOCAL STUDIES

Answer **three (3)** questions from this section.

4. Evaluate the global efforts that have been made on the management and conservation of fisheries.

5. Describe eight contributions of the tree crops farming in the socio, economic, development of Nigeria.

6. Explore the influence of human and physical factors on the development of agriculture in sub- Saharan Africa.

7. Examine the reasons as to why pastoralists are resistant to modernize their economy.

8. Account for the change of the location of steel and iron industry in Germany. Explain four adverse impacts of iron and steel industry.

Candidate's .....

ST. AUGUSTINE – TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

HISTORY 1

Time: 2:00Hours **Combination** **May, 2020**

INSTRUCTIONS

7. This paper consists of **SEVEN (7)** questions.
8. Answer **five (5)** questions, choosing **number ONE (1)** is compulsory.
9. Each question carries **twenty (20)** marks.
10. Write your **Name** on every page of your answer sheet(s) provided.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
40		
41		
42		
43		
44		
45		
46		
TOTAL		

This paper consists of two (2) printed pages

1. The feudal mode of production did not develop in the entire African continent. Account for the variations (Give six points)

2. Marine technology played a big role in the widening of the gap between Africa and Western Europe. Comment with six points.

3. "Settler agriculture legalized land displacement between the two races in favour of the foreigner". In the light of this statement explain how the implementation of this system affected the natives. (Provide six points)

4. Discuss six outcomes of the 1919 Versailles Treaty in the rise of African nationalism and the struggle for independence.

5. Analyze four changes and four objectives of introducing colonial education after Second World War in 1945.

6. Discuss reasons for the inevitability of Africa working class movements after the Second World War.

7. Discuss six (6) important issues which needs for a new constitution for strengthening Tanzania as a democratic society.

Candidate's .....

ST. AUGUSTINE – TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

HISTORY 2

Time: 2:00Hours Combination May, 2020

INSTRUCTIONS

11. This paper consists of **SEVEN (7)** questions.
12. Answer **five (5)** questions, choosing **number ONE (1)** is compulsory.
13. Each question carries **twenty (20)** marks.
14. Write your **Name** on every page of your answer sheet(s) provided.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**SIGNATURE**
47		
48		
49		
50		
51		
52		
53		
TOTAL		

This paper consists of two (2) printed pages

1. "The rise of capitalism in Europe was contributed by the Trans-Atlantic Trade". Justify with six points.

2. The 1848 revolutions are known for their dramatic nature. Discuss four characteristics and four achievements of the revolutions.

3. The unifications of Germany and Italy stood on similar aims and employed the same tactics substantiate the statement with four aims, four tactics.

4. Trade three genesis of monopoly capitalism and its three effects on Africa.

5. In six points, show how Tanzanians benefited by a new economic strategy which was adopted in 1967.

6. Discuss three reasons for signing and three impacts of Camp David of 1878-1979 between Israel and Egypt in trying to resolve the existing disputes in the Middle East.

7. "Africa's extreme poverty is partly attributed to historical phenomena" validate this statement by giving six points.

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL
FORM SIX MID TERM TEST

PHYSICS 2

Time: 3 Hours **Combination** **May, 2020**

INSTRUCTIONS:

1. This examination paper consists of **four** (**4**) printed pages with **six (6)** questions each carrying **20 marks**
2. Answer **any five (5)** questions
3. Do not use this examination paper for rough work. All rough work must be done in the answer book (at the back) and crossed through.
4. This examination paper must be handed in together with your answer book.
5. Unauthorized materials and gadgets such as: All types of mobile Phones and accessories as well as other relevant unauthorized materials Are Not Allowed in the Examination Venues.

Useful constants:

(i) Young's modulus Y of rubber, $5.0\times10^{8}\ Nm^{-2}$

(ii) Surface tension of water, γ_{H_2O} $70\ dynes\ cm^{-1}$

(iii) Surface tension of Chloroform, $\gamma_{Chloroform}$ $27\ dynes\ cm^{-1}$

(iv) Acceleration due to gravity, g $10\ m/s^{2}$

(v) Planck's constant, h $6.6\times10^{-34}\ Js$

(vi) Speed of sound in air, v $330\ m/s$

(vii) Speed of light, c $3.0\times10^{8}\ ms^{-1}$

(viii) Atomic mass ^{9}Be 9.01219 amu.

(ix) Particle masses in amu are: proton = 1.007277; neutron = 1.008665; electron = 0.0005486. Conversion factor for $E = mc^2$ is 931 MeV/amu.

FOR EXAMINER'S USE ONLY		
QUESTIONS NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
TOTAL		

This paper consists of **Four** (**4**) printed pages

1 (a) Explain the following physical phenomenon;

(i) When a dry brush is dipped in water its hair spread out.

(ii) The pressure on its concave side of a curved liquid surface is greater than the pressure on its convex side.

(b) (i) Derive an expression of the formula for the capillary rise of a liquid.

(ii) The lower ends of the vertical glass take each 1.2 *mm* internal diameter are immersed into the beaker containing water and chloroform respectively and the upper end are joining by a T piece. Air is withdrawn through the T piece until the top of the water column is $22\,cm$ above the level of the beaker.

Find the height of the chloroform above the level in the beaker assuming that the angle of contact is zero for each liquid.

2 (a) A certain mass of gas is heated first in a small vessel of volume V_1 and then in a large vessel of volume V_2. Use the diagram to explain the variation of pressure and temperature.

(b) Use the concept of kinetic theory of gases to show that the mean velocity of a gas molecules in a system is given as $\sqrt{\frac{8kT}{\pi m}}$

(c) (i) If a copper wire is replaced by another wire of the same length and material but of twice diameter, how does this replacement affect elongation under the applied load?

(ii) The rubber cord of catapult has a cross-sectional area of 1.0 mm^2 and total unstretched length $9\,cm$. It is stretched to $16\,cm$. and then released to project a missile of mass $4\,g$. If the total elastic energy of catapult is converted into kinetic energy without any heat loss, calculate the velocity of the projection.

3 (a) Explain any four assumptions of Kinetic theory of gases.

(b) Derive the gas equation obeyed by a system consisting of N molecules each of mass, *m* and root mean speed $\overline{c}^2$ hence obtain the K.E per molecules in terms of absolute temperature vessel of volume $6.0\times10^{-3}m^3$ containing nitrogen having pressure of $2.0\times10^2\,Pa$ and temperature of $27^0\,C$. Calculate;

(i) The number of nitrogen molecules in the vessel

(ii) The r.m.s speed

4 (a) (i) In a room at $18^0\,C$ a body cools from $35^0\,C$ to $30^0\,C$ in 5 minutes. Find the further time elapse before the temperature of the body is $20^0\,C$.

(ii) The energy arriving per unit area on the earth's surface per second from the sun is $1.34\times10^3\,Wm^{-2}$. The averaged distance from the earth to the sun is 215 times as great as the Sun's radius. Find the surface temperature of the Sun, assuming that both the Earth and the Sun are black bodies.

(b) (i) Why during the clear day, the sky looks blue.

(ii) Draw a rough sketch showing the variation with wave length of the radiation from the radiation from the black body temperature of 1000 K and 3000 K respectively.

5 (a) (i) State the Kirchoffs laws

(ii) Determine currents I_1 , I_2 and I_3. as described in Figure 1.

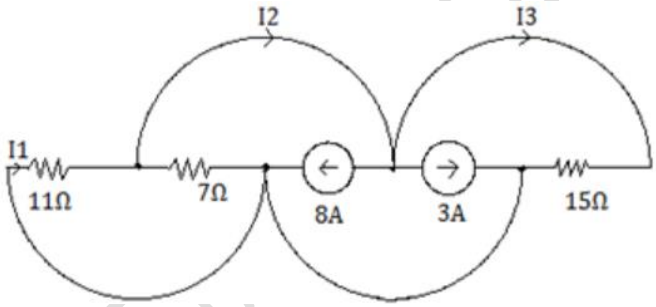


Figure 1

(b) What is the value of the electric field at point **C** as shown in figure 2?

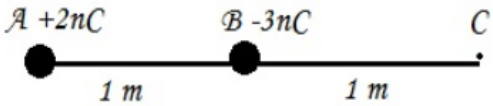


Figure 2

6 (a) (i) When an electric discharge is passed through gaseous hydrogen, the H_2 molecules dissociate. Why the energetically excited hydrogen atoms produced emit electromagnetic radiation of discrete frequencies.

(ii) When electromagnetic radiation of wavelength 300 nm falls on the surface of sodium, electrons are emitted with a kinetic energy of 1.68 ×105 $Jmol^{-1}$. What is the minimum energy needed to remove an electron from sodium? What is the maximum wavelength that will cause a photoelectron to be emitted ?

(b) (i) What are the frequency and wavelength of a photon emitted during a transition from $n = 5$ state to the $n = 2$ state in the hydrogen atom?

(ii) Calculate the binding energy per nucleon (in units of MeV) for ^{9}Be.

(c) (i) Explain basic essential factors establishment of a nuclear plant.

(ii) How much $^{2}_{1}H$ in kg/s is required to generate 100 MW by fusion.

Candidate's .....

ST. AUGUSTINE-TAGASTE SECONDARY SCHOOL

FORM SIX MID TERM TEST

PHYSICS 1

Time: 3 Hours **Combination** **May, 2020**

INSTRUCTIONS:

1. This paper consists of **ten (10)** questions.
2. Answer **ALL** questions in **section A** and **two** questions in **section B**.
3. Write your full names in the answer sheets provided
4. Mathematical tables and non-programmable scientific calculators may be used.
5. **The following useful information may be used;**

(x)	Acceleration due to gravity, g	$10\ m/s^2$
(xi)	Universal Gravitational constant, G	$6.67\times10^{-11}\ Nm^2kg^{-2}$
(xii)	Planck's constant, h	$6.6\times10^{-34}\ Js$
(xiii)	Density of air	$1.2\ kgm^{-3}$
(xiv)	Speed of sound in air, v	$330\ m/s$
(xv)	Speed of light, c	$3.0\times10^{8}\ ms^{-1}$

FOR EXAMINER'S USE ONLY		
QUESTIONS NUMBER	**SCORE**	**SIGNATURE**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		

This paper consists of **Four** (**4**) printed pages

SECTION A (70 marks)

1. (a) The following results were obtained in an experiment to determine to determine the resistivity ρ of a metal wire; resistance of the wire $R = (2.00 \pm 0.01)\Omega$, diameter of the wire $d = (0.57 \pm 0.01)\,mm$ and length of the wire $l = (105.60 \pm 0.1)\,mm$. Calculate the percentage error in resistivity from the obtained experimental results.

   (b) The viscosity of a liquid η depends on the radius of the tube, pressure gradient and the rate of flowing of the liquid through the tube. Use the method of dimensional analysis to determine the relation that shows how viscosity depends on the radius of the tube, pressure gradient and rate of fluid flow.

   (c) Explain any limitation encountered in deriving the formula in 1 (b).

2. A particle moves over a path such that the components of its position with respect to an origin of coordinates are given as a function of time by: $x = -t^2 + 12\,t + 5$ and

   $y = -2\,t^2 + 16\,t + 10$ where t is in seconds and x and y are in meters. Find the particle's velocity vector v *and* acceleration vector a as a function of time, and find its magnitude and direction at t= 6 s.

3. A projectile of mass m_1=m moving along the x direction with a speed v_1=10√3 m/s collides elastically with a stationary target of mass m_2 =2m. After the collision, the projectile is deflected at an angle of 90^o.
   (i) What is the speed and angle of the target after collision?
   (ii) What is the final speed of the projectile and the fraction of kinetic energy transferred to the target?

4. An airplane is flying horizontally with a constant speed $v_\circ$ =400 km/h at a constant elevation h =2 km above the ground, Fig. 1. Shows the pilot decided to release a package of supplies very close to a truck on the ground. Find;
   (i) what is the time of flight of the package?
   (ii) What is the horizontal distance covered by the package in that time.

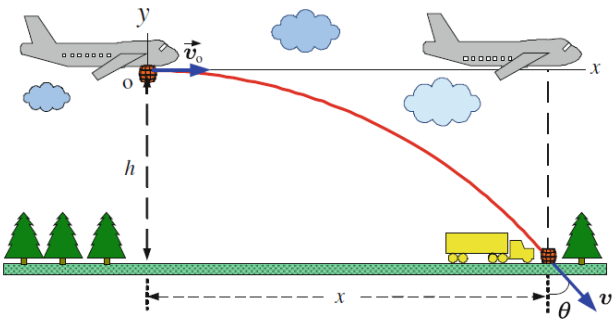


Fig 1

5. A tennis ball of mass $m1$ = 0.04 kg, moving with a speed of 5m/s, has an elastic head-on collision with a target ball of mass $m2$ = 0.06 kg that was moving at a speed of 3m/s. What is the velocity of each ball after the collision if the two balls are moving:

   (a) in the same direction

(b) in opposite direction

6. (a) A system of three particles of masses $m1$ = 0.5kg, $m2$ = 1kg, and $m3$ = 1.5kg are spread out in two dimensions and located as shown in Fig. 2. Find the center of mass of the system.

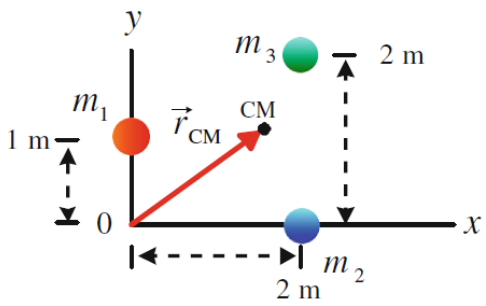


Fig 2

(b) A rocket has amass 2×104 kg of which 104 kg is fuel. When the rocket is lunched vertically from the ground, it consumes fuel from its rear at a rate of 1.5×103 kg/s with an exhaust speed of 2.5×103 m/s relative to the rocket. Neglect air resistance and take the acceleration due to gravity to be g = 9.8m/s2.

(i) Find the thrust on the rocket.

(ii) Find the net force on the rocket, once when it is full of fuel and once when it is empty.

(iii) Find the final speed of the rocket when the fuel burns completely.

7. (a) A wheel 0.4m in diameter rotates uniformly at an angular speed of 3.6×10^2 rev/min.

(i) What is its angular speed in rad/s?

(ii) Find the linear speed and acceleration of a point on its rim.

(b) Three objects (a solid sphere, a disk, and a thin hoop) each having a mass M are at rest at the same height h. At the exact same instant, these objects start to roll without sliding down the incline of Fig. **3**. In what order do they arrive at the bottom?

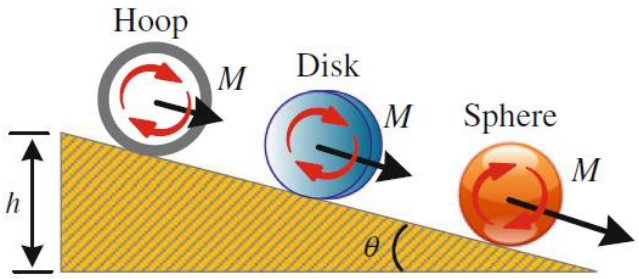


Fig 3

SECTION B (30 marks)

8. A glass beaker of water is at 20 ◦C. The beaker has a mass m_g =200 g with specific heat c_g =840 J/kg.C◦ and contains water of mass m_w =300 g with specific heat c_w =4,186 J/kg.C. A quantity of steam initially at 120 ◦C is used to warm the system to 50 ◦C. If the specific heat of steam is c_s =2,010 J/kg.C◦ and latent heat of vaporization is L_V =2.26×106 J/kg, what is the mass of the steam?

9. (a) Tanzania shifted from Television analogy transmission to digital transmission, explain any three advantages of the shift.
   (b) Differentiate the following terms as used in Telecommunication;
      (i) Amplitude Modulation (AM) and Frequency Modulation (FM)
      (ii) Bandwidth and Communication system
   (c) (i) In the process of transmission of information signal, the signal is accompanied with noise anywhere between the information source and the receiving end. Describe the sources of the noise.
      (ii) State what bandwidth is required for a radio wave frequency 500 kHz when amplitude modulated by audio frequencies of up to 15 kHz.

10. (a) Explain any three usefulness of logic gates in daily life.
   (b) The Elevator door should open if the elevator is stopped, it is level with the floor, and the timer has not expired, or if the elevator is stopped, it is level with the floor, and a button is pressed. If D "Elevator door opens", S "Elevator is stopped", F "Level with floor", T "Timer expired", B "Button Pressed". Construct a Boolean expression.
      (i) Construct a Boolean expression
      (ii) Determine the truth table of the Boolean expression