NAME …………………………..…………….. INDEX NO. …………………………

SCHOOL ……….…….……………...…..… DATE …………….…………..

232/1
PHYSICS
PAPER 1
(THEORY)
JULY/AUGUST 2017
TIME: 2 HOURS.

SCHOOL BASED FORM 4 EXAM JULY-AUGUST 2017

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES.

- This paper consists of two sections A and B.
- Answer **ALL** the questions in the spaces provided after each question.
- **ALL** working must be clearly shown.
- Electronic calculators, mathematical tables may be used
- All numerical answers should be expressed in the decimal notations.
- $g = 10ms^{-2}$

FOR EXAMINER'S USE ONLY.

Section	Question	Maximum score 80	Candidate's score
A	1 – 13	25	
B	14	11	
	15	11	
	16	13	
	17	9	
	18	11	
	TOTAL	80	

This paper consists of 9 printed pages. Candidates should check to ensure that they have all the pages and that no question or part of question is missing.

SECTION A (25 MARKS)

1. State the reading in seconds indicated on the digital stopwatch shown in the figure below. (2 mks)

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2. An aircraft 250m from the ground, travelling horizontally at 450m/s releases a parcel. Calculate the horizontally distance covered by the parcel from the point of release (Take g = 10m/s² and ignore air resistance) (3 mks)

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3. State one factor that would increase the surface tension of pure water in a beaker of water. (3 mks)

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4. The diagram below shows a set up used by a student to show variation of pressure in a liquid . State and explain the effect on the height, h, when the thistle funnel used moved towards the surface of the liquid. (2 mks)

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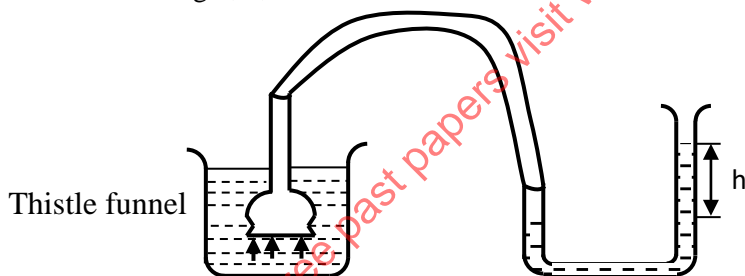
5. A body of mass 3kg moving with a velocity of 4m/s collides head on with a stationary body of mass 1.5kg and imparts to it a velocity of 3.2m/s. Calculate the velocity of the 3kg body after collision. (2 mks)

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6. A footballer kicks a ball of mass 0.6kg initially at rest using a force 960N. If the foot was in contact with the ball for 0.1 seconds, determine the take off speed of the ball. (2 mks)

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7. The relative density of a solid is 2.4. Determine the upthrust it experiences when floating on water if the weight is 200N in air. (2 mks)

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8. State and indicate two forces that come into play when a body is suspended by a string in air. (2 mks)

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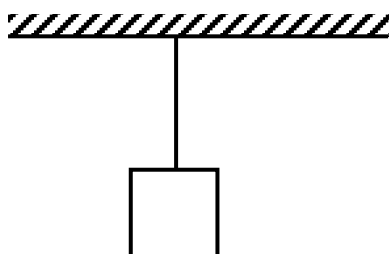
9. A turntable of a record player makes 90 revolutions per minute. Calculate its angular velocity in radians per seconds. (2 mks)

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10. A man uses a pulley of velocity ratio 4 to lift a load. Determine the mechanical advantage of the system given that the efficiency of the system is 75%. (2 mks)

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11. A 50W heating coil is totally immersed in 200g of water contained in an insulated flask of negligible heat capacity. The initial temperature of the water in the flask is 25^0C. Determine how long it takes for the water to boil at 100^0C when the heater is switched on. (Take specific heat capacity of water = 4200 JKg^{-1}K^{-1})   (2 mks)

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12. A gas occupies a volume of 4 litres when its temperature is 20^0C. Calculate the new volume of the gas if its temperature is raised to 90^0C at a constant pressure.   (2 mks)

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13. A car goes round a flat circular bend whose radius is 100m at a constant speed of 30m/s. Give a reason why the driver of the car has to move through the same bend at a lower speed during a rainy day.   (1 mk)

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14. (a) State and explain one factor that affect thermal conductivity of a body. (2 mks)

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(b) In an experiment to determine the specific heat capacity of a metal, the set up below was used.
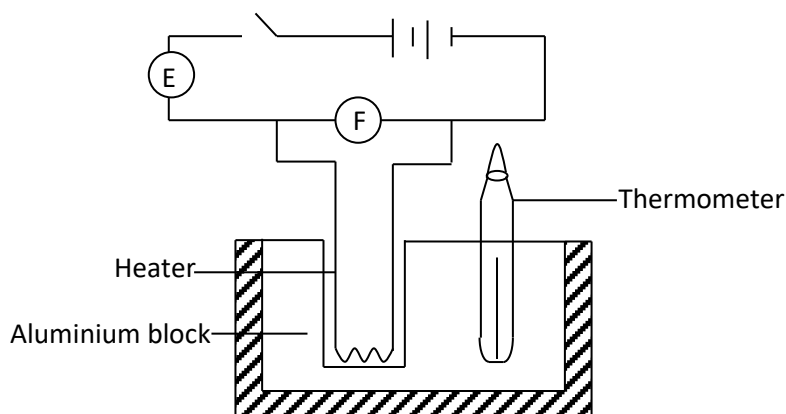
(i) What are the measuring instruments labelled E and F (2 mks)

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(ii) What other measuring instrument not indicated in the diagram is needed in the experiment. (2 mks)

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(c) In the experiment the following data was recorded.

Voltmeter reading = 24V

Ammeter reading = 2.0A

Mass of the block = 1.02kg

Initial temperature of block = 25^0C

Final temperature of block = 41^0C

Time for heating = 300 seconds

Use the information to calculate the specific heat capacity of the block. (3 mks)

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(d) Some hot water was added to three times its mass of cold water at 10^0C and the resulting temperature was 20^0C. What was the temperature of the hot water? (3 mks)

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15. (a) A butcher has a beam balance and masses of 0.5kg and 1.5kg. How would he measure 1kg of meat on the balance at once. (1 mk)

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(b) A mixture consists of 80cm^3 of water and 120cm^3 of liquid X. If the density of water and liquid X are 1.0g/cm^3 and 0.8g/cm^3 respectively. Calculate the density of the mixture (3 mks)

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(c) (i) Why is mercury more suitable for use in a simple barometer than water. (2 mks)

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(ii) Determine the pressure exerted at the bottom of a lake which is 60m deep, if the density of sea water is 1030kg/m^3. (2 mks)

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(d) (i) State one assumption made when the size of the molecule of oil is estimated. (1 mk)

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(ii) An oil drop of volume 2mm^3 is introduced on the surface of water and it spreads to form a patch whose area is 40cm^2. Determine the size of the molecule of oil. (2 mks)

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16. (a) State the law of floatation (1 mk)

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(b) A rod of cross-section area 3.0cm² and length 16cm floats vertically upwards in a liquid of density of 1.1g/cm³ with its length of 7cm above the surface. Determine

(i) weight of the rod.   (3 mks)

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(ii) the depth it will be submerged if put in a liquid of density 0.8g/cm³.   (2 mks)

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(c) A hot air balloon is fixed to the ground on a windless day as shown in the figure below.
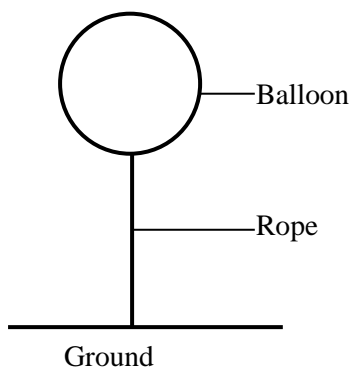
The balloon contains 1600m³ of hot air of density 0.7kg/m³. The mass of the balloon fabric is 400kg and density of surrounding air is 1.3kg/m³. Calculate

(i) weight of hot air in the balloon.   (2 mks)

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(ii) total weight of the balloon   (1 mk)

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(iii) weight of the air displaced   (2 mks)

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(iv) the tension in the rope   (2 mks)

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17. (a) In the study of gas laws what is s.t.p? (1 mk)

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(b) A firm container of volume $300cm^3$ is filled by a gas at a pressure of 2 atmospheres and a temperature of 30^0C. If the gas is cooled to 2.3 atmospheres, calculate its temperature. (3 mks)

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(c) (i) Define the term angular velocity (1 mk)

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(ii) A particle on a wheel is to be released to fly away when the wheel revolves at a rate of 4 revolution per second. If the wheel has a radius of 1.5m, determine the
(I) angular velocity of the wheel. (2 mks)

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(II) the linear speed of the particle when it flies away (2 mks)

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18. (a) (i) A system can be said to be in equilibrium. Explain the meaning of the term 'equilibrium' in this context.
(2 mks)

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(ii) A uniform half metre rod is balanced on a knife edge by a force of 50N placed 10cm from one end as shown in the figure below.
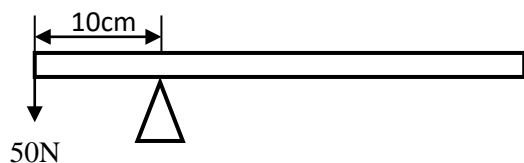
Determine the weight of the rod.   (2 mks)

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(b) (i) A person of mass 60kg walks up 50 stairs each of length 30cm in 150 seconds, calculate the average power of the person.   (3 mks)

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(ii) A horizontal force of 14N is applied on a wooden block of mass 2kg placed on a horizontal surface. It causes the block to accelerate at $6m/s^2$. Determine the frictional force between the block and the surface.
                                                                    (2 mks)

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(c) The radius of the larger wheel of a wheel and axle machine is 12cm and that of the smaller wheel is 4cm. What is the velocity ratio of the machine.   (2 mks)

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