NYAMBARIA HIGH SCHOOL

END OF YEAR EXAMS

Paving Way For Kenya Certificate of Secondary Education Success

Name …….. Admission no…….

Candidate's Signature…… Date…….

FORM 3

PHYSICS

PAPER 1

TIME: 2Hours

Instruction to candidates

- Write your name, Admission number in the spaces provided.
- This paper consists of TWO sections: A and B
- Answer ALL questions in section A and B in the spaces provided.
- ALL workings MUST be clearly shown.
- Mathematical tables and electronic calculators may be used.
- You may use gravitational pull as '10N/kg'

Contact 0724333200/0795491185 for marking schemes or order online at
www.kenyaeducators.co.ke

For examiner's use only:

Section	Question	Maximum score	Candidate's score
A	1 – 12	25	
B	13 14 15 16 17	13 12 12 09 09	
	Total	80	

SECTION A (25 MARKS)

1.

a) Define 'least count' as used in the operation of vernier calipers **(1 mark)**

……

……

b) The figure below shows the scale of vernier calipers used for determining the diameter of a cylindrical metal rod of length 100 mm. The vernier scale has a negative zero-error of -0.16 cm. determine the volume of the metal rod. **(3 marks)**

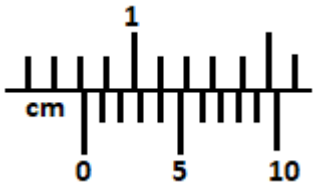


Figure 1

……

……

……

……

……

……

2. Define 'moment of force' and state its SI unit **(2 marks)**

……

……

……

……

3. Two glass tubes are dipped into a beaker of water as shown below:

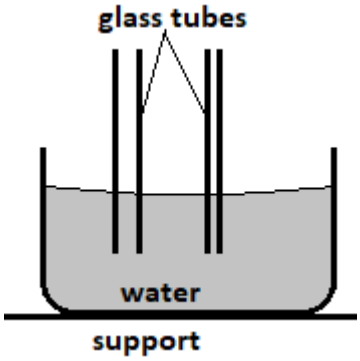


Figure 2

a) Indicate on the diagram, the level of water in the glass tubes **(1 mark)**

b) Explain your answer in (3,a) above **(2 marks)**

……

……

……

……

4. Distinguish between 'velocity' and 'speed' **(1 mark)**

……

……

5. A body is vertically projected upwards from the ground at a velocity of 5m/s. Draw a velocity-time graph of the body for its entire duration of flight **(2 marks)**

……

……

……

……

6. Motor vehicles such as tractors which work on swampy areas have wide tyres fitted on them. Explain **(1 mark)**

……

……..

7. A spring of length 6 cm is stretched to a length of 8.5 cm by a force of 5 N. Calculate the energy stored by the spring. **(3 marks)**

……

……..

……

……..

……

……..

8. The diagram below shows a model of fire alarm which was made by a form one student. The compound bar is made of brass and iron. Explain how it works **(3 marks)**

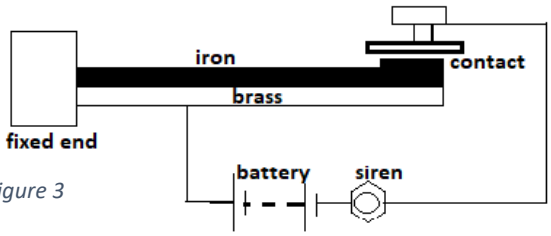


Figure 3

……

……..

……

……..

……

……..

9. The rate of flow of water in a tube is $0.001 m^3/s$. If the cross section area of the tube is 5 cm^2, determine the speed of flow of the water. **(2 marks)**

10. In the determination of size of an oil molecule, lycopodium powder is sprinkled on the water surface before oil drop is introduced onto the surface of the water. Give reason for this.
(1 mark)

……

……

11. In a vacuum flask the walls enclosing the vacuum are silvered on the inside. State how the silvered wall is able to achieve its function **(2 marks)**

……

……

……

……

12. Alcohol and mercury are the two most used thermometric liquids. Give a reason why one would prefer alcohol to mercury for a particular measurement of temperature **(1 mark)**

……

……

SECTION B (55 MARKS)

13.

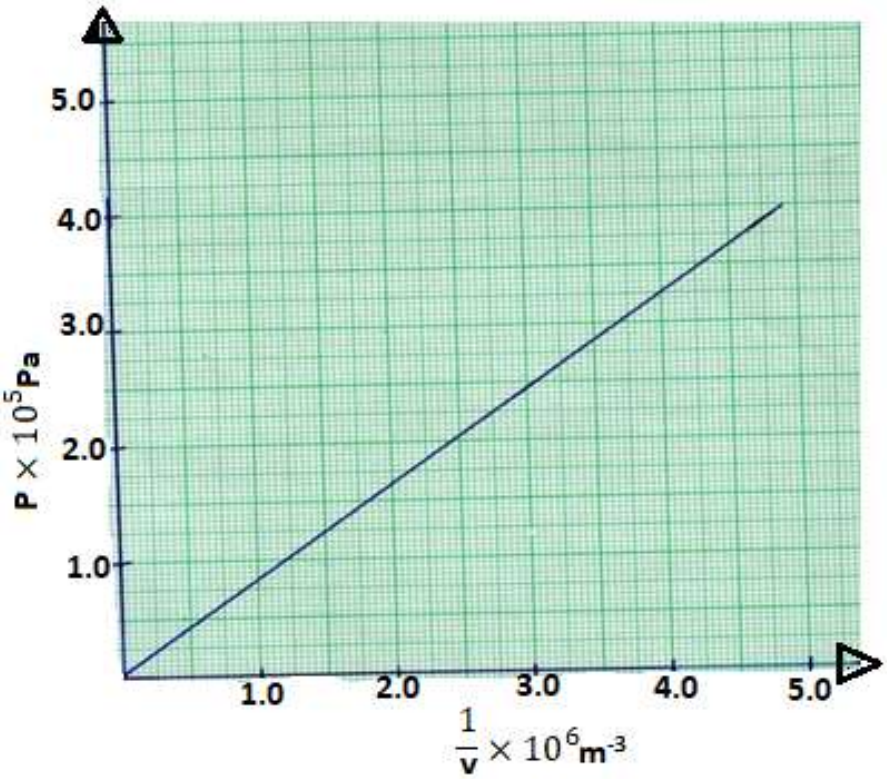
a) State what is meant by an ideal gas. **(1mark)**

……..…….

……..

b) The pressure acting on a gas in a container was changed steadily while the temperature of the gas was maintained constant. The value of volume (v) of gas was measured for various value of pressure (p). The graph in the figure below shows the relationship between the pressure (p) and the reciprocal of volume (v).

Figure 4



i. Draw a well labelled diagram of the set-up from which the above data was obtained **(4 marks)**

ii. Suggest how the temperature of the gas could be kept constant. **(1 mark)**

……

……

iii. Given that the relationship between pressure (p) and volume (v) of the gas is given by: PV = k, whereby k is a constant, use the graph to determine the value of k. **(3 marks)**

……

……

……

……

……

……

c) State one precaution you would take when performing such an experiment. **(1mark)**

……

……

d) A gas occupies a volume of 4000 litres at a temperature of 37^0c and normal atmospheric pressure. Determine the new volume of the gas if it is heated at a constant pressure to a temperature of 67^0C.
(Normal atmospheric pressure = 1.01 x10^5pa) **(3 marks)**

……

……

……

……

……

14.

a) Define 'specific heat capacity' **(1 mark)**

……

……..

b) A liquid at 80^0C in a cup was allowed to cool for 20 minutes. State two factors that determine the final temperature. **(2 marks)**

……

……..

……

……..

c) What is meant by specific latent heat of vaporization? **(1 mark)**

……

……..

d) In an experiment to determine the specific latent heat of vaporization of water, steam at 100^0c was passed into water contained in a well logged copper calorimeter. The following measurements were made:
Mass of calorimeter = 80g
Initial mass of water = 70g
Initial temperature of water =5^0c
Final mass of calorimeter + water + condensed steam=156g.
Final temperature of mixture = 30^0c.
Specific heat capacity of water = 4200J/kgK and specific heat capacity for copper = $390Jkg^{-1}k^{-1}$.
Determine:

i. Mass of condensed steam. **(1 mark)**

……

……..

ii. Heat gained by the calorimeter and water. **(2 marks)**

……

……..

……

……..

iii. Given heat L is the specific latent heat of vaporization of steam. Write an expression for the heat given out by steam. **(2 marks)**

……

……

……

……

iv. Determine the value of L. **(2marks)**

……

……

……

……

15. A pulley system having a velocity of 5 is used to raise a load of 800N through a height of 0.6m at a constant speed using an effort of 200N in a time of 15 seconds.

a) Draw a diagram in the spaces provided below to show the pulley system and on it mark the direction of tension on all the string sections; **(2marks)**

……

……

……

……

b) Calculate the mechanical advantage of the pulley system; **(2marks)**

……

……

……

……

c) Find the efficiency of the pulley system; **(3marks)**

……

……

……

……

……

d) Calculate the power developed by the effort. **(3 marks)**

……

……

……

……

……

……

e) Give two reasons why the efficiency of the pulley system is less than 100% **(2 marks)**

……

……

……

……

16.

a) What is diffusion? **(1mark)**

……

……

b) A smoke cell contains a mixture of trapped air and smoke. The cell is brightly lit and viewed through a microscope. State and explain what is observed. **(2marks)**

……

……

……

……

c) A beaker is filled completely with water. A spoon full of common salt is added slowly. The salt dissolves and the water does not overflow.

i) Why is salt added slowly? **(1mark)**

……

……

ii) State the reason why water does not overflow. **(1mark)**

……

……

d) The figure 5 below shows a pipe of varying cross- section. Three vertical tubes X, Y and Z of same diameter are fixed to the section A, B and C of the pipe respectively as shown below.

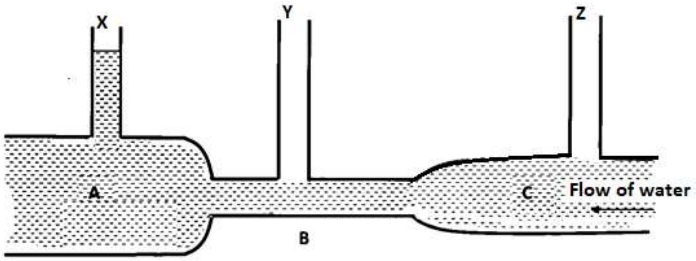


Figure 5

i. Given that the water flows in the direction shown by the arrow, indicate on the diagram the relative levels of water in Y and Z. **(1mark)**

ii. The diagram below shows a Bunsen burner. Explain how it works using Bernoulli's principle **(3 marks)**

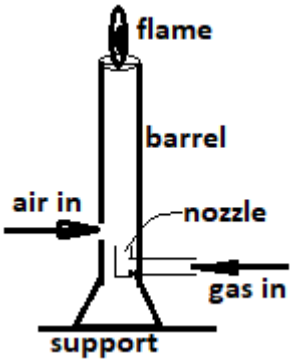


Figure 6

……

……

……

……

……

……

17. The figure below shows a hydraulic brake system.

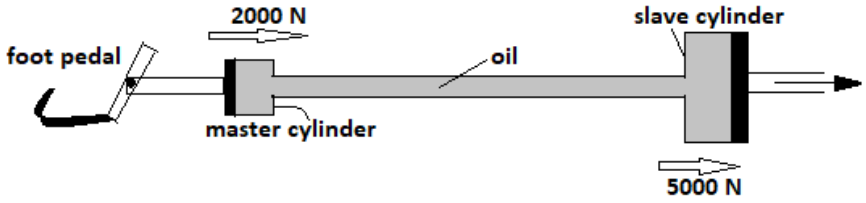


Figure 7

A force of 2000 N is applied on the foot pedal connected to a piston of area $0.005m^2$. This causes a stopping force of 5000N on one wheel. Calculate.

a) Pressure in the master cylinder **(2 marks)**

……

……

……

……

b) Area of the slave piston. **(2 marks)**

……

……

……

……

c) Velocity ratio of the system. **(3marks)**

……

……

……

……

……

……

d) Give two reasons why oil is used in the hydraulic brake system. **(2marks)**

……

……

……

……