WAJA GIRLS SECONDARY SCHOOL

DEPARTMENT OF MATHEMATICS

FORM FIVE HOLIDAY PACKAGE

ADVANCED MATHEMATICS

APRIL, 2020

1. (a) Write down an expression for $tanh$ x interms of e^x and e^{-x} hence show that:
   $1 - tanhx = \frac{2e^{-2x}}{1+e^{-2x}}$

   (b) Find the values of x which $8\ cosh\ x\ +\ 4\ sinhx\ =\ 7$, giving logarithms.
   (c) Show that $sinh^{-1}x = \ln(x + \sqrt{x^2+1}$ and hence find the value of $sinh^{-}(4)$ to 3 decimal places.

2. If $4x^2 + 4x + 5 = (Px + q)^2 + r$
   (a) Find the values of constants p, q and r.
   (b) Hence or otherwise, find
   $\int \frac{dx}{4x^2+4x+5}$

3. If y = A $coshkx\ +\ B\ sinhkx$, prove that $\frac{d^2y}{dx^2} = k^2y$. Hence find y as a function of x, given that d^2y/dx^2 = 4y and that when x = 0, y = 2 and $\frac{dy}{dx} = 2$

4. Prove that
   $tanh^{-1}x - tanh^{-1}y = tanh^{-1}\ \frac{x-y}{1-xy}$

5. (a) Solve the equation $2tanh^{-1}x = ln3$
   (b) Find x if $cosh^{-1}5x = sinh^{-1}4x$
   (c) Solve $tanh^{-1}\left(\frac{x^2-1}{x^2+1}\right) = ln2$
   (d) Find the minimum value of 5 $coshx$ + 3sinh x

6. (a) Find the possible value of $sinhx$ if $\begin{vmatrix} \text{coshx} & -\text{snhx} \\ \text{sinhx} & \text{coshx} \end{vmatrix} = 2$
   (b) Prove that
   $tanhx = \sqrt{\frac{cosh2x-1}{cosh2x+1}}\ (x > 0)$

7. Use the definition of $sinhx, coshx$ to prove that $1 - tanh^2x = sech^2x$

8. Solve the equation $cosech^{-1}x + lnx = ln3$
9. $\int \sqrt{\frac{x+1}{x^2-1}}\,dx$
10. Differentiate y = $sinhx\ tanhx\ w.r.t.x$

11. For a group of 50 male workers the mean and standard deviation of their daily wages are 63 dollars and 9 dollars respectively. For a group of 40 female workers these values are 54 dollars and 6 dollars respectively. Find the mean and standard deviation of the combined group of 90 workers.
12. The average marks of 25 male students in a section are 61 and student in the same section is 58. Find the combined average marks of 60 students.
13. The mean and standard deviation of 6 observations are 8 and 4 respectively. If each observation is multiplied by 3, find the new mean and standard deviation of the resulting observations.
14. From the data 14, 23, 39, 4, 11, 19, 45, 31, 7, 30, 42, 17, find
    (i) Interquatile range
    (ii) The mean deviation from the median for the data

15. Consider the frequency distribution table below:

x	3	4	5	6	7
f	2	6	11	8	3

Calculate:
(i) Median
(ii) Mode
(iii) 70^{th} percentile

16. The masses measured to the nearest kg of 50 boys are noted and distributed as follows:

Mass kg	60-64	65-69	70-74	75-79	80-84	85-89
f	2	6	12	14	10	6

(i) Construct a frequency cumulative curve and use it to estimate median.
(ii) Construct the histogram and use it to estimate mode
(iii) Find the mean and standard deviation by coding method
(iv) Find the 56^{th} percentile
(v) Find the interquantile range

17. If $A = \{1,3,5\}$and $B = \{3,5,6\}$and $C = \{1,3,7\}$
    (i) Verify that $A \cup (B \cap C) = (A \cup B) \cup (A \cap C)$
    (ii) Verify that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
    (iii) Represent $A \cap (B \cup C)$ on a number line.

18. There are 20 students in a class with 10 of them being footballers, 15 volley ballers, and 6 footballer and volleyballs.

(i) How many students are footballers or volleyballs.
(ii) How many are neither of the two.

19. Use the basic properties of sets to simplify
(i) $[A \cap (A' \cup B)] \cup [B \cap (A' \cup B')]$
(ii) $(A \cap B') \cup (A' \cup B')$
(iii) $(\cup B)' \cap A$

20. (a) Simplify
(i) $[(A - B) \cup (A - C)] \cap A'$
(ii) $(A - B) - (A \cup B')$

(b) Show that

(i) $[A \cap (B \cap C')] \cup C = (A \cup C)$
(ii) $(A \cap B') \cup (A' \cap B) \cup (A \cap B) = A \cup B$

21. The sets A, B, C and D are defined as
A = $\{X \epsilon R \coloneqq -5 < x \leq 8\}$
B = $\{X \epsilon R: X < -3 \; or \; x \geq 0\}$
C = $\{X \epsilon R: \; {}^{3}/_{2} \leq x \leq {}^{11}/_{2}$
D = $\{x \epsilon R: \; -1 > x\}$

Express the following on a number line.
(i) $A \cap B'$ (ii) $B \cup C$ (iii) $B \cap (A \cup D)'$ (iv) $(A \cup B) \cap (C \cup D)$

22. (a) If $f(x) = -4x + 9$ and g(x) = 2x − 7, find (fog)(x)
(c) If $f(x) = \sqrt{x}$ and g(x) = x^2, find fog(81) and fog(x)

23. (a) If f(x) = $x^2 - 1, g(x) = \sqrt{x+1}$ and h(x) = $\frac{1}{x^2}$, find
(i) fogohx (ii) $(hof)^{-1}$ (4)

(b) Sketch the graph of the following functions

(i) $f(x) = \frac{x^3-1}{x^2-4x}$ and hence determine the domain and range.

24. A ball is thrown into a and its path is given by the graph of the function f(t)= $-10t^2 + 4t + 15$ where t is in seconds and f(t) is in decimeters. Find how high the ball goes.
25. Given the function f(x) = 2^x
(i) Find f-1(x)
(ii) Sketch the graph of f(x) and f-1(x) on the same coordinate plane
(iii) Describe the geometrical relation between f(x) and $f^{-1}(x)$
(iv) Determine domain and range of each function.

26. (a) Find the domain and range of the relation g(x) = $\sqrt{\frac{8-2x^2}{x}}$

    (b) If yz = a^2 prove that $\frac{1}{a+y}+\frac{1}{a+2}=\frac{1}{a}$. By using this result or otherwise, find the numerical values of $\frac{1}{1+k^x}+\frac{1}{1+x^{-k}}$

27. (a) Given that m and n are rational and that:
    $(\sqrt{m}-\sqrt{n})2 \quad = 47-12\sqrt{15}$, find the possible values of m and n.

    (b) Sketch the graph of $y=\frac{x^2-4}{x^2+x-12}$ stating all the important infuriation about the graph.

28. (a) Find the equation of the circle whose centre is (2,3) and touches the x-axis.
    (b) Find the coordinates of point D which divide internally the lien segment joining P(-1,5) and Q(1,1) in the ratio of 2:3
    (c) Find the area of a rectangle whose verticals are (1,-2), (4,0) and (0,4), (-2,1).

29. A circle whose coordinates of its centre are positive touches both axes of the coordinates. If also touches the line 3x-4y+6 = 0, find its equation and the coordinates of its point of contact with this line.
30. Show that the length of the line joining the common points of the line y = mx and the curve $y^2=4x$ is $\frac{4}{\mathrm{m}^2}\sqrt{(1+\mathrm{m}^2)(1-\mathrm{mc}}$
31. The coordinates of point A, B are respectively (2,5) and (5,8) p is a point such that AP = 2BP. Find the equation of the locus of P.
32. A point moves so that the sum of the squares of its distances from the two fixed points (a, 0) and (-a,0) is constant and equal to $2c^2$, show that the equation of the locus in $x^2+y^2=c^2-a^2$
33. The two curves $y=2x^2-3$ and $\mathrm{y}=\mathrm{x}^2-5\mathrm{x}+3$ intersect at two points one of which, p is in the font quadrant find the target of the acute angle between these curves at P.
34. Show that part of the line 3y = x+5 is a chard of the circle $x^2+y^2-6x-2y-15=0$ and find the length of this chard.
35. (a) Find the shortest distance from the point P(3, -1) to the circle $x^2+2x+y^2-4y=4$
    (b) Find the equation of the circle with centre 0(2) and orthogonal to the other circle with equation $x^2-6x+y^2+2y+1=0$

36. Integrate the following
    (a) $\int e^{2x}\cos x\,dx$
    (b) $\int x^2 lnxdx$
    (c) $\int\frac{2dx}{x^2-4x+5}$

37. Evaluate the following
    (a) $\int \left(cos^{-1}2x + \frac{1}{\sqrt{x^2-4}}\right) dx$
    (b) $\int x\,(3x^2+4)^5 dx$

38. The gradient of a curve at any point is given by $^{dy}/_{dx} = 2x - 1$. Find the equation of the curve if the curve passes through the point (1,1).

39. Evaluate the following
    (a) $\int \frac{x}{(x-1)(x^2+4)}$dx
    (b) $\int \frac{cos\theta d\theta}{6-5sin\theta+sin^2\theta}$
    (c) $\int \frac{1}{1+3e^x+2e^{2x}}\, dx$
    (d) $\int \frac{2sin+3cosx}{3sinx+4cosx}$dx
    (e) $\int \sqrt{\frac{x-1}{x+1}}\, dx$

40. Find $\int \frac{1}{1+e^x} dx$
41. Find the value of the solid generated after rotating about x-axis the area enclosed by the curve $y^2 = 4x \; and \; 2y = x$
42. Show that the length of the curve y = f(x) from x = a, to b = x is given by
    $l = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx$

43. If y = $\sqrt{\frac{1+sinx}{1-sinx}}$ show that
    $\frac{dx}{dy} = \frac{1}{1-sinx}$

44. If y = $\frac{sinx}{x^2}$, find $\frac{dy}{dx}$ and
    $\frac{d^2y}{dx^2}$ and prove that
    $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + (x^2+2)y = 0$

45. Differentiate from the first principle y = ln x^2
46. If the absolute value of x is greater than a unity, show that:
    ln $\left(\frac{x+1}{x-1}\right) = 2\left(\frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \cdots\right)$ and use the series to calculate ln 2 three desined places.

47. Find the maximum value of $\frac{lnx}{x}$
48. Sketch the curve of

$y^2(x+a) + x(x-a) =$
0 where is a positive constant and show that y is maximum or minimum whn x = $\pm a\sqrt{2-a}$

49. An error of 3% is made in measuring the radius of a sphere. Find the percentage error in measuring volume.
50. A water tank in the shape of a right circler cone has a height of 10 feet. The top rim of a tank is a circle with radius 4 feet. If water is being pumped into the tank at the rate of 2 cubic feet per minute, what is the rate of change of the water depth, in feet per minute, when the depth is 5 feet?
51. Eliminate of the equation
    (i) x = sin $2\theta, y = \sec 4\theta$
    (ii) x = tan $2\theta, y = \tan\theta$

52. Find x if $\sin^{-1} x + \cos^{-1} x/2 = \frac{5\pi}{6}$
53. Prove that: $tan^{-1}3 + 2tan^{-1}2 = \pi + cot^{-1}3$
54. Express 3 cosө+4 sin ө in the form of r cos (ө-x) giving value of r and ө and hence solve the equation 3 cosө+4 sinө=-5 for $\dot{0} \leq \theta 360°$
55. Express $\sqrt{\frac{1-sin2\theta}{1+sin2\theta}}$ interms of tanθ
56. Find the general solution of the equation cosθ-$\sqrt{3}sin\theta = 1$
    (i) By using half angle formulae
    (ii) By using a compound angle transformation

57. If A, B and C are the angles of a triangle, prove that
    (i) Sin B + sin (A-C) = 2sin A cos C
    (ii) CosA+CsB + Cosc = 1 + 4 sin $A/2$ sin B/C sin $C/2$
    (iii) Sin 2A + sin 2B + sin2c = 4 Sin A sin B sin C

58. Find the approximation for the expression $\frac{\sin 3\theta}{1+\cos 2\theta}$
59. Find the greatest and least values of
$\frac{1}{4sin\theta-3cos\theta+6}$

60. If A + B = $\wedge/2$ and tan A = $\frac{n}{n+1}$ find tan B and ten (A – B)
61. Prove that $\frac{\cos A-\cos B}{\sin A+\sin B} = \tan\left(\frac{B-A}{2}\right)$
62. Find the angles x and y between 0° and 90° which satisfy the simultaneous equations cos x cosy = 0.6 and sin x sin y = 0.2.
63. Given that x = 2 sin $(nt + \pi/6)$ express x and y in terms of sin nt and cos nt. Find the centersion equation of the locus of the point (x,y) as t varies.

64. (a) If $\propto, \beta$ and γ are the three roots of the equation $ax^3 + bx^2 + cx + d = 0$, prove that $\propto + \beta + \gamma = {}^{b}/_{a}, \propto \beta + \propto \gamma = {}^{c}/_{a}$ and $\propto \beta\gamma = {}^{-d}/_{a}$

(b) Find the coefficient of x^3 in the expansion of $(1 + x - x^2)^6$

(c) Express $\frac{2}{(2x+1)(2x-1)}$ in show that

$$\sum_{r=1}^{r=n} \frac{2}{(2r-1(2r+1} = 1 - \frac{1}{2n+1}$$

65. Solve the equation

(a) $\begin{vmatrix} x-3 & 1 & -1 \\ -7 & x+5 & -1 \\ -6 & 6 & x-2 \end{vmatrix} = 0$

(b) If $\propto$ and β are the roots of the equation $x^2 - 3x - 5 = 0$, find the equation that has the roots of:

(i) $\frac{1}{\propto+1}, \frac{1}{\beta+1}$

(ii) $\frac{1}{\propto^2}, \frac{1}{\beta^2}$

(c) Expand $\frac{(1+2x)^3}{2-x}$ in ascending power of x up to and including the term in x^3, and state the values of x in which the expansion is valid.

66. (a) Given that $(a + b)^3 = 0$ prove that log (a+b) = $\frac{1}{2}$ (loga + log b + log c).

(b) Solve for x if $log_3 x + log_x 9 = 3$

(c) $log_2 x + log_4 (x + 4) = \frac{1}{2}$

(d) $\begin{cases} log_x y = 2 \\ xy = 8 \end{cases}$

67. (a) State the reminder theorem

(b) A polynomial p(x) when divided by x – 1, x and x + 1 it has remainder of 1, 2 and 3 respectively. Find the remainder when it is divided by $x^3 - x$

(c) Find the range of values of k for which the equation $x^2 - 2x - k = 0$
Has read roots. If the roots of this equation differ by one, find the value of k.

68. (a) Find the first four terms of the expansion of the following in ascending power of x

$\sqrt{\frac{1+x}{1-x}}$

(b) Expand $(1-x)^{1/3}$ in ascending power of x as far as the fourth term. By taking the first two terms of the expansion taking $x = \frac{1}{100}$, find the value of $\sqrt[3]{37}$

(c) Write down the constant terms of $\left(x - \frac{1}{x}\right)$

69. Show that the dot product of two vectors a = a, I + a_2j + a_3k and b = b1i b2j + b3k is given by a. b = a_1 b_1 + a_2b_2 + b3 a_3
70. Show that $|\underline{a}.\underline{b}|2 \quad + |\underline{a}x\underline{b}|^2 = |a|^2|b|^2$
71. Two vectors a and b are defined interms of parameter t as $\underline{a} = \dot{e} + t\underline{j} + t^3\underline{k}$ and $\underline{b} = 2t\underline{t} - t^3\underline{k}$. Determine

(i) $^{d}/_{dt}\,(\underline{a}.b)$ (ii) $\frac{d}{dt}(\underline{a}x\underline{b})$

72. Forces of magnitude 5 and 3 units acting in the direction of $6\underline{i} = 2\underline{j} + 3\underline{k}$ and $3\underline{i} - 2\underline{j} + 6\underline{k}$ respectively acting on a particle which is displaced from point (2, 2, -1), (4, 3, 1). Find the work done by the force.
73. A particle with 200g of mass is moving along the curve with velocity $^{i}/_{4}\,t - \frac{7t}{t} + \frac{\underline{k}}{(1-2t)}$

(i) Find the force applied to the particle at any time t.

(ii) Find the position vector at time t where the particle is heading.

74. A particle is moving along a curve so that its velocity t seconds later is given by V = $\frac{1}{t^2+4t-5}$. Starting with V = $^{ds}/_{dt}$. Find the expression of the displacements at t seconds given that 5 = 0, when t = 1.

75. A force of magnitude of 27N in the direction of a vector $2\underline{j} + \underline{j} + 2\underline{k}$ at the point P (1, ¯3, ¯1). Find the vector moment of a force about the origin.

**********END**********

WAJA GIRLS SECONDARY SCHOOL

DEPARTMENT OF MATHEMATICS

FORM FIVE HOLIDAY PACKAGE

BASIC APPLIED MATHEMATICS

APRIL, 2020

1. (a) Use the non-programmable calculator the evaluate

(i) $\ln\left(\frac{ln\left(\frac{4x10^2}{\pi}\right)}{log_3\sqrt{3}}\right)$

(ii) $\sqrt[6]{\frac{e^{6.2}\ln\sqrt{7}\div log_2 20}{2456\ sin^{-1}(\pi/6)}}$

(iii) $\sqrt{\frac{(p-q)\ (p+q)}{4r\ (r-q)}}$ where

P = 1.49621
q = 0.044063
r = 0.51010

(iv) $\int_0^2 (x^2-3)^3\ dx$

(b) Find minimum or maximum value of $f(x) = -5x + \frac{1}{2}x^2 + 6$

2. (i) Sketch the graphs for the following

(a) $f(x) = \frac{1}{x^2-1}$

(b) $f(x) = \frac{2x^2-4}{x^2-9}$

(c) $f(x) = \begin{cases} 2x^2 - 4 & \text{if } -2 \leq x < 4 \\ 2 & \text{if } x = 4 \\ 2x - 1 & \text{if } x > 4 \end{cases}$

(d) $R = \{(x, y): 2x - y \leq 5\}$

(ii) Calculate the sum of the series

$$\sum_{n=-3}^{-1} \frac{\sqrt{n^2 - 1}}{3n - 3}$$

(iii) Convert the recurring decimal $1.4\dot{2}$ into fractions by infinity geometric approach.

(iv) If the first term of a G.P is (x – 1) and the third term is $(x-1)^2$ show that the sum of the first two terms is: $\frac{(x-1)\,(x-2)}{(\sqrt{x-1})-1}$

(v) Write the following sigma notation

(a) $-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+\cdots$

(b) $2 + 4 + 6 + 9$

(c) $\frac{2}{3}+\frac{4}{4}+\frac{8}{27}+\cdots$

3. (a) If m varies inversely as t and directly as n3. Determine m interms of t and n. Given that m = 3, n = 2, t = 3

(b) Use the first principle to differentiate the following:

(i) $f(x) = \frac{1}{\sqrt{x}}$ (ii) $f(x) = 2x^2 - \frac{1}{x}$ (iii) $f(x) = \frac{5}{4}x^2$

(c) Differentiate the following

(i) $y = e^x sin2x$

(ii) $y = \ln\sqrt{x}\ e^x$

(iii)$x^2 - 3xy + 2y^2 - 2x = 4$ at a point (1,3)

(d) Determine the maximum point of y = $2(x-1)^3$ and sketch it

(e) The rate of decrease of the area of sphere is $\frac{1}{10}$ cm^2/sec. Determine the rate of decrease of the radius when the radius is 7cm.

(f) Given that $y = (2x + 1)^2$ find $\frac{d^2y}{dx^2} - \frac{dy}{dx} - y$

4. (a) Evaluate the following

(i) $\int cos^2 x dx$

(ii) $\int_0^1 3x^2(x^3-1)dx$

(iii) $\int \frac{sinx}{1-cosx}dx$

(b) Find the area enclosed between the given conditions.

(i) $f(x) = x^2 - 4x$ between x = 0 and x = 2

(ii) $f(x) = 3^3 + 3x^2 + 3x$ between x = 1 and x = 2

(c) Find the area enclosed between the curves $y = 5x - x^2$ and $y = x^2$

(d) Determine the volume of solid of revolution obtained by rotating the given curves about x-axis within stated limits.

(i) $y = x2$ between x = 0 and x = 2

(ii) $y = cosx$ between x = 0 and x = $\pi/2$

(iii) $y = 5 - x$ between x = 1 and x = 5

5. (a) Determine the semi-interquartile range from the data:-
97, 9, 14, 87, 29, 38, 44, 100, 28, 27, 111, 92, 79, 19

(b) Given the frequency table below

Marks	1-23	25-48	50-73	75-98
Frequency	8	2	11	4

Determine:

(i) The mean mark
(ii) Mean by coding method
(iii) Mode
(iv) Variance
(v) Upper quartile
(vi) Sketch histogram and determine mode
(vii) Draw ogive and estimate median

6. (a) Find the remaining angles in the triangle ABC in which a = 12.5cm, c = 17.7cm and c = 116°.

(b) Elimate θ from the equation $x = 3\cos\theta$ and $y = 5\sin\theta$

(c) If $\sin(x + a) = 2\cos(x - a)$ prove that $\tan x = \frac{2-\tan a}{1-2\tan a}$

(d) Solve for x between O° and 360° given the equation $\cos 2x + \sin^2 x = 0$

(e) Prove the following identities

(i) $\frac{1-tan\theta}{1+tan\theta} + \frac{co+\theta-1}{co+\theta+1}$

(ii) $\frac{1+cos\theta}{sin\theta} + \frac{sin\theta}{1-cos\theta}$

(iii)$cos2\theta = \frac{1-tan^2\theta}{1+tan^2\theta}$

(f) Sketch the graph of the functions

(i) $f(x) = sinx$ for $\dot{0} \leq x \leq 180°$

(ii) $f(x) = \tan x$ for $-2\pi \leq x \leq 2\pi$

7. (a) Define the following terms as applied to L.P
   (i) Objective function
   (ii) Optimal solution
   (iii) Non-negative constraints

   (b) Solve the following equations graphically

   (i) $\begin{cases} y = 2x - 1 \\ y = 2x + 1 \end{cases}$

   (ii) $\begin{cases} 2x + 3y - 3 \\ -3x - 5 = -y \end{cases}$

   (c) Mariam Gitanya wants to earn at least 13000/= this week. Her father has agreed to pay her 500/= to mow the lawn and 2000/= to weed the garden in a day. Suppose she mows the lawn once. What minimum number of days will she have to spend weeding the garden?

   (d) Janeth Kapandila makes two kids of furniture chairs and tables. Two operation M and N are used. Operation M is limited to 20 days a month while operation N is limited to 15 days per month. Table below shows the all details.

Furniture	M	N	Profit
Chair	2 days	3 days	20000/=
Table	4 days	1 day	24000/=

   How many tables and chairs should her make in a month to maximize the income?

8. Integrate (i) $\int (3x - x^2)\, dx$ (ii) $\int_0^1 (\theta + 8\theta^2) d\theta$
9. Determine area between curve f(x) = -x2 – 2x and x – axis
10. Determine volume of solid of revolution obtained by no taking $\frac{y}{x+1} = 1$ about x-axis once between x = 0 and x = 4.
11. The mean of one set of 8 numbers is 13.6 and the mean of another set of 11 numbers is 8.8. Find the mean of all these 19 number when taken as one set.
12. Evaluate $\int \sqrt{t^2}\ dt$

13. Differentiate $t = \frac{1}{\theta^2} - \sin 3\theta + cos6\theta$
14. Find $\frac{dy}{dx}$ if $x^2 + y^2 - x^4 + xy^6 = 12$
15. Determine stationary point hence sketch graph of $y = 2x^2 - 8x$
16. Write the series of:
    (i) $\sum_{k=0}^{6}(11 + 6k)$ (ii) $\sum_{t=0}^{18}(-1)^t$
17. Find the 8th term of the series 2 + 10 + 50 +…….
18. Write in sigma notation $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots$
19. Sketch graph of: $f(x) = \frac{2x^2+x-4}{x-5}$
20. Differentiate between relation and function
21. Use calculator to evaluate
    $\sqrt{\frac{21^{\ln(sin40)}}{e^{sin^{-1}(0.61)} + e^{\ln(\ln(24))}}}$
22. Solve completely the triangles in which
    (a) b = 6m, A = 80°, c = 46°
    (b) A = 115°, a = 65m, 6 = 32m
23. Simplify $sin^4\theta - cos^4\theta$
24. Prove that $(cos\theta - sin\theta)^2 + (cosec\theta + sin6)^2 = 2$
25. Express sin 3 x in terms of sinx
26. Solve 2 sinθ - $\sqrt{3} = 0$ for $0 \leq \theta \leq 360$
27. Solve $2sin\theta^2 + 3cos\theta - 2 = 0$
28. Sketch graph of (a) y = 3sinx (b) y = 1 + cosx
29. The volume of cylinder is 500cm^3. Find the height and the radius of the cylinder such that the cylinder has a small area possible.
30. Plot a graph representing the following inequalities.
    $x \geq 0, y \geq 0, 3 + 2y \leq 18, 2x + 4y =\leq 16$. List all the points inside the region whose x and y coordinates are both even numbers.
31. A farmer wants to plant coffee and potatoes. Coffee needs 3 men per hectare and potatoes need also 3 men per hectare. He has 48 hired labourers available. To maintain a hectare of coffee he needs 250 shillings while a hectare of potatoes costs him 100 Tsh. Find the greatest possible area of land he can sow if he is prepared to use 25,000 Tsh.
32. Use calculates to evaluate mean, standard deviation.

Clinternal	10-20	20-30	30-40	40-50	50-60
Frequency	10	12	15	20	14

********** ***The End*** **********

WAJA GIRLS SECONDARY SCHOOL

DEPARTMENT OF ARTS

FORM FIVE HOLIDAY PACKAGE

ECONOMICS 1

APRIL, 2020

SUBJECT MATTER OF ECONOMICS

1. There are as many definitions of economics as there are economists. Discuss.
2. Economics falls under positive and normative economics. Discuss.
3. Due to the main economic problem of scarcity fundamental economic problems of what, how, when, how much, for whom and where to produced must be answered clearly explain how scarcity is solved in various societies.
4. How important is a transition period? Give five points.
5. Write short notes on
   (a) Modes of production
   (b) Economic systems
   (c) Distribution and income distribution
   (d) Opportunity cost

6. Examine the roles of the government in mixed economy. Provide seven (07) points.

PRODUCTION

7. Discuss the economics of scale and the diseconomies of scale.
8. (a) With the aid of curves explain.
   (i) Areas of production by a firm in short run
   (ii) Stages of production by a firm in short run

   (b) Examine techniques of productions.

9. (a) Explain the assumptions underlying the production possibility frontier of a country and state why the marginal rate of transformation differ from country to another country's PPC.
   (b) Elaborate the problems of classifying or categorizing factors of production.

10. (a) Production may continue even at no profit case. Justify.
    (b) Write short notes on
    (i) Quasi rent

(ii) Economic rent
(iii)Marginal utility

11. Discuss and then criticize theories of wages.
12. Explain the theory of interest.

THEORY OF MARKET

13. Clearly classify "market"
14. With curves, show the equilibrium of the firm (i) enjoying the profit (ii) incurring loss operating under.
    (a) Monopolistic
    (b) Monopoly
    (c) Perfect competition market structure
15. Discuss eight (0) factors for the emergence of monopoly.
16. Examine eight types of monopoly.
17. Provide four criticism of the kinked demand theory.
18. Write short notes on
    (a) Market overt
    (b) Price leadership
    (c) Price war
    (d) Black market
    (e) Collusive monopoly
    (f) Ant-monopoly measures

THEORY OF DEMAND AND SUPPLY

19. With the aid of curves explain four market periods.
20. Explain why at ceteris peribus, the higher the price the lower the quantity demanded and the vice versa. Provide three points.
21. (a) Summarize seven factors for elasticity of supply.
    (b) Summarize seven factors for elasticity of demand.
22. Explain all possible factors for change in
    (a) Supply
    (b) Demand
    (NB: Sketch curves are necessary)
23. Discuss in details the following
    (a) Inter-related demand
    (b) Cross elasticity of demand
    (c) Arc elasticity of demand
    (d) Inter-related supply
    (e) Marginal revenue test/total revenue test

(f) Point elasticity of demand

24. Examine the importance of elasticity of demand.

THEORY OF THE FIRM

25. The firm sometimes may continue with production of a commodity even at a loss. Discuss, provide five (05) points.
26. Clearly classify production costs.
27. (a) In which grounds one fails to a firm and an industry for a certain commodity
    (b) With sketch curves give reasons for the shapes of unit cost curves.

28. (a) State the laws of returns. Explain each.
    (b) What is an economic profit?

29. When does a firm produce at a super normal profit and when does it maximize profit?
30. Examine five (05) barriers of entry of new firms in an industry.

THEORY OF MONEY

31. The quantity theory of money is just "Truism" but not a theory. Discuss.
32. Effects on change on money supply in an economy are (is) subject to the state of the economy. Discuss.
33. Elaborate the utilities of price indices provide six (06) points.
34. "Money has solved the problems of batter trade". Explain this statement.
35. Write short notes on
    (a) Inconvertible currency
    (b) Fiat money
    (c) Mobile money
    (d) Exchange system
    (e) Metallic money
    (f) Types and causes of inflation.

36. Explain in details the meaning of the "price index".

TRADE CYCLE

37. "Features of phases of trade cycle are not features of trade cycle". Discuss.
38. Elaborate any three theories of the trade cycle.
39. Trade cycle "cumulative". Briefly explain.

EMPLOYMENT & UNEMPLOYMENT

40. "Zero unemployment rate does not mean that <u>all people</u> in a country are employed or self employed". Explain; give four (04) points.
41. Summarize types of unemployment existing in Tanzania. Give out seven points.

42. Discuss the main causes of unemployment in Tanzania. Give out seven points.
43. (a) Discuss eight (08) effects of unemployment.
    (b) Show how the unemployment rate can be calculated.
    (c) How can the unemployment problem be minimizing?

44. Define employment and state types of employment in Tanzania.

PRIVATIZATION

45. Discuss arguments for and arguments against privatization. Prove six points in each case.
46. Explain types of privatization.
47. Explain why privation process is inevitable when the economy is transforming from socialism to capitalism or to mixed economy.
48. Discuss features of privatization.

ENVIRONMENTAL ECONOMICS

49. Write short notes on
    (a) Positive and negative production externality
    (b) Positive and negative consumption externality
    (c) Free riding problem
    (d) Environmental issues
    (e) Importance of the environment

50. (a) Define sustainable development
    (b) Discuss measures to be taken by the government for controlling negative externality.

51. Explain the meaning of "Tragedy of the commons"
52. What is the importance of studying "Environmental economics" by the student doing economics?
53. Distinguish between pollution and externality and state when pollution becomes externality.

***********The End*********************

WAJA GIRLS SECONDARY SCHOOL

DEPARTMENT OF ARTS

FORM FIVE HOLIDAY PACKAGE

ECONOMICS 2

APRIL, 2020

NATIONAL INCOME

1. (a) "National income" is defined variously. Explain, give three points.
   (b) The national income figure of a hypothetical country is USD 98,500 in million. Provide three implications of the figure shown.

2. Standard of living differs among even those countries with the same per capital income. Discuss, give five points.
3. (a) Briefly explain "equilibrium income" and show that it occurs when savings equals to investment.
   (b) If MPS = 03y – 25 and that the level of investment if given 6y I = 0.2y. Find:
   i. The equilibrium level of income
   ii. Savings and average propensity to save.

4. Explain clearly the meaning of "INCOME INEQUALITY"
5. National income statistics are of no use than computation of per capital income. Discuss.
6. National income falls under various concepts. Explain, give out six points.

PUBLIC FINANCE

7. Discuss eight (08) efforts that must be applied by governments for management of Public debt.
8. (a) Outline various ways for financing the national budget deficit.
   (b) The National Budget is a tool for stabilization and growth of the economy. Explain in details.

9. Tax incidence does not always fall on final consumers (final customer). With the aid of curves explain this statement, provide five points.
10. (a) Tax evasion is illegal and tax avoidance is not illegal. Explain in briefly.
    (b) Discuss various measures for minimization of evasion and avoidance of tax.

11. Explain the meaning of V.A.T and show how it works.

12. Taxation is not just government source of revenue. Discuss, give out six points.

FINANCIAL INSTITUTIONS

13. Differentiate banks from Non-banks. Give out five differences.
14. Outline contributions of banking financial institution in the economy. Provide five points.
15. With examples, explain how banks create credits.
16. Explain how the central Bank stabilizes the economy through bankers.
17. How did NSSSF come into existence in Tanzania and why?
18. Write short notes on the emergence of
    (i) The current National Bank of commerce
    (ii) The Bank of Tanzania
    (iii) Cooperative Rural Development Bank.

MARKETING AND COMMUNICATION

19. (a) Give out examples of agricultural cooperative Unions in Tanzania and briefly explain their common major roles.
    (b) Marketing involves marketing functions. Explain.

20. What is effective communication and why communication must be effective? Give three reasons.

********END**********

WAJA GIRLS SECONDARY SCHOOL

DEPARTMENT OF SCIENCE

FORM FIVE HOLIDAY PACKAGE

PHYSICS

APRIL, 2020

INSTRUCTIONS

- Attempt all questions
- All work done must be shown clearly

Errors and dimension

1. (a) Mention two applications and two limitations of dimensional analysis.
   (b) The frequency f of a note produced by a fact wire stretched between two support depends on the distance ℓ between the supports, the mass per unit length of the wire, μ and the tension T. Use dimension analysis to find how f is related to ℓ, μ and T.

2. (a) The period T of oscillation of a body is said to be 1.5I 0.002S while its amplitude A is 0.3I 0.005m and the radius of gyration K is 0.28I 0.005m. If the acceleration due to gravity 9 was found to be related to T A and K by the equation.
   $\frac{gA}{4\pi^2} = \frac{A^2+K^2}{T^2}$, find the:-

   (i) Numerical value of g in four decimal places
   (ii) Percentage error in g

Projectile motion

1. (a) (i) Define the term trajectory
   (ii) Briefly explain why horizontal component of the initial velocity of a projectile always remained constant.

   (b) (i) List down two limitations of projective motion
   (ii) A body projected from the ground at the angle of 60° is required to pass just above the two vertical walls each of height 7m. If the velocity of projection is 100m/s, calculate the distance between the two walls.
2. (a) (i) Mention two characteristics of projectile motion

(ii) If the range of the projectile is 120m and its time of flight is 4 seconds, determine the angle of projection and its initial velocity of projection assuming that the acceleration due to g rarity, g = 10m/s^2

(b) (i) Mention two examples of projectile motion
(ii) Find the velocity and angle of projection of a particle which passes in a horizontal direction just over the top of a wall which is 12m high and 32m away.

Newton's laws of motion

1. (a) (i) State the principles on which the rocket propulsion is based
   (ii) A jet engine on a test bed takes in 40kg of air per second at a velocity of 100m/s and burns 0.80kg of fuel per second. After compression and heating the exhaust gases are ejected at 600m/s relative to the air craft. Calculate the thrust of the engine.

   (b) (i) Define the term coefficient of restitution
   (ii) Explain why the astronaut appears to be weightless when travelling in the space vehicle.
   (iii) A jet of water emerges from a horse pipe of cross section area $5.0x10^{-3}m^2$ with a velocity of 3.om/s and strikes a wall at right angle. Assuming the water to be brought to rest by the wall and does not rebound, calculate the force on the wall.
2. (a) Define the following terms
   (i) Momentum
   (ii) Impulse of a force

   (b) (i) State the principle of conservation of linear momentum.

   (ii) Give two examples of the principles stated above.

   (c) A cannon of mass 1300kg fires a 72kg ball in a horizontal direction with a muzzle speed of 55m/s. If the cannon is mounted so that it can recoil / freely calculate the:-

   (i) Recoil velocity of the cannon relative to the earth
   (ii) Horizontal velocity of the ball relative to the earth.

Circular motion

1. (a) Define the following terms:-
   (i) Radial acceleration
   (ii) Centripetal acceleration
   (iii) Banked road

   (b) A insect is released from rest at the top of the smooth bowling ball such that it slides over the ball. Prove that it will loose its fooling with the ball at an angle of about 48° with the vertical.

2. (a) What is the origin of centripetal force for:-
   (i) A satellite orbiting around the earth
   (ii) An election in the hydrogen atom

   (b) A small mass of 0.15kg is suspended from a fixed point by a thread of a fixed length. The mass is given a push so that it moves along a circular path of radius 1.82m in a horizontal place at a steady speed, taking 18.0 seconds to make 10 complete revolutions. Calculate:-

   (i) The speed of the small mass
   (ii) The centripetal acceleration
   (iii)The tension in the thread

Gravitational motion

1. (a) (i) What do you understand by the term escape velocity?
   (ii) Calculate the escape velocity from the moon's surface given that a man on the moon has $^1/_6$ his weight on earth. The mean radius the moon is 1.75×10^6m.

   (b) (i) Define the universal gravitational constant
   (ii) How is gravitational potential related to gravitational field strength?

2. (a) (i) Write down an expression for the acceleration due to gravity (g) of a body of mass (m) which is at a distance (r) from the centre of the earth.
   (ii) If the earth were made of lead of relative density of 11.3, what would be the value of acceleration due to gravity on the surface of the earth?

   (b) (i) Why the value of acceleration due to gravity (g) changes due to the change in latitude? Give two reasons.
   (ii) A rocket is fired from the earth towards the sun. at what point on its path is the gravitational force on the rocket zero?

   Simple Harmonic motion (SHM)
   1. (a) (i) State where the magnitude of acceleration is greatest in a simple harmonic motion.
      (b) A vertical spring fixed at one end has a mass of 0.2kg and is attacked at the other end.

      Determine the:-
      (i) Extension of the spring
      (ii) Energy stored in the spring

   2. (a) The displacement of a particle from the equilibrium position moving with single harmonic motion is given by $x = 0.05 \sin 6t$, where t is time in seconds measured from an instant when $x = 0$. Calculate the:-
      (i) Amplitude of the oscillation
      (ii) Period of oscillation
      (iii) Maximum acceleration of the particle

(b) (i) Give two similarities between SHM and circular motion.

(ii) On the same set of axes, sketch how energy exchange (K.E to P.E) takes place in an oscillator placed in a damping medium.

Rotational Dynamics

1. (a) (i) State the parallel and perpendicular axes theorems
   (ii) Show that the K.E of rotation of a rigid body about an axis with a constant angular velocity W is given by K.E = ½ $1W^2$, where I is the moment of inertia of the rigid body about the given axis.

   (b) (i) Define moment of inertial of a body
   (ii) Briefly explain why there is no unique value of for the moment of inertial of a given body.

   (iii) A horizontal disc rotating freely about a vertical axis makes 45 revolutions per minutes. A small piece of putty of mass 2.0 x 10^{-2}kg falls elliptically onto the disc and sticks to it at a distance of 5 x 10^{-2}m from the axis. If the number of revolutions per minutes is there by reduced to 36r p.m, calculate the moment of inertial of the disc.

2. (a) Explain briefly why a
   (i) High diver can turn more somersaults before striking the water.
   (ii) Dancer on skates can spin fats by folding her arms?

   (b) A heavy flywheel of moment of inertia 0.4kgm2 is mounted on a horizontal axle of radius 0.01m. If a force of 60N is applied tangentially to the axle.

   (i) Calculate the angular velocity of the fly wheel after 5 seconds from rest.
   (ii) List down two assumptions taken to arrive at your answer above.

Properties of matter

1. (a) (i) Explain in terms of surface energy, what is meant by the surface tension, Ɣ of a liquid.
   (ii) What energy is required to form a soap bubble of radius 1.0mm if the surface tension of the soap solution is 2.5 x 10^{-4} N/m

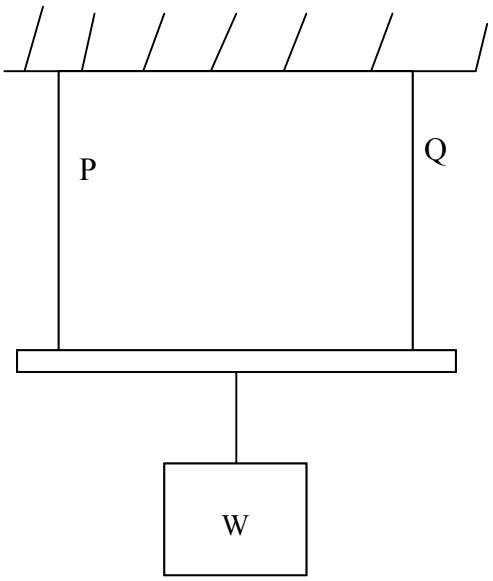
   (b) A circular ring of thin wire 3cm in radius is suspended with its plane horizontal by a thread passing through the 10cm mark of a metre rule pirated at its centre and is balanced by 8g weight suspended at the 80cm mark. When the ring is just brought in contact with the surface of a liquid, the 8g weight has to be moved to the 90cm mark to just detach the ring from the liquid. Find the surface tension of the liquid (assume zero angle of contact).

2. (a) Define the following terms
   (i) Free surface energy
   (ii) Capillary action

(iii) Angle of contact

(b) What is strain energy?

A piece of rod 1.05m long whose weight is negligible is suspended at its ends by wires Q and P of equal length as show a below.



The cross sectional area of P is 1mm2 and that of Q is 2mm^2, at what point along the bar should the weight be suspended in order to produce.

(i) Equal stress of P and Q
(ii) Equal strain of P and Q

(Given that young's modules of P = 2.4 x 10^{11} N/m2 and that of Q = 1.6 x 10^{11} N/m^2)

3. (a) (i) Define an ideal gas
(ii) State the four (4) assumption necessary for an ideal gas that are used to develop the expression P = ½ ℓ C^2

(b) (i) How is pressure explained in terms of the kinetic theory?
(ii) Without a detailed mathematical analysis argue Re steps to follow in deriving the relation.
P = ½ ℓ C^2
(c) Define the temperature of an ideal gas as a consequence of the kinetic theory.

A certain diatomic gas is contained in a vessel whose inner surface is small absorber which remains any atoms or molecules of gas which strike it. Show that if doubling the absolute temperature causes one half of the molecules to dissociate into atoms then the rate at which the absorber is gaining mass increases by a factor $1 + {}^{1}/_{\sqrt{2}}$.

Fluid mechanics

1. (a) Write the continuity and Bernoulli's equations as applied to fluid dynamics

(b) (i) Under what conditions is the Bernoulli's equation applicable?
(ii) Discuss two (2) applications of the Bernoulli's equation
(iii) Develop an equation to determine the velocity of a fluid in a venturimeter pipe.

(c) The static pressure in a horizontal pipeline is 4.3×10^4Pa, the total pressure is 4.7×10^4Pa and the area of cross section is $20cm^2$. The fluid may be considered to be incompressible and non-viscous and has a density of $1000kg/m^3$. Calculate the flow velocity and the volume flow rate in the pipeline.

2. (a) (i) State Newton's law of viscosity and hence deduce the dimension of the coefficient of viscosity.
(ii) In an experiment to determine the coefficient of viscosity of motor oil, the following measurements are made:-
   - Mass of glass sphere = 1.2×10^{-4}kg
   - Diameter of sphere = 4.0×10^{-3}m
   - Terminal velocity of sphere = 5.4×10^{-4}m/s
   - Density of oil = $860kg/m^3$

   Calculate the coefficient of viscosity of the oil

   (b) (i) Briefly explain the carburetor of a car as applied to Bernoulli's theorem.

   (ii) Why hotter liquid flow faster than cold ones.

   (iii) Why a flag flutter when strong minds are blowing on a certain day.

Heat

1. (a) Give a common example of a adiabatic process
(ii) What happens to the internal energy of a gas during adiabatic expansion?

(b) A mass of an ideal gas of volume $400cm^3$ at 288k expands adiabatically. If its temperature falls to 273k.
(i) Find the new volume of the gas
(ii) Calculate the final volume of the gas if it is then compressed isothermally until the pressure returns to its original value.

2. (a) (i) What is meant by thermal radiation?
(ii) Briefly explain why forced convection is necessary for excess temperature less than 20k?

(b) (i) Why is the energy of thermal radiation less than that of visible light?
(ii) A body with a surface area of $5.0cm^2$ and a temperature of 727°C radiates 300 joules of energy in one minutes calculate its emissivity.

(c) (i) State Newton's law of cooling

(ii) A body cooks from 70°C to 40°C in 5 minutes. If the temperature of the surroundings is 10°C. Calculate the time it takes to cool from 50°C to 20°C.

3. (a) (i) What is meant by a thermometric property?
   (ii) Mention three qualities that make a particular property suitable for use in a practical thermometer.

   (b) Study the values in table below which represent the observations of a particular room temperature obtained by using two types of thermometers and then answer the questions that follow:

Table

Temperature in °C	Resistance measured by resistance thermometer (Ω)	Pressure recorded by constant volume gas thermometer (NM^{-2})
Steam point 100°C	75.00	1.10×10^{7}
Ice point O°C	63.00	8.00×10^{6}
Unknown room temperature	64.992	8.51×10^{6}

(i) Calculate the value of unknown room temperature on the scales of resistance thermometer and constant volume gas thermometer.
(ii) Why do the answers in b (i) above differ slightly?

Waves and mechanical vibrations

1. (a) (i) Describe the formation of Newton's rings. How would you measure the wavelength of yellow light by use of Newton's rings?
   (ii) What would happen to the central sport when air rests between the lens and the plates of the apparatus for Newton's rings?

   (b) (i) What is meant by Doppler effect?
   (ii) Mention two (2) common applications of the Doppler shift.

   (c) Ultra sound of frequency 5 $x10^{5}$Hz is incident at an angle of 30° to the blood vessel of a patient and a Doppler shift of 4.5 kHz is observed. If the blood vessel has a diameter 10^{-3}m and the velocity of ultrasound is 1.5×10^{3}m/s. Calculate the:-

   (i) Blood flow velocity
   (ii) Volume rate of blood flow

2. (a) (i) What is interference? Explain the term path difference with reference to the interference of two wave-train,

(ii) What is it not possible to see interference when the light beams from head lamps of a car over lap?

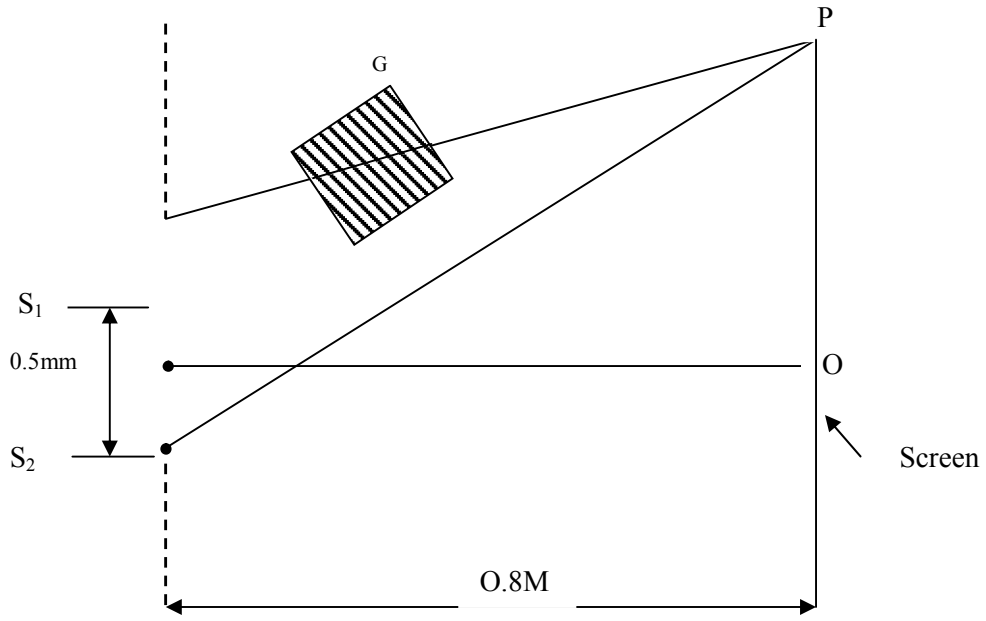
(iii) Discuss whether it is possible to observe an interference pattern when white light is shone on a young's double slit experiment.

(b) A grating has 500 lines per millimeter and is illuminated normally with monodromatic light of wavelength 5.89 x 10^{-7}m.

(i) How many diffraction maxima may be observed?

(ii) Calculate the angular separation

(c) In figure below S_1 and S_2 are two coherent light services in a young's double slits experiment separated by a distance 0.5mm and O is a point equidistant from S_1 and S_2 at a distance 0.8m from the slits. When a thin parallel sided piece of glass (G) of thickness 3.6 x 10^{-6}m is placed near S_1 as shown the central fringe system moves from O to a point P. Calculate OP. (The wavelength of light used = 6.0 x 10^{-7}m).



Given: Refractive index of glass is 1.5

3. (a) Define the following terms

(i) Damped oscillation

(ii) Forced oscillation

(iii) Resonance

(b) (i) What is meant by the statement that light is plane polarized.

(ii) State Brewster's law

(iii) Sunlight is reflected from a calm lake. The reflected sunlight is totally polarized. What is the angle between the sun and the horizon?

(c) (i) What is meant by crossed Polaroid's?

(ii) Give two differences between diffracting grating spectra and prism spectra.

(iii) State Huygens's principle of wave construction.

Electrostatics

1. (a) (i) What is capacitance?
   (ii) List three factors that govern the capacitance of a parallel plate capacitor.

   (b) Show that the energy per unit volume stored in a parallel plate capacitor is given by:-
   U = ½ $\mathcal{E}_O E^2$ and define all the symbols in this equation.

   (c) Given that the distance of separation between the parallel plates of a capacitor is 5mm, and the plates have an area of 5m? A potential difference of 10KV is applied across the capacitor which is parallel in vacuum compute:-

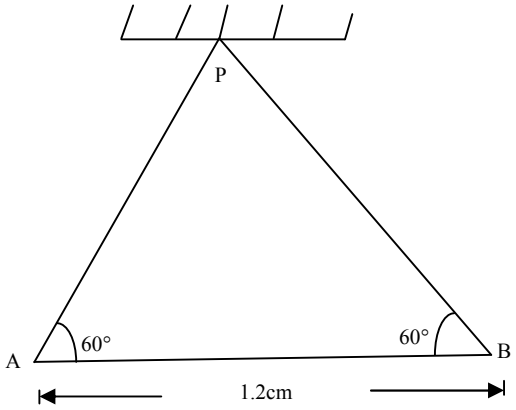
   (i) The capacitance
   (ii) The election intensity in the space between the plates
   (iii) The change in the stored energy if the separation of the plates is increased from 5mm to 5.5mm.

2. (a) Explain the following observation
   (i) A dressing table mirror becomes dusty when nipped with a dry cloth on a warm day.
   (ii) A charged metal ball comes into contact with an uncharged identical ball. (Illustrate your answer by using diagrams).

   (b) (i) Show that the unit of CR (time constant) is seconds and prove that for a discharging capacitor it is the time taken for the charge to fall by 37%.

   (ii) The variable radio capacitor can be charged from 50pf to 950pf by turning the dial from O° to 180°. With the dial at 180°, the capacitor is connected from the battery and the dial is turned to O°. What is the charge on the capacitor? What is the p.d cross the capacitor when the dial reads O° and the work done required to turn the dial to O°? (Neglect frictional effects).

3. (a) (i) State coulomb's law of electrostatics
   (ii) Define electric field strength, E at any point
   (iii) Mention two common properties of electric field lives.
   (c) Two identical balls each of mass 0.8kg carry identical charge and they are separated by thread of equal length. At equilibrium they positioned themselves at a distance of 1.2cm as show in figure below. Calculate the charge in either ball.



4. (a) Define the following terms:-
   (i) Capacitance
   (ii) Charge density
   (iii) Equipotential surface

   (b) By using the coulomb's law of electrostatic, device an expression for the electric field strength E, due to a point charge if the material is surrounded by a material of permittivity $\mathcal{E}$, and hence show how it relates with charge density 6.

   (c) Describe the structure and mode of action of a simplified version of the Van de Graaff generator.

********** ***The End*************

WAJA GIRLS SECONDARY SCHOOL

DEPARTMENT OF ARTS

FORM FIVE HOLIDAY PACKAGE

HISTORY 2

APRIL, 2020

INSTRUCTIONS:

This paper consists of section A, B and C attempt 2 questions from section A and B and only question from section C.

SECTION A

1. Explain any six development that give to the rise of working movement in Britain.
2. Explain six features of mercantilism you know.
3. Explain six roles played by Tudor Monarch in the rise of mercantilist capitalism from 15^{th}C.
4. With relevant examples show six main agricultural changes made among European state the bring the meaningful concept of African Revolution from 16^{th}C.

SECTION B

5. Account for the emergence of industrial Revolution in Europe. 6 points.
6. Why Britain was referred as the workshop of the world from 1750s – 1870s.
7. Explain y principles that governed European democracy before democratic revolutions in Britain and France.
8. Account for the emergence of enclosure system in Europe six points.

SECTION C

9. Account for the inevitability of English Revolution six points.
10. Account for the rise of war Roses in England six points.

***********Prepared by Subject Master*********

WAJA SECONDARY SCHOOLS

SCIENCE DEPARTMENT

FORM FIVE: HOLIDAY PACKAGE 02

BIOLOGY **APRIL 2020**

1. (a)Why a by some is said to be a suicide bag?
   (b) Draw and label a cell lacking cell wall as seen under electron microscope

2. (a) illustrate the formation of peptide bond
   (b) Why is the molecule formed above act as buffer?

3. State the adaptations of the following organisms
   i. Golgi apparatus
   ii. Cell membrane
   iii. Mitochondria
   iv. Chloroplast
   v. Nucleus

4. (a) What is allostorize site?
   (b) Explain how the knowledge of competitive inhibition can be applied in fighting against diseases

5. Sketch the graphs shaving the following concepts
   i. Comteptitive inhibition
   ii. Non – competitive inhibition
   iii. Effect of temperature on enzyme controlled reaction.
   iv. Effect of substrate concentration

6. State six function of carbohydrate with examples

2: CLASSIFICATION

1. (a) What is virus
   (b) State the dual nature of the following
   i. COVID -19
   ii. Euglena

2. Write an essay on economic importance of kingdom Protoctista
3. State the adaptation of it to its made of life
4. What are the adaptation of the following in its mode of life.

i. Hepatica fasciola
ii. Taenia solium
iii. Phytophora infestant
iv. Mushroom

5. with explain the advantages of kingdom fungi
6. Use a man as an example to outline the taxonomic hiaroahy

3: COORDINATION

1. (a) Mention and state the role of different types of neuroglia cells.
   (b) state five reason as to why the nervous tissue accomplish its role successful?

2. (a) identify the structure of membranous of labyrinth
   (b) Describe the structure of membranous of labyrinth

3. (a) Outline the commercial application of the following phytohormones
   (b) Explain one experiment showing that Auxins induces phototrophic responses

4. (a) State the properties of nerve impulse
   (b) State the reasons for the sudden influx of sodium ions following stimulation
5. Describe the reflex adjustment of the pupil size when electricity is cut off
6. Describe the mechanisms concerning with maintaining stability of the head from different plane.

4: GASES EXCHANGE AND RESPIRATION

1. Use arrows and words within how glucose molecule is oxidized when there is plenty of oxygen.
2. (a) differentiate between alcoholic fermentation and lactic acid fermentation
   (b) When one molecule of glucose is completely oxidized releases a total energy of about 2880KJ. And the value of energy in one A.T.P is 30KJ. What will be the efficiency for transfer of energy when two molecule of glucose are completely oxidized
3. (a) What is lean body moss/
   (b) How does the following affect the BMR of an individual
      i. Body size
      ii. Health status of an individual
4. What changes will occur when a person get government transfer Dar es salaam (low altitude) to Moshi (a large altitude)

5. (a) What is oxygen dissociation curve?

(b) Outline three factors affect the affinity to oxygen.

(c) Draw the graph showing oxygen dissociation curve between the fatal HB and maternal HB.

6. Describe the mechanism of gaseous exchange across the alveolus

5: NUTRITION

1. (a) Explain the following
    i. Why pepsin is secreted in inactive form
    ii. Ileum has finger like projectiles called Niceville
    iii. Light reaction is called light dependent reactions

(b) Explain Carbondioxide fixative phase of Calvin cycle.

2. Explain the hormonal control of digestive juice secretions
3. (a) Describe the structure of columnar epithelium

(b) Tabulate the location and role of the following tissues.

i. Columnar epithelium
ii. Cobondal epithehum
iii. Stratified epithelium

4. (a) Differentiate between cyclic and non cyclic photophosphorylation.

(b) Using illustration ONLY show the events of light dependent reactions

5. (a) What is the role of the following
    i. NADP
    ii. Pep case
    iii. Malute shunt
    iv. Regeneration of cas acceptor

(b) How light intensive affect photosynthesis

6: HOMEOSTASIS

1. (a) What osmotic problem faced by the following organism

i. Marine elasmobiandies
ii. Freshwater bony fish

2. (a) What is negative feedback mechanism?

(b) For the normal finalizing of the body the level of blood sugar does not fall or rise negative feedback mechanism explain this phenomena

3. How does human being overcome the problem of overheating during the day or night.

4. What will response will be the body when you have taken little water very salt meal and too much seating occurs.

5. Use diagram only show the mechanism of oxrithine cycle.

6. What are the significance of the following in homeostasis

WAJA SECONDARY SCHOOLS

ART DEPARTMENT

FORM FIVE HOLIDAY PACKAGE 02

GENERAL STUDIES APRIL 2020

Answer all question: Examples are part and parcel of your work: Avoid copying and pasting.

1. With examples examine seven challenges facing Tanzania in combating with eruptive diseases and other diseases like HIV/AIDS.
2. How East Africa countries and neighboring nations are currently affecte3d by natural disasters and what measures are taken to prevent more harm?
3. Analyse seven challenges scaring the EAC in recent five years.
4. Explain how All defend its members from external threats and domination (six points)
5. What is the usefulness of Tanzania being a chair – country of SADC from 2019 to 2020? (six points)
6. Explain in details the Tanzania foreign policy
7. Describe seven importance of using home technology in times like this of corona disease.
8. What are hindrances facing free and fair elections in most of sub – Saharan countries seven points.
9. Despite an impressive human rights record Tanzania still suffer from instants human rights abuse. Use seven points to validate this statement
10. Examine the importance of life skills to the youth in Tanzania
11. Explain six moral issues and six current issues that you have encountered during this period of world cries of Colona aid on each give your own opinion or suggestions
12. Although Mwl Nyerere died in 1999, he is still living among Tanzania and other Africans Justify using seven points.

13. With examples explain six function of the commission for human rights and good governance in Tanzania
14. How Tanzania society can overcome the problem of forced and eaerly marriage (six points)
15. From your personal understanding explain the main reasons for Africa and Tanzania in particular is still poor.
16. What are the cods of election that can help Tanzania to have democratic election in 2020.
17. Show relevancy of Nkurumah's philosophy in Tanzania
18. Describe six side effect of religion among people
19. Suggest seven ways to rescue Africa countries from civil wars and terrorist attacks
20. What facilitate wide spread of drugs trafficking and use (6 points)
21. Show 6 advantages that Tanzania gets from being a member of EAC
22. Explain how Tanzania benefit from bilateral relationship with China and USA
23. How general studies are real general studies? Seven points
24. Tanzania has advanced in women empowerment in recent years. Prove this statement using six points.
25. Cybercrime is one of the challenges facing many youths in Tanzania. Use seven points to suggest how the government of Tanzania can fight cybercrime in the country
26. Explain six achievement attained by the Tanzania government in promoting social economic development in the country.
27. Examine the effectiveness of using representative democracy in most African countries including Tanzania.

WAJA GIRLS SECONDARY SCHOOL

ART DEPARTMENT

FORM FIVE HOLIDAY PACKAGE 02

311/1 **GEOGRAPHY** APRIL 2020

INSTRUCTIONS:

Attempt at least five (05) questions from each topic

POSITION, BEHAVIOUR AND STRUCTURE OF THE EARTH

1.
    a. provide evidence of the earth's sphericity
    b. Why is earth no exactly a spheroid?
2. Critically examine the theory of continental drift and explain how it can be used to substantiate the landform formation on the earth's surface
3. Show the relevance or applicability of the theory of continental drift to the African continent
4. Account for the dynamic state of the earth and show its impacts on the earth
5. "The earth is restless". Substantiate the this statement
6. Providing evidences write a succinct account of the theory of isostacy
7. Show the differences between the theory of isostacy and the theory of continental drift
8. What are the impacts of the drifting movement of the continents.
9. Account for the plate movement and show the features that are formed on the plate margins.
10. Define the following
    a. Element
    b. Minerals
    c. Rocks
    d. Metamorphism
    e. Rock cycle
11. Attempt the classification of the following
    a. Rocks according to their mode of formation
    b. Igneous rock
    c. Metamorphic rock
    d. Sedimentary rock
12. Why is igneous rock referred to as mother rock
13. Write down what you understand by the following
    a. Dynamic metamorphism
    b. Regional metamorphism
    c. Contact metamorphism
14. What are the advantages and disadvantages of the geological time scale
15. Describe and explain the processes of the rock cycle

16. There are just as much varied landforms as there are numerous processes that lead to their formation. Substantiate this contention.
17. .
    a. Define rock cycle
    b. Explain and give evidence which supports its existence
18. Classify igneous rock
19. In what ways are igneous rocks the origin of the other types of rock
20. Sedimentary rocks are said to be both industrial raw materials and source of energy. Justify
21. "The mother igneous". How does the statement help to explain the relationship between igneous and other types of rocks
22. With examples, classify sedimentary rocks according to their mode of formation and examine their importance to human kind.

THE DYNAMIC EARTH AND QUENCEQUENCES

311/1 GEOGRAPHY **2020**

1. With the aid of a diagram, describe three zones of the interior of the earth.
2. Explain four factors for the occurrence of earthquake and give its four effects
3. Describe the nature, distribution and significance of Fold Mountains.
4. Analyze the cause of plate's movement of the lithosphere
5. Describe volcanoes according to their mode of formation
6. With examples, examine eight values of rocks to human kind
7. Explain values of volcanism for the development of the society. give eight points
8. Describe five causes of plate tectonic movement and prove its existence by providing four evidences.
9. Describe the factors that determine the resistance of the rock to denudation
10. Justify the sphericity of the earth with vivid evidence
11. Discuss the environmental impact of green house effects and global warming
12. Classify igneous rocks according to the place of occurrence and the chemical composition
13. Using concrete examples explain how faulting has been responsible for landscape evolution
14. Mechanical and chemical weathering in the tropics are related and influenced by the same factors'. Discuss
15. Giving vivid examples, explain the effects of diastrophic forces on the earth's surface
16. Examine the possible theories of mountain building
17. Examine how the following wind depositional features are formed in a desert landscape
    a. Barchans
    b. Longitudinal dunes
    c. Transverse dunes
18. 'Plate tectonic theory is a new version of continental drift theory'. Elaborate
19. Outline the pieces of evidence that support the theory of plate tectonics.
20. With examples, classify sedimentary rocks according to their mode of formation and examine their importance to humankind.
21. Examine the vertical structure of the atmosphere
22. Examine pieces of evidence of isostacy theory.
23. Examine the interdependence nature between weathering and erosion when shaping earth's surface.
24. To what extent can the theory of plate tectonic explain the present landforms in east Africa?
25. With the aid of diagrams write short notes on any four of the following;
    a. mesas and buttes

b. zone of subduction
c. yardangs
d. zeugens
e. recumbent fold

26. give an account of the major divisions of the geological time scale
27. consider the global distribution of volcanoes and discuss
    a. types of volcanoes
    b. eruptive features of volcanoes
28. use expressive examples to narrate the roles of plate tectonics theory on the formation of landforms
29.
    a. What is volcanism?
    b. With specific examples, discuss the effects of volcanism to human activities.
30.
    a. give an account of the characteristic features of a desert landform
    b. Use clear examples to explain human and physical factors that influence the formation of a desert.
31. Discuss the role played by climate on weathering process.
32. Sedimentary rocks are said to be both industrial raw materials and source of energy. Justify

113/1 **GEOGRAPHY 1**

THE STUDY OF SOIL **2020**

1.
    a. Examine six factors which make soil to lose its fertility
    b. How does soil texture and soil PH influence farming?
2. .
    a. Describe the following
        i. Soil pH
        ii. Soil temperature
        iii. Cation exchange in soil
        iv. Soil catena
    b. Explain the importance of each in (a) above
3. Analyze six properties to be considered when studying soil profile at the field
4. Examine eight methods to use in soil conservation in order to improve agricultural production in Tanzania.
5. Explain the various processes involved in soil formation
6. In mwatulole village there is serious problem of soil erosion. Explain six (6) ways you will advise the villagers to control soil erosion.
7. Highlight the factors which influence the quantity and rate of accumulation of organic matter in the soil.
8. Examine the factors which are important in assessing soil fertility
9. Explain the role of humus in soil fertility and suggest ways of improving soil fertility.
10. Describe the classification of soil according to texture
11. With examples analyze the factors which influence soil formation.
12. Give a clear classification of azonal soils
13. Examine the main factors which influence the fertility of soil
14. Examine the characteristics of a matured hypothetical soil profile
15.
    a. What do you understand by ‘soil conservation’?

b. Give an account of the farming practices which will help to conserve soil
16. Define intrazonal soil and describe its chief characteristic features.
17. Describe the processes involved in the formation and development of the soil profile and structure.

WATER MASSES

1. Classify lakes according to their modes of formation
2. Using specific examples for each, contrast the effect of glaciations upon upland area and low land area.
3. Briefly discuss the conditions that produce hot springs and geysers.
4. Give an account of the world distribution of coral reefs and atolls and explain the problems posed by their origin.
5. Give an account of fluvial landforms formed by deposition
6. Define an artesian well. What are the necessary conditions for the formation of this type of well?
7. Justify the statement that, 'salinity in the oceans is a result of several causes".
8. Describe the evolution of a coastal land as a result of waves.
9. Distinguish clearly the kinds of river rejuvenation and explain the land forms associated with it.
10. Describe the geological structure which leads to the formation of waterfalls.
11. How are the coastal characteristics related to emergence and submergence of the coastal lines?
12. Investigate the theories which aspire to describe the occurrence of glacial periods.
13. Describe the favorable conditions for the development of a river capture.
14. Examine the factors which influence the rate of coastal wave erosion.
15. Give an account of the factors which influence the amount of groundwater and the rate of percolation.
16. Examine the factors that have influenced evolution of coastlines.
17. Account for the development of a long and cross profile of a river.
18. The present coastline definitely differs greatly from that of the last century. Give supporting evidence to prove the validity of the above statement.
19. Examine the formation of lakes in a glaciated region
20. "Variation in river volume is an inevitable circumstance". Discuss.
21. Write an essay on the accordant and discordant patterns.
22. With the aid of diagrams give an account of the erosional features associated with alpine glaciations.
23. Explain the formation of coral reefs and give their economic significance.
24. "Ocean currents are the outcome of the interaction of a number of actors". Justify
25. Give an account of the main factors which influence the infiltration of ground water.
26. With specific examples, enumerate nine importances of rivers in Africa.
27. "Glaciated regions are that bad". Justify.
28. Give an account of the factors which influence the salinity of the ocean water(six points)
29. To what extent is a river basin development both advantageous and disastrous?
30. Describe five environmental problems facing the coastal areas and four measures to be taken so as to overcome them
31. Explain eight human activities that degrade wetlands.
32. Explain eight factors responsible for the occurrence of river regime.
33. (a)Describe four major characteristics of karst scenery.
    (b) Explain six factors influencing the existence of underground water.
34. Account for three theories explaining the occurrence of coral reef and atoll.
35. Describe the hydrological cycle and show its link to underground water.

1. Examine six consequences brought by depletion of the ozone layer in the atmosphere
2. Examine five causes of temperature inversion and give its three effects.
3. Examine four layers of the atmosphere and in each give three characteristics.
4. Discuss eight factors that influence variation in the amount of insolation received on the earth surface.
5. Discuss six theories which account for climatic change.
6. Describe five meteorological and edaphic effects on global vegetation variations.
7. Examine eight adaptive features of plants to desert hostile environment
8. Describe the composition of the atmosphere and its functions to the universe.
9. Describe the factors that control global distribution of plant communities
10.
    a. Explain eight characteristics of the tropical rainforest.
    b. Examine the relationship between climatic regions and river regimes (give five points)
11. Discuss the environmental impacts of green house effect and global warming
12. Describe the characteristics of tropical cyclones.
13. Write a detailed account on the characteristics and distribution of coniferous forests.
14. Describe the factors which affect the amount of insolation on the earth's surface
15. Describe the following terms
    a. Air mass
    b. Temperature inversion
    c. Advection fog
    d. Katabatic wind
16. How do plants in desert and semi-desert areas adapt to their climatic conditions?
17. Examine the vertical structure of the atmosphere
18. Give an explanatory account on the factors that influence the wind direction and strength
19. The temperature of an atmosphere is controlled by interacting number of components. Substantiate.
20. Briefly explain the following;
    a. Ecosystem
    b. Habitat
    c. Micro – climate
    d. Climax vegetation
21. Write short notes on the following;
    a. Plant succession
    b. Plant community
22. Define lapse rate. How does lapse rate assist in the understanding of weather?
23. Explain the features of koppen's classification of climates
24. Variation in vegetations in Africa is a result of variation of plant variables over space. Justify
25. Write short notes on the following geographical concepts
    a. Thunderstorms
    b. Hurricanes
    c. Temperature inversions
    d. Classification of clouds
26. Give a general classification of air masses
27. Outline the main characteristics and importance of tropical monsoon winds
28. Give an account of temperate pressure systems