Candidate's Examination Number _____

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

226 ENGINEERING SCIENCE

TIME 2:30 HOURS THURSDAY 07TH DECEMBER, 2023 A.M

INSTRUCTIONS TO THE CANDIDATE

1. **This paper consists of THREE (3) sections A, B and C.**
2. **Answer ALL questions in section A, B and C.**
3. **Write your Examination Number on every page of the booklet.**
4. **All answers must be written in the answer's booklet.**
5. **All working must be written in black or blue ink and diagrams must be in pencil.**
6. **Calculators, cellular phones and unauthorized materials are not allowed in the examination room.**

FOR EXAMINER'S USE ONLY					
Question number	Marks	Signature	Question number	Marks	Signature
1			6		
2			7		
3			8		
4			9		
5			10		
TOTAL					
CHECKER'S SIGNATURE					

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This paper consist of 13 printed pages

Candidate's Examination Number _____

SECTION A: (15 Marks)

Answer both TWO (2) questions in this section.

1. Choose the letter of the correct answer and write it below the item number in the table below.

i) Which of the following forces prevent a body from sliding?

A. Frictional force B. Compressional force

C. Restoring force D. Stretching force

ii) A machine has a velocity ratio of 9 if an effort of 10N is applied to lift a load of 50N.its efficiency is approximately equal to

A. 5% B. 45% C. 55% D. 90%

iii) Which of the following devices work by the help of atmospheric pressure?

A. Bicycle pumps and hydraulic press

B. Flushing tanks and syringes

C. lactometers and thermometers

D. Lift pump and hydrometer

iv) What is the common name of substance having a mass and occupies space?

A. Energy B. Matter

C. Nature D. Universe

v) The ability of a body to float in a fluid is known as

A. The law of up thrust B. The law of Archimedes

C. The law of floatation D. Floating

vi) What will be the value of current passing through a 2 Ohm coil connected in series with 3Ohm coil. Assuming that a battery has 10V.

A. 0.5A B. 2A C. 5A D. 20A

vii) Which of the following devices uses the theory of latent heat of fusion and latent heat of vaporization ?

A. Hotpot

B. Pressure cooker

C. Refrigerator

D. Thermos flask

viii) What is the value of 72km/h in m/s?

A. 20m/s

B. 120m/s

C. 1200m/s

D. 2000m/s

ix) What is the instrument used to observe objects around obstacle?

A. Microscope

B. Periscope

C. Plane glass

D. Telescope

x) Why the sun is said to be an example of luminous bodies?

A. because it is a big star

B. because it is made by god

C. because produce its own light

D. because it reflects light from the earth

Answers

i	ii	iii	iv	v	vi	vii	viii	ix	x

2. Match the measuring instruments in **list A** with appropriate application of instruments in **list B** by writing the letter of the correct response below the item number in a given table.

LIST A	LIST B
i. Clinical thermometer ii. Glass tubler iii. Measuring cylinder iv. Spring balance v. Vernier caliper	A. An instrument that measure length, depth and internal diameter B. An instrument that measure volume of liquid C. An instrument used to measure force of pull D. An instrument that measure specific amount of liquid from one container to another E. An instrument that is used to measure body temperature F. An instrument used to measure pressure of liquid G. An instrument that measure mass of a Substance

Answers

i	ii	iii	iv	v

SECTION B: (70 Marks)

Answer ALL questions in this section.

3. a) Define the term inertia.

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b) Why daladala passengers tend to fall forward when the daladala stops unexpectedely?

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c) A small PAJERO car of mass 1000kg is moving with a velocity of 60km/h. What will be the momentum of the car?

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4. a) Define the term force and state its unit.

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b) List two (2) examples of fundamental forces.

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c) A spring balance reads 12N when a metal block is suspended from it and 10N when the block is completely immersed in water.

i) Calculate the up thrust on the block

ii) Relative density of the block

5. a) The terms Load and effort are the popular terms when dealing with simple machine. Give the difference between these two terms.

b) Identify two (2) examples of simple machine that are used in everyday life.

c) A load of 500N is raised through 5m by a machine when its effort moves simultaneously through a distance of 25m. if the efficiency of a machine is 80%, determine its mechanical advantage.

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6. a) During practical exercise in a laboratory, you were given the following components,

   i) Two cells

   ii) Switch

   ii) Pieces of wires and

   iv) Electric bulb

   Use the given components to construct a circuit diagram that will enable the bulb to give light.

b) When the ammeter is connected in a circuit it reads 0.3A and When the voltmeter is connected to the same circuit, it reads 3V. Determine

i) The resistance of the circuit

ii) The power in kilowatts

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7. a) Define the term Pressure.

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b) List down four (4) applications of hydraulic press.

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c) Why do you prefer to cut hard material using a knife with sharp edge?

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d) Calculate the pressure at the bottom of sea water 52m deep if the density of water is 1025kg/m^3. Assuming that the acceleration due to gravity is 10ms^{-2}.

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8. a) Ali is pushing an object X but the object remain at the same position. Fatma is pulling an object Y and the object is moving.
Which one of them is said to do a work? (Give reason to support your answer).

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b) Identify three (3) forms of energy.

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c) A piece of iron having a mass of 2kg falls from a height of 25m above the ground. Calculate the Potential energy possessed by a piece of iron. Assuming that acceleration due to gravity is $9.8m/s^2$.

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9. a) Draw a diagram to show the reflection of light on a plane mirror. On your diagram, show the incident ray, reflected ray and angle of reflection.

b) Briefly explain the following terms,

i) Incident ray

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ii) Reflected ray

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c) How many images can be formed if two mirrors are set at an angle of 60^0?

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SECTION C: (15 Marks)

Answer only ONE (1) question in this section.

10. a) State the law of conservation of energy.

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b) Asha wants to boil water at home but she has no direct source of heat for that purpose. What will be your advice to Asha if ac voltage is available at Asha's home?

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c) A man released an iron mass of 100g from the top of a building 5m high. The iron mass moved horizontally with retardation of $2m/s^2$ after hitting the ground.

i) Find the velocity of iron mass after it hit the ground.

ii) The time taken by the iron mass to travel before it stopped completely. Use $g= 10m/s^2$.

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