Name: ..... **Index No.** .....

School: ..... **Date:** ..... **Candidate's Sign** .....

443/1
PHYSICS
PAPER 1 (THEORY)
FORM 4
MARCH / APRIL 2013
TIME: 2HOURS

WESTERN ZONE JOINT EXAMINATIONS - 2013 (WEZOJE)

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

- Write your name admission number and class I the spaces provided
- This paper consists of two sections, A and B.
- Answer ALL the questions in the spaces provided.
- All working must be clearly shown in the spaces provided in this booklet
- Mathematical tables and Electronic calculators may be used.

FOR EXAMINER'S USE ONLY

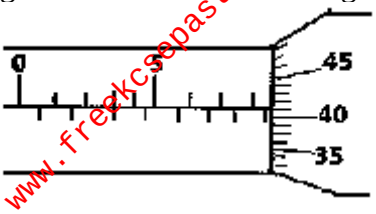
Section	Question	Maximum Score	Candidate's Score
A	1 - 15	25	
B	16		
	17		
	18		
	19		
Total			

This paper consists of 8 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.

SECTION A: (25MARKS)

Answer all questions in this section.

1. What is the reading of the micrometer screw gauge shown below with an error of + 0.5mm? (1mark)



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2. In a ball and ring experiment, the ball goes through the rings at room temperature. When it is heated it does not go through the ring, but when left on the ring for some time, it goes through. Explain this observation. (2marks)

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3. In the study of free fall, it is assumed that the force F acting on a given body of mass, m, is gravitational, given by F = ma. State two other forces that act on the same body. (1mark)

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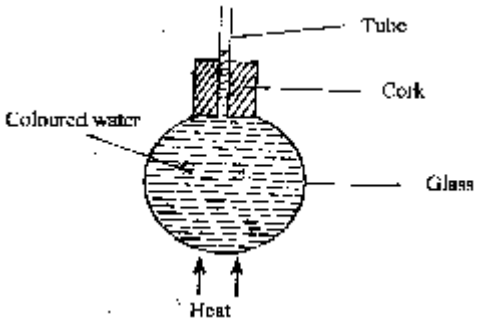
4. In the set up shown below, it is observed that the level of the water initially drops before starting to rise. Explain this observation. (2marks)



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5. Distinguish between speed and velocity. (2marks)

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6. State how the pressure in a moving fluid varies with sped of the fluid. (1mark)

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7. A piece of metal weighs 3N is air and 2N when totally immersed in water. Calculate the volume of the metal. (3marks)

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8. Why banking of raods necessary? (1mark)

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9. Give a reason why air is not commonly used as the fluid in a hydraulic lift. (1mark)

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10. Tall buildings are built with lighter materials at the upper part. Explain (2marks)

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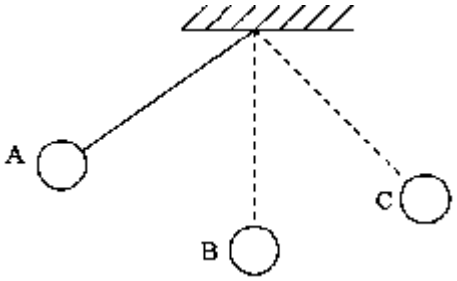
11. The figure below shows a swinging pendulum.



State the energy conservation taking place as the pendulum moves from A to B and B to C (2marks)

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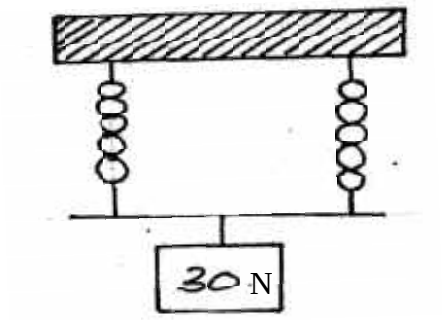
12. The identical springs of spring constant 3N/cm are used to support a load of 30N as shown.



Determine the extension on of each spring. (3marks)

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13. In a vacuum flask, the walls enclosing the vacuum are silvered on the inside. State the reason for this. (1mark)

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14. State the features that govern the strength of a spiral of a given material. (2marks)

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15. Sketch velocity – time graph of a body moving down a viscous fluid. (1mark)

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SECTION B: (55MARKS)

Answer ALL the questions in the spaces provided.

16. a) Define the term efficiency as applied in simple machine. (1mark)

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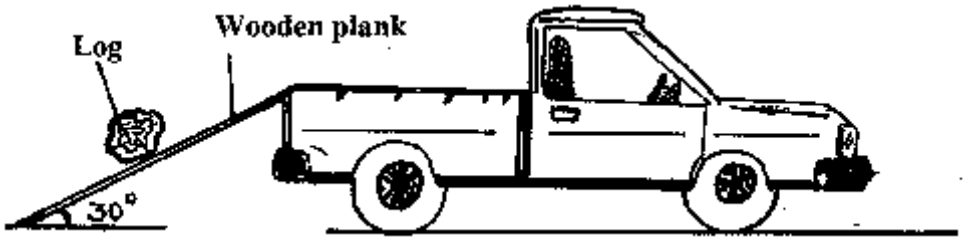
b) A man used a wooden plank to lift a log of wood from the ground to a stationary lorry on a flat ground as shown in figure below. The wooden plank was inclined at an angle of 30^0 to the ground.



i) Indicate with an arrow on the diagram, the direction of the effort and the load. (2marks)

ii) Calculate the velocity ratio of the set up. (2marks)

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iii) Calculate the mechanical advantages of the set up if its efficiency is 65%. (2marks)

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c) A pump is used to spray water from a pool to form fountain.

i) Determine the minimum power of the pump if it ejects 50 litres of water pre minutes and spray reached a height of 5metres. (3marks)

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ii) Give a reason why water often returning to the pool has a different temperature from that which left the pump. (2marks)

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17. a) Define centre of gravity (1mark)

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b) The figure below shows a wine glass

Explain how the stability of the glass is affected if it is filled with wine. (2marks)

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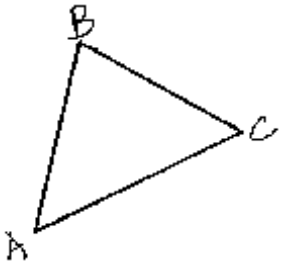
c) In the triangular ABC shown in the figure below, determine geometrically the centre of gravity. (3marks)



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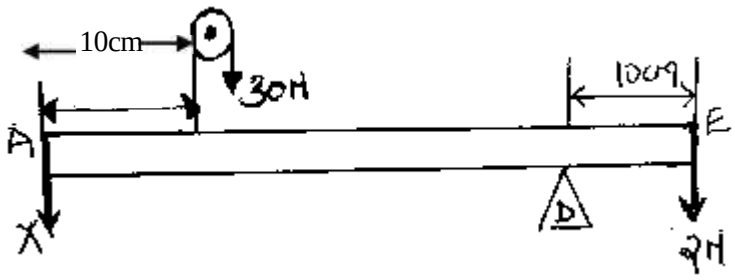
d) The figure below shows a uniform rod AE which is 40cm long. It has a mass of 2kg pivoted at D. If 2N is acting at point E, and 30N force is passed through a frictionless pulley.



Find the force (x) acting at end A. (3marks)

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e) i) State the principle of moments. (1mark)

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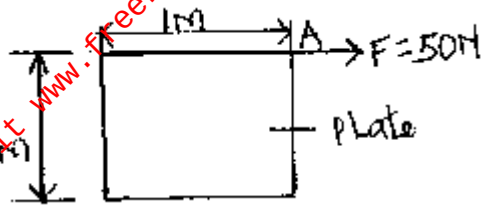
ii) The figure below shows a metal plate 2M long, 1M wide and negligible thickness A horizontal force of 50N applied at point 'A' just makes the plate tilt.



Calculate the weight of the plate. (3marks)

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18. a) Define the term specific heat capacity (1mark)

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b) Explain the following

i) Why evaporation causes cooling? (2marks)

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ii) An increase in atmospheric pressure increases the boiling point of a liquid. (2marks)

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c) A current was passed through a heater of resistance 15Ω immersed in 250g of ice and 250g of water both at 0^0C in a vacuum flask. The vacuum flask and its contents were heated to a temperature of 8^0C in 5 minutes. Assume that the total heat received by the vacuum flask is 1200J. (Take = Specific heat capacity of water as 4200Jkg^{-1}k^{-1}, specific latent heat of fusion of ice = 33000Jkg^{-1}.

i) Determine the amount of heat that was received by the vacuum flask and its contents. (3marks)

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ii) Calculate the current that was passed through the heater. (3marks)

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d) Water drops form a water fall 120m High. The temperature of ath water at the bottom is found to be 240C. Calculate its temperature at the top (Take specific heat capacity of water = $4200Jk^{-1}k^{-1}$. (4marks)

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19. a) State the law of floatation (1mark)

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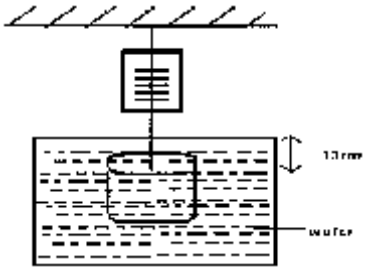
b) A solid metal block cross-section area $4cm^2$ and of density $2500g/cm^3$ is fully immersed in water, supported by a spring balance.



i) A part from the weight, state and indicate the direction of any two forces acting on the metal block (2marks)

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ii) If the upward force acting on the bottom face is 1.5N, calculate the volume of the block (3marks)

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iii) Calculate the apparent weight of block in water. (3marks)

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c) Explain why the hydrometer is not graduated uniformly? (1mark)

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d) Using Kinetic theory of Gases, explain how the rise in temperature of a gas causes rise in the pressure of a gas if the volume is kept constant. (3marks)

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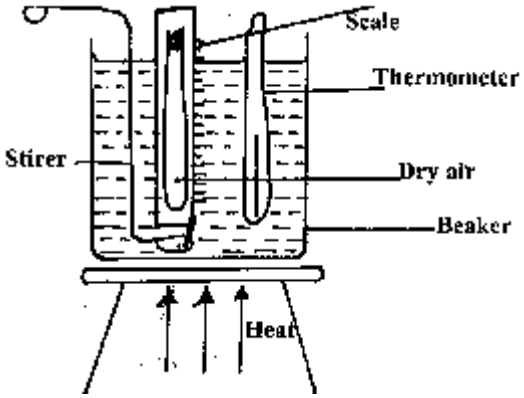
i) The figure below is a set up that can be used to verify Charles' law of gases.



ii) State the measurement that should be taken in the experiment. (2marks)

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iii) Explain how the measurement taken above can be used to verify Charles law. (4marks)

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e) A certain mass of hydrogen gas occupies a volume of $2.6m^3$ at a pressure of 1.5×10^5 pa and temperature of 12^0C. Determine its volume at a temperature of 0^0C and pressure of 1.0×10^5 pa. (2marks)

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