Candidate's examination number..........................

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

054 **ENGINEERING SCIENCE**

TIME 2:30 HOURS **WEDNESDAY, 05TH DECEMBE 2018 am**

INSTRUCTIONS TO CANDIDATES

1. This paper consists of sections A, B and C.
2. Answer ALL questions in sections A and B and any three (3) questions in section C.
3. ALL answers must be written in the space provided.
4. Write your examination number on every page of this booklet.
5. Calculators and cellular phones are not allowed in the examination room.

FOR EXAMINER'S USE ONLY					
QUESTION NUMBER	**MARKS**	**SIGNATURE**	**QUESTION NUMBER**	**MARKS**	**SIGNATURE**
1			**9**		
2			**10**		
3			**11**		
4			**12**		
5			**13**		
6			**14**		
7			**15**		
8					
TOTAL					

This paper consists of 20 printed pages.

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SECTION A : (10 Marks)

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

i) A man presses more weight on earth at

A. Sitting position
B. Standing Position
C. Lying Position
D. None of these

ii) A piece of ice is dropped in a vessel containing kerosene. When ice melts, the level of kerosene will

A. Rise
B. Fall
C. Remain Same
D. None of these

iii) If Bob runs 100 m in 20 seconds, how fast has he travelled?

A. 5 m/s
B. 100 m/s
C. 2000 m/s
D. 0.2 m/s

iv) Product of Force and Velocity is called:

A. Work
B. Power
C. Energy
D. Momentum

v) Which one of the following has the highest value of specific heat?

A. Alcohol
B. Methane
C. Kerosene
D. Water

vi) The rotational effect of a force on a body about an axis of rotation is described in terms of the

A. Centre of gravity
B. Centripetal force
C. Centrifugal force
D. Moment of force

vii) Which law is also called the law of inertia ?

A. Newton's first law
B. Newton's Second Law
C. Newton's Third Law
D. All of these

viii) Energy possessed by a body in motion is called

A. Kinetic Energy
B. Potential Energy
C. Both A and B
D. None of these

ix) Forces can do many things to a moving tennis ball. Which one of these can be done by force?

A. To change its mass of an object B. To change shape of an object

C. To change speed of an object D.To change direction of an object

x) Which of these is the correct formula for speed?

A. speed = distance x time B. speed = distance ÷ time

C. speed = time x distance D. speed = time ÷ distance

ANSWERS

i	ii	iii	iv	v	vi	vii	viii	ix	x

SECTION B :(30 marks)

Answer ALL questions

2. Write down a formula that can be used to determine the density of a liquid

3. State the four (4) types of fundamental forces.

4. The tip of a needle has correctional area\ of 1x10^{-6} m^2. if a doctor applies a force of 20N to a syringe that is connected to a needle, what is the pressure exerted at the tip of a needle?

5. Define the following terms

   i) Floating

   ii) Sinking

6. a) A force of 60N pulls a box along a smooth and level ground through a distance of 5m. Calculate the work done by force.

7. a) State the unit used to express the charge stored in a capacitor.

b) Draw a simple arrangement of three (3) capacitors which are connected in parallel.

8. a) Define the term "angular acceleration".

b) A car traveling initially at 20 m/s comes to stop in a distance of 100 m . What was the acceleration?

9. Write down the applications of the following instruments

   i) Micrometer screw gauge

   ii) a ruler

   iii) A vernier caliper.

10. Write down the relationship between Apparent loss in weight, Real weight and Apparent weight of body in liquid.

11. Convert the following

   i) 0.005km in to m

   ii) 30J in to MJ

iii) $450000cm^3$ in to m^3

SECTIOJN C: (60 marks)

Answer any three (3) questions.

12. a) Define the following terms

i) Force ratio

ii) Movement ratio

iii) efficiency

b) The effort is applied at a radius of 250mm on a certain screw jack. The screw has a thread of 120mm. An effort of 100Nis required to raise a load of 6KN.determine

i) The movement ratio .

ii) The force ratio.

iii) The work done on load when it is raised by 48mm.

iv) The efficiency.

13. a) State the second Newton’s law of motion.

b) A 4kg object is moving to the right at 2m/s when it collides elastically head-on with a stationary 6kg object .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 K.E before the collision?

14. a) Distinguish between the lower fixed point and upper fixed point.

b) What is the difference between heat capacity and specific heat capacity of a substance?

c) An aluminium block of mass 0.2kg at 85^0C is dropped into 0.1kg of water at 15^0C. Determine the final steady temperature. Assuming that there is no heat lost in to the air. Given that:

Specific heat capacity of water is 4200J/kgK

Specific heat capacity of aluminium is 1100J/KgK

15. A car is uniformly accelerated from a velocity of 10m/s to 100m/s in20s,it is then move with this constant velocity for 2minutes.Finally,a car brought to rest and stop after 1 minute.

a) Plot the velocity-time graph for this motion (use a graph paper provided.

b) Use the graph to determine

i) the acceleration of the car

ii) Deceleration of the car

iii) The total distance covered by the car.

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