

PETTA COMMUNITY SECONDARY SCHOOL

MIDTERM II EXAMS 2015

S.5 PHYSICS PAPER 1

DATE: July 7th

TIME: 2 HOURS

INSTRUCTIONS;

1. Attempt all the questions



2. Assume where necessary

- Gravitational acceleration $g = 9.81 \text{ Ms}^{-1}$

- Specific heat capacity of water $= 4200 \text{ JKg}^{-1} \text{ K}^{-1}$

- Specific heat capacity of copper $= 400 \text{ JKg}^{-1} \text{ K}^{-1}$

SECTION A

- 1(a)(i) What is meant by scalar and vector quantities? (2)
- (ii) Give three examples of each of the quantities in (a)(i) above. (3)
- (b)(i) What is meant by uniformly accelerated motion? (1)
- (ii) Sketch speed-time and distance-time graphs for a body moving with uniform acceleration. (2)
- (c) A ball is kicked from a spot 30m from the goal posts with a velocity of 20m/s at 30° to the horizontal. The ball just, clears the horizontal bar of the goal posts. Find
- (i) The height of the goal posts (5)
- (ii) The time of flight (4)
- (iii) How far behind the goal posts the ball lands. (3)
- 2 (a) Find the resultant force for the following system of forces. (4)
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- (b) State the conditions for a system of three coplanar forces to be in equilibrium. (2)
- (ii) State Newton's laws of motion. (3)
- (d) The diagram below shows a block X of mass 2kg placed on a rough plane inclined at an angle of 30° to the horizontal. A string which is parallel to the plane and passes over a light smooth pulley connects X to another block Y of mass 3kg.
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- If the coefficient of friction between block X and the inclined plane is 0.3, Find:
- (i) The acceleration of the system. (3)
- (ii) The tension in the string. (2)
- e (i) State the principle of conservation of linear momentum. (1)
- (ii) Show how Newton's laws of motion can be applied to arrive at the principle stated in (3)
- (iii) State two conditions for a collision to be perfectly elastic. (2)

SECTION B:

2. a) i) what is a thermometric property? *1 mark.*
 ii) What qualities make a particular thermometric property suitable for use in a practical thermometer? *2 marks*
 iii) List four thermometric properties which are used in thermometry *2 marks*
- b) i) With reference to an electrical resistance thermometer, outline the Essential steps involved in the setting up of a Celsius temperature scale *3 marks*
 i) What advantages and disadvantages are there in using a platinum resistance thermometer? *3 marks*
- c) i) The temperature θ on a resistance thermometer is given by: $R_{\theta} = R_0(1 + \alpha \theta)$, where α is the temperature coefficient of resistance of the metal of the resistance thermometer.
 The resistance of the thermometer is 3.49... at 40°C and 3.56.... at 50°C. What is α ?
 What is the temperature of a liquid in which the thermometer has a resistance of 3.79....?
4 marks
- 3 a) i) Define specific Heat capacity and give the units in which it is measured *2 marks*
 i) Explain how you would determine the specific Heat Capacity of a piece of copper. State any assumptions and precautions taken. *6 marks*
- b) A metal of mass 500g is heated to 120°C and dropped into 100g of water of 20°C, contained in a copper can of mass 200g and specific Heat capacity 0.43KJkg⁻¹k⁻¹. The final temperature reached by the mixture was 45°C. What is the specific Heat Capacity of the metal? *4marks*
- c) i) The temperature of 0.45kg of water in a calorimeter of Heat capacity 80JK⁻¹ is increased from 288K to 352K in 480S by an electrical heater. Neglecting heat losses, calculate the power of the heater. *3 marks*

