Name ..... Index No. .....

School .....Candidate's signature .....

Date .....

232/1

PHYSICS
Paper 1
July/August 2016
Time 2 hours

NYANDARUA SOUTH FORM FOUR JOINT EVALUATION

Kenya Certificate of Secondary Education

PHYSICS

Paper - 232/1

July/August 2016

Time: 2 hours

for free past papers visit www.freekcsepastpapers.com or call 0720092479

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- This paper consist of two sections A and B.
- Answer ALL questions in section A and B in the spaces provided.
- All working must be clearly shown in the spaces provided in this booklet.
- Non-programmable, silent electronic calculators and KNEC mathematical tables may be used.

EXAMINER'S USE ONLY

						TOTAL SCORE
SECTION A	1 to 12					
SECTION B	13	14	15	16	17	
GRAND TOTAL						

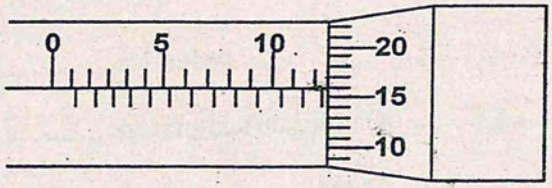
This paper consists of 10 printed pages
Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

SECTION A (25 marks)

Answer ALL the questions in the spaces provided.

1. Figure 1 below shows a micrometer screw gauge being used to measure the diameter of a metal rod. The thimble scale has 50 divisions.

Fig 1



What is the reading shown? (1 mark)

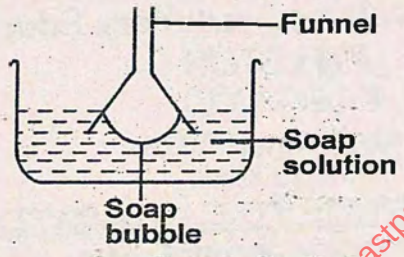
.....

2. a) What is surface tension? (1 mark)

.....

b) Figure 2 below shows a funnel dipped into a liquid soap solution.

Fig 2



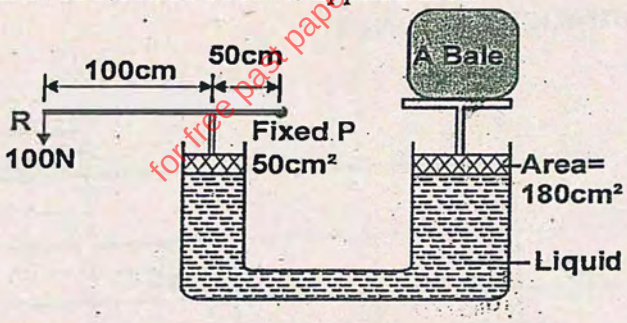
Explain what happens to the soap film when the funnel is removed. (1 mark)

.....

.....

3. Figure 3 shows a hydraulic press system using a lever of negligible mass on the side of a small piston pivoted at point P. A force of 100N is applied at R.

Fig 3



Find the weight of the bale supported by the large piston. (3 marks)

.....

.....

.....

for free past papers visit: www.freekcsepastpapers.com or call: 0720502479

4. a) Give a reason why heat transfer by radiation is faster than heat transfer by conduction. (1 mark)

.....

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

.....

.....

5. The figure 4 below shows an electric heater placed midway between two flasks A and B, flask A is shiny on the outside and flask B is blackened on the outside.

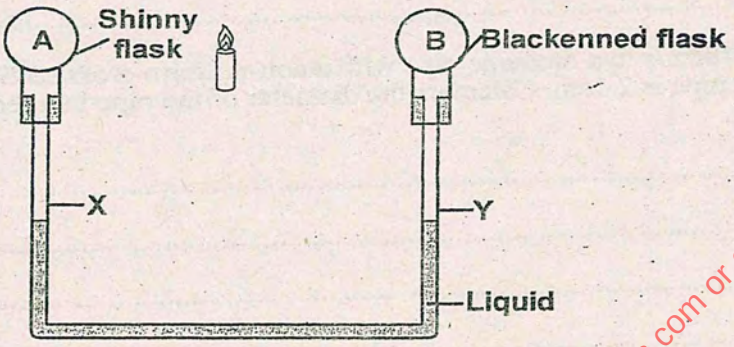


Fig 4

a) Name the process by which heat travels from the heater to the flasks. (1 mark)

.....

b) State the observations that will be made. (1 mark)

.....

6. Figure 5 below shows an arrangement to demonstrate diffusion through solids:

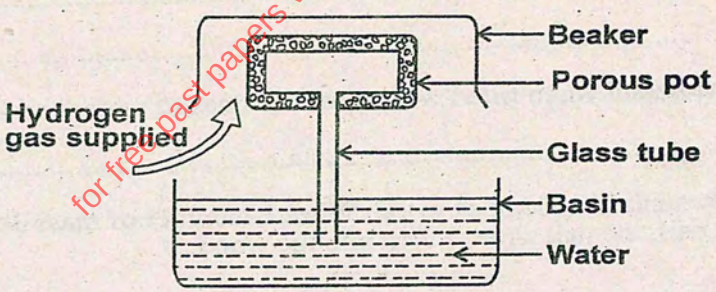


Fig 5

The hydrogen gas is supplied for sometimes then stopped and the beaker removed. State and explain what is likely to be observed when the hydrogen gas supply is stopped. (2 marks)

.....

.....

.....

for free past papers visit: www.freekcsepastpapers.com or call: 0720502479

7. The illustration below shows the layers of water in a cold region.

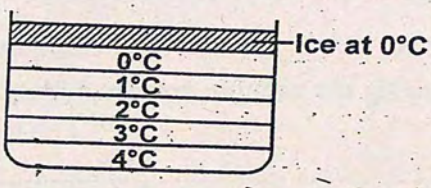


Fig 6

Explain how fish survive under water and yet the top is frozen. (1 mark)

.....

.....

.....

8. Water flows at a velocity of 48cm/s in a drainage pipe with a non-uniform cross sectional area at a point where the radius of the pipe is 2.1cm. Calculate the diameter of the pipe in a section in which the velocity becomes 32cm/s. (3 marks)

.....

.....

.....

.....

9. When a vessel of mass 50g is filled with water, the total mass is 125g. When the vessel is filled with liquid L, the total mass is 110g.

a) Determine the relative density of liquid L. (2 marks)

.....

.....

.....

.....

b) Calculate the total mass of the vessel when filled with equal volumes of water and liquid. (1 mark)

.....

10. An iron of mass 3g is partially sunk in a block of wood. When a hammer of mass 3kg moving a velocity of $50ms^{-1}$ strikes the nail, the nail sinks 0.5cm into the wood.

Determine:

a) The initial velocity of the nail immediately the hammer strikes. (2 marks)

.....

.....

.....

b) The force resisting the entry of the nail into the wood. (1 mark)

.....

.....

for free past papers visit: www.freekcsepastpapers.com or call: 0720502419

11. A piece of thick glass removed from hot water and dipped into cold water will crack while thin glass does not crack. Explain this observation. (1 mark)

.....

.....

12. Figure 7 below shows a uniform bar of length 1.0m pivoted near one end. The bar is kept in equilibrium by a spring balance as shown.

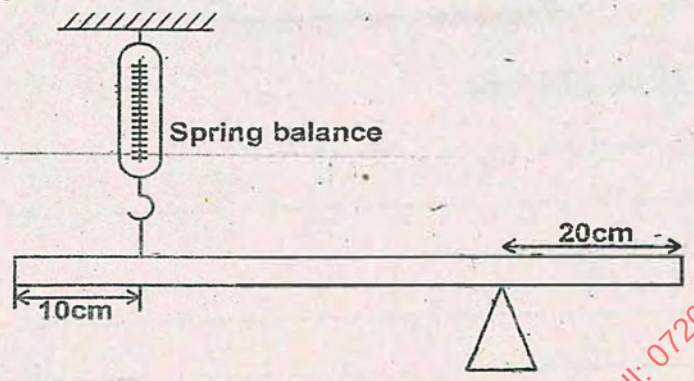


Fig 7

Given that reading of the spring balance is 0.6N. Determine the weight of the bar. (2 marks)

.....

.....

.....

SECTION B (55 MARKS

13.a) State one reason why the efficiency of a machines less than 100% (1 mark)

.....

b) The sketch below shows the relationship between the efficiency and the load of a pulley system.

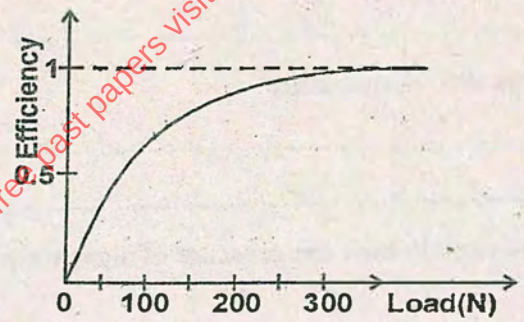


Fig 8

Explain the shape of the curve. (2 marks)

.....

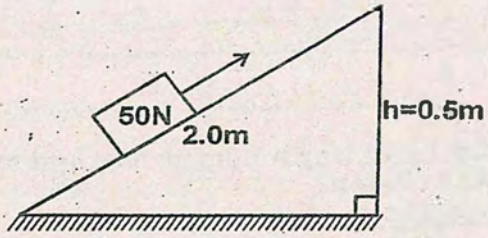
.....

.....

for free past papers visit www.freekcsepastpapers.com or call: 0720502479

c) The following diagram shows a load of 50N being raised by pulling it along an inclined plane of length 2.0m.

Fig 9



Determine:

i) the work done by the 22N force. (2 marks)

.....

.....

ii) the work done on the load (2 marks)

.....

.....

iii) the velocity ratio (1 mark)

.....

iv) the mechanical advantage.. (1 mark)

.....

v) the efficiency of the system (2 marks)

.....

.....

.....

14.a) State what is meant by 'absolute zero temperature' (1 mark)

.....

.....

b) Using the kinetic theory of gases explain how the pressure of a gas rises when the gas is heated at constant volume. (2 marks)

.....

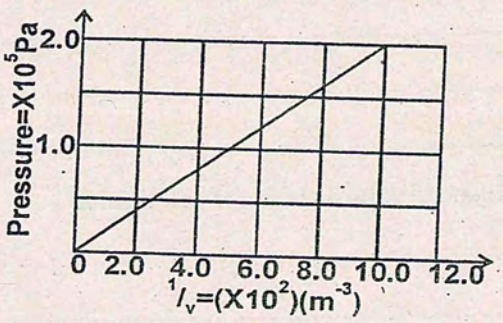
.....

.....

for free past papers visit www.freekcsepastpapers.com or call 0720502479

c) The graph below shows the relationship between the pressure of a gas and the reciprocal of its volume at constant temperature.

Fig 10



i) State how the pressure and the volume of the gas are related. (1 mark)

.....

ii) Why would it not be practical for the volume of a gas to be zero? (1 mark)

.....

iii) Given that $pV = 0.80T$ where T is the absolute temperature of the gas, determine the value of T from the graph. (3 marks)

.....

.....

.....

d) 3000cm³ of air of a temperature of 0°C and a pressure of 1.0×10^5pa was heated in a sealed container. Assuming the volume of the container remains unchanged, determine the temperature at which pressure rises to 5×10^5 pa. (4 marks)

.....

.....

.....

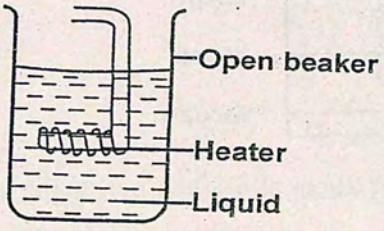
.....

15.a) Define the term 'specific latent heat of vaporisation' of a substance. (1 mark)

.....

b) An immersion heater rated 15W is used to heat a liquid in an open beaker. The beaker contains 300g of a liquid. After the liquid boils, the heater is left on for 10 minutes before being switched off. The mass of the liquid is found ot have reduced to 296.5g

Fig 11



for free past papers visit: www.freekcsepastpapers.com or call: 0720502479

i) Determine the heat supplied by the heater during the 10 minutes of boiling. (3 marks)

.....

.....

.....

.....

ii) Determine the specific latent heat of vaporisation of the liquid. (3 marks)

.....

.....

.....

.....

iii) Explain why this method of measuring the specific heat of vaporisation of a substance may not be accurate. (1 mark)

.....

.....

c) A metal cylinder of mass 100g is dipped into boiling water at 100°C and then placed in a calorimeter containing 80g of water at 20°C. After stirring, the temperature of the mixture stabilizes at 23.4°C ignoring the heat gained by the calorimeter determine the specific heat capacity of the metal. (Take specific heat capacity of water = 4.2×10^3 $Jkg^{-1}k^{-1}$) (3 marks)

.....

.....

.....

.....

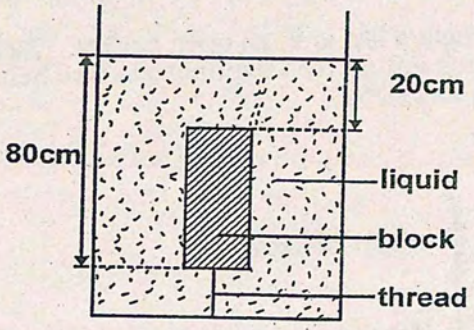
6.a) State Archimedes's principle. (1 mark)

.....

.....

) A rectangular block of cross-sectional area $0.08m^2$ is immersed in a liquid of density $1200kgm^{-3}$.

Fig 12



The top of the lower surfaces of the block are 20cm and 80cm below the surface of the liquid respectively.

for free past papers visit: www.freekcsepastpapers.com or call: 0720502479

i) What is the downward force of the top surface of the block? (2 marks)

.....

.....

.....

ii) What is the upward force of the block's lower surface? (2 marks)

.....

.....

.....

iii) Calculate the upthrust on the block. (2 marks)

.....

.....

.....

) A wooden block of mass 400kg is floating with 20% of its volume above hte water level.

Determine

i) the force needed to submerge the block completely. (3 marks)

.....

.....

.....

.....

ii) the density of the wooden block. (take the density of water = $1000kgm^{-3}$) (2 marks)

.....

.....

.....

7.a) The following diagram shows a ball whirled in a vertical plane in anticlockwise direction.

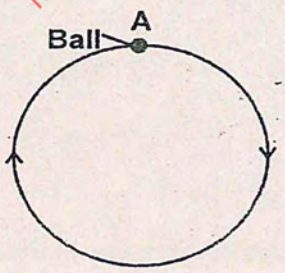


Fig 13

i) Sketch the path of the ball if the string breaks when the ball is at position A (1 mark)

for free past papers visit: www.freekcsepastpapers.com or call: 0720502479

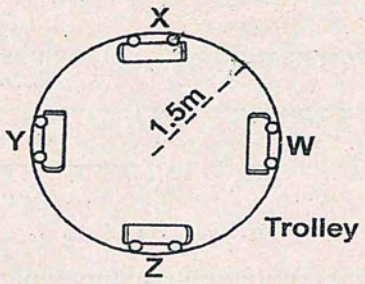
ii) A body in uniform circular motion is always accelerating. Explain. (1 mark)

.....

.....

b) The diagram below shows a trolley moving on a circular rail in a vertical plane. The mass of the trolley is 200g and the radius of the rail is 1.5m.

Fig 14



i) Determine the minimum velocity at which the trolley passed point X. (2 marks)

.....

.....

.....

ii) If the trolley moves with the velocity of $4ms^{-1}$ as it passes point Z, find its angular velocity at this point. (2 marks)

.....

.....

.....

iii) Find the force exerted on the rail at point Z with velocity 4m/s. (3 marks)

.....

.....

.....

.....

for free past papers visit www.freekcsepastpapers.com or call: 0720502479