Candidate's Examination Number .....

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

042 PHYSICS

TIME: 2:30 HOURS THURSDAY, 24TH DECEMBER 2020 A.M

INSTRUCTIONS TO CANDIDATES

1. This paper consists of THREE (3) sections A, B and C.
2. Attempt ALL questions in section A and B, and any TWO (2) in section C. Question NINE (9) is COMPULSORY.
3. Write your examination number on each page.
4. Write your answers in the space provided.
5. Use a blue or black pen in writing. The diagrams must be in a pencil.
6. Cellular phones and unauthorized materials are not allowed in the examination room.
7. Where necessary the following constants may be used.
   i. Density of water = $1000kg/m^3$ (ii) Pie**, π = 3. 14** (iii) $g = 10m/s^2$

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	MARKS	SIGNATURE
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9 a.		
9 b.		
10.		
11.		
TOTAL		

This paper consists of 15 printed pages

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SECTION A: (30 Marks)

Answer ALL questions in this section.

1. Write the letter of the most correct answer in the box below.

i. When a body floats in water means
   A. Its density is smaller than that of water
   B. Its density must be 1000 kg/m^3
   C. Its density is greater than that of water
   D. None of the above

ii. Litre is the unit that is used for measuring volume of
   A. Regular shape B. Liquid
   C. Cylinder D. Irregular shape

iii. The process through which a magnet losses its magnetism is called
   A. Magnetization B. Magnetic pole
   C. Demagnetization D. Magnetic field

iv. Force is measured in
   A. Pascal B. Watt C. Joule D. Newton

v. If there are two capacitors C_1 and C_2 which are connected in series, the formula of total capacitance, C_T is
   A. $C_T = C_1 + C_2$ B. $C_T = \frac{C_1}{C_2}$
   C. $\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2}$ D. $C_T = C_1 \times C_2$

vi. Umbra refers to
   A. Partial shadow B. Total shadow
   C. Full moon D. Eclipse of the moon

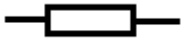
vii. A lever which has its load between the fulcrum and the effort is said to be
   A. First class lever B. Second class lever
   C. Third class lever D. Fourth class lever

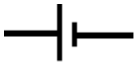
viii. The temperature of a certain town is 33^oC, this is equivalent to
   A. 306 K B. 33 K C. 313 K D. 30 K

ix. The movement of solvent molecules from high to low concentration through a semi – permeable membrane is called

A. Fusion B. Osmosis C. Diffusion D. Concentration

x. The symbol of a cell is given by

A.  B. 

C.  D. 

ANSWERS

i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x

2. Match the items in LIST A with responses in LIST B by writing its letter in the table below.

LIST A	LIST B
i. Calorimeter	A. Energy from car battery
ii. Ohm's law	B. $\frac{\mathbf{V.R}}{\mathbf{M.A}}$ x 100%
iii. Efficiency	C. Product of mass and distance
iv. Repulsion	D. Like poles
v. Moment	E. Boiling point is 78 ^{o}C
vi. Alcohol	F. $\boldsymbol{F = \frac{mv}{t}}$
vii. Galvanometer	G. $\boldsymbol{V \propto I}$
viii. Watt	H. *S*.I unit of power
ix. Chemical energy	I. 
x. Second Newton's law of motion	J. Product of force and distance
	K. Unlike poles
	L. $\mathbf{R_T = R_1 + R_2 + R_3}$
	M. Determining the quantity of matter
	N. $\frac{\mathbf{M.A}}{\mathbf{V.R}}$x 100%

ANSWERS

i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x

3. Fill the correct answer in the blank spaces provided.

   i. Gases have no definite _____ because_____.

   ii. A bulb of light changes _____ energy to light energy and _____ energy.

   iii. The product of _____ and velocity is called _____.

   iv. Resistance of a conductor depends on _____, temperature and _____.

   v. When a magnet is freely suspended the _____ pole tends south and the North Pole tends _____.

   vi. Energy can neither be _____ nor _____.

   vii. When a body is immersed in a fluid the _____ of the body is equal to the weight of the fluid _____.

   viii. Sea wave's energy is a result of _____ of the sea.

   ix. Capacitor is a device used to _____ electric _____.

   x. Water reaches its highest _____ at a temperature of _____ Degrees Celsius.

SECTION B: (50 Marks)

Answer ALL questions in this section.

4. Distinguish between the following terms.

   a. i. Adhesion and Cohesion

_____

_____

_____

_____

_____

_____

ii. Elastic material and plastic material.

_____

_____

_____

_____

_____

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_____

b. Write down three (3) factors affecting surface tension of a liquid.

i. _____

ii. _____

iii. _____

5. a. Define the following terms.

i. Electrostatics

_____

_____

_____

_____

ii. Conductors

_____

_____

_____

_____

b. Name four (4) devices which use capacitors.

_____

_____

c. Explain briefly what happens when

i. Ebonite rod rubbed with fur

_____

_____

ii. Glass rod rubbed with silk.

_____

_____

6. a. i. What is periscope?

_____

_____

_____

_____

ii. In which area is the periscope used?

_____

_____

iii. Draw a periscope

b. Calculate the surface area of an object which exerts a pressure of $20N/m^2$ when a force acting on it is 2N.

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7. a. i. State the Principle of moments.

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ii. Distinguish between stable and unstable equilibrium.

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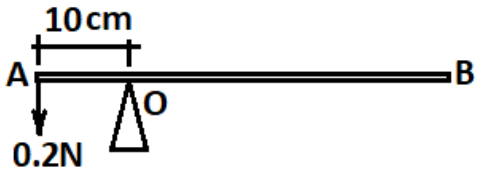
b. A meter rule is pivoted about a point O as shown in figure below and it is balanced by a load of 0.2N. Calculate the mass of the meter rule.



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8. a. i. Define the term levers.

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ii. Mention two (2) examples of third class lever.

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b. A wheel and axle with an efficiency of 90% is to be used to raise a load of 10,000N, the radius of the wheel is 40cm while that of an axle is 5cm. Calculate.

i. Velocity ratio (V.R) of the wheel and axle.

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ii. Mechanical advantage (M.A) of wheel and axle.

iii. Effort required to raise the load of 10,000N.

SECTION C: (20 Marks)

Choose any TWO (2) questions in this section. Question NINE (9) is COMPULSORY, answer either 9 (a) or 9 (b)

8. a. An experiment was conducted at a certain Secondary School to study the relationship between force applied and the extension of a spiral spring. The results were as follows:
Note: Initial reading (lo) = 53.4cm

Weight, W (g)	Force (N)	Length, l (cm)	Extension, e = (l – lo) cm
50	0.5	55.4	
100	1.0	58.0	
150	1.5	60.4	
200	2.0	62.8	
250	2.5	65.2	
300	3.0	67.5	

i. Complete the table above.

ii. Plot the graph of the force against extension (on the graph paper).

iii. From the graph find the slope.

_____

_____

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9. b. Complete the table below.

Name	Symbols	Uses/Applications
i. Clinical thermometer		
ii.		
iii.		To measure relative density of the liquid
iv. Pulley		
v.		

10. a. i. Define the volume of a substance.

_____

_____

_____

_____

ii. Name three (3) apparatus that are used to measure the volume of a liquid.

_____

_____

_____

b. A cylinder tank has a radius of 7 cm and a height of 12 cm. Calculate its volume.

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11. a. Differentiate between elastic and inelastic collisions.

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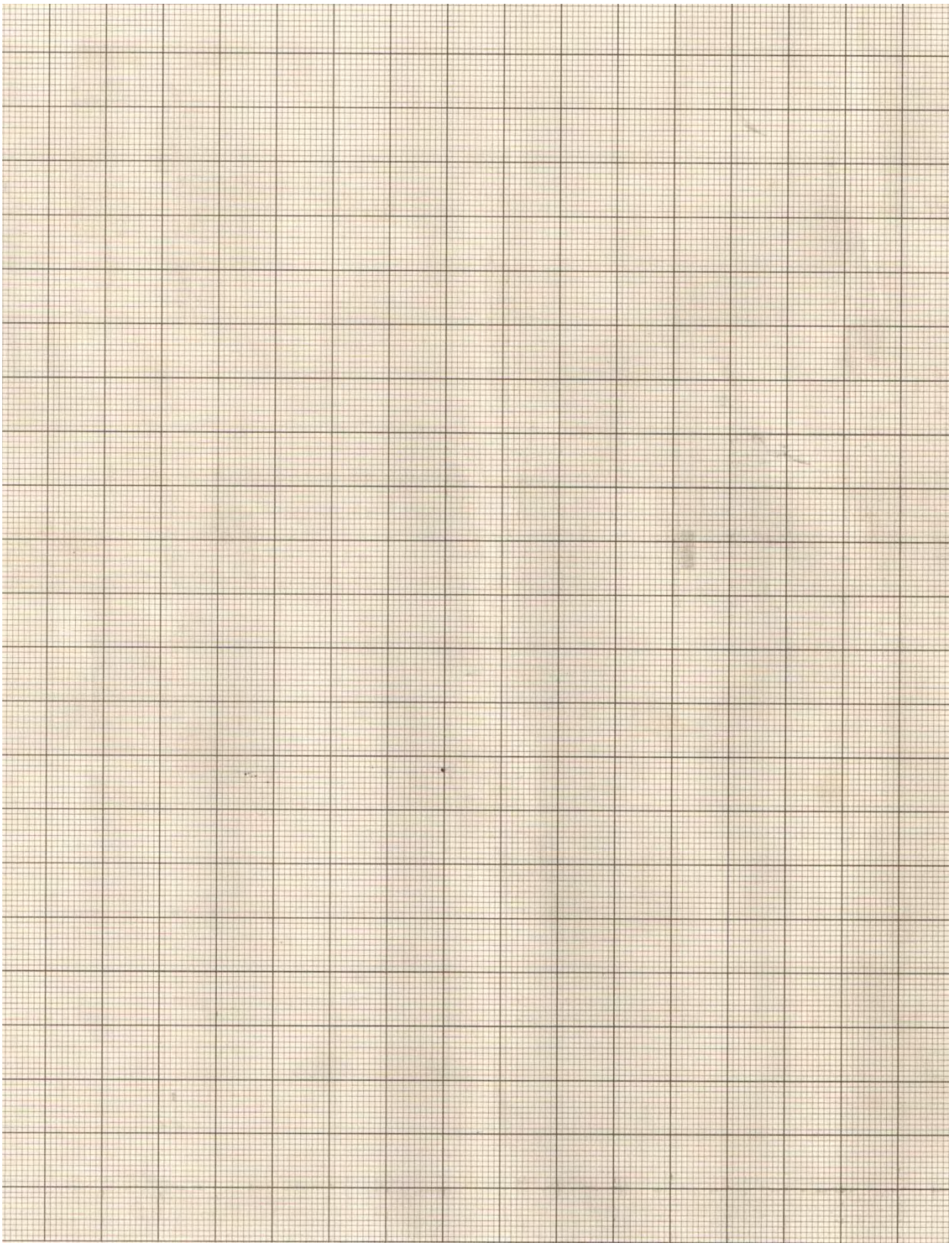
b. A 4 kg object is moving to the right at 2m/s, then it collides with a stationary object of 6kg. After the collision, the velocity of the 6kg object is 1.6m/s to the right.

i. What is the velocity of the 4kg object after the collision?

ii. What is the total kinetic energy before and after collision?



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FOR ROUGH WORK