WAMPEEWO NTAKKE SECONDARY SCHOOL
Uganda Certificate of Education
INTERNAL MOCK EXAMINATION
PHYSICS
PAPER TWO (535/2)
DURATION: 2hrs. 15mins

INSTRUCTIONS TO THE CANDIDATES

Attempt any five questions
The following physical quantities may be useful to you
Acceleration due to gravity g   = 10ms^{-2}
Specific latent heat of fusion of ice = 3.36x 10^5 Jkg^{-1}
Speed of sound in air   = 320ms^{-1}
Density of water   = 1000kgm^{-3}
Specific heat capacity of water   = 4200Jkg^{-1}k-^{1}
Specific latent heat of vaporization of steam = $2.26 \times 10^6 \, J \, kg^{-1}$

1a)i)   What is meant by **acceleration due to gravity**?   (01mark)

ii)   Describe an experiment to determine the acceleration due to gravity using a
        pendulum bob, retort stand and a stop clock.   (05 marks)

iii)   Give two reasons and explain why the acceleration due to gravity varies on the
        surface of the earth.   (03marks)

b)   A train travelling at $72 \, km \, h^{-1}$ under goes a uniform retardation $2 \, ms^{-2}$ when
        the brakes are applied. Find the time taken to come to rest and the distance
        travelled from the place the brakes were applied. (04mks)

c)   An object is dropped from a height of $20 \, m$ above the ground with an initial
        velocity of $30 \, ms^{-1}$. Find the time taken for the object to reach the ground.
        (03marks)

2a) Define **power** of a lens.   (01mark)

 b)   Distinguish between a real image and a virtual image   (02marks)

 c)   A converging lens of focal length $20 \, cm$ produces an upright image of an object
        which is magnified 4 times. Find by scale drawing:
        i)   the object distance from the lens.
        ii)   nature of image.   (04marks)

d)   Describe how you would determine the focal length of a thin converging lens with the help of a plane mirror. Illustrate with a ray diagram. (05marks)

e) The diagram below shows a ray of yellow light incident at an angle of 50° on one side of an equilateral triangular glass prism of refractive index 1.52 .
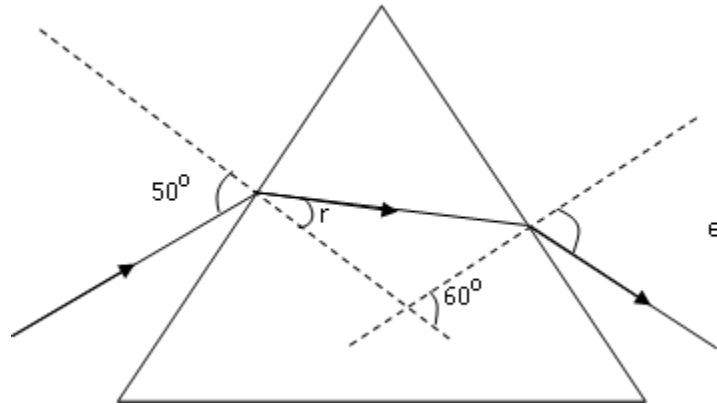
Calculate the angles marked r and e .   (04 marks)

3a) With a clear diagram, explain the mode of operation of a refrigerator. (05maks)
ii) What is meant by latent heat of evaporation   (01mark)

b) The cooling system of a refrigerator extracts $0.7\,kW$ of heat. How long will it take to convert $500g$ of water at 20^oC into ice
(04marks)

c) An electrical kettle rated at $2.25\,kW$ takes $2.5\min$ to raise the temperature of $0.80\,kg$ of water by 80°C. Calculate:
i)   The heat produced by the kettle in this time.   (03marks)
ii)   Heat absorbed by water   (02marks)
iii)   Suggest one reason for the difference in these readings   (01marks)

4a) What is meant by a **Longitudinal wave** and a **Transverse wave**. Give an example each.   (03marks)

b) A vibrator in a ripple tank vibrates at $5\,Hz$. If the distance between 10 successive crests is $37.8\,cm$, calculate,
i)   the wavelength of the wave.   (02marks)
ii)   the velocity of the wave   (03marks)
c) Explain why open pipes are preferred to closed pipes in producing sound.   (02marks)
e) Describe a simple experiment to demonstrate that sound waves require a material for their transmission   (06marks)

5. Define the following terms as used in machines.
      i)   Mechanical advantage
      ii)   Efficiency   (02marks)
b) (i) Give two reasons why machines are never efficiency.   (02marks)
    (ii) How can one improve on the efficiency of a machine?   (02marks)

c)   Describe an experiment to investigate how the efficiency of a

     block and tackle pulley system varies with the load it is used to lift. (04marks)

d) A block and tackle pulley system with a velocity ratio of 5 and 60% efficiency
    is used to lift a load of mass $60\,kg$ through a vertical height of $2\,m$.
      i)   What effort must be exerted?   (02marks)
      ii)   How much work is done in lifting the load?   (02 marks)
      iii)   How much energy is wasted?   (02marks)

6. a) Define the following:
     (i) Moment of a force about a point   (01mark)
     (ii) centre of gravity of a body.   (01mark)
b) i)   State the principle of moments.   (01mark)
    ii) Describe an experiment to determine the mass of a uniform metre
      rule.   (05 marks)
iii)   A uniform beam AB, 4m long and mass 50kg rests horizontally on two
      supports placed 0.5m from A and B respectively. The beam carries a load
      of 75kg at a distance of 1.5m from A. Find the reactions at the supports.
                                      (06 marks)
d) A load of 12 N stretches a spring by 80 mm. Find the weight which
    produces an extension of 60mm on the same spring.   (02 marks)

7 (a) i) State the **law of floatation**   (01mark)
ii) Explain why ships float yet they are made from steel and iron which are
    more dense.   (03marks)
iii) Using a diagram, describe the effect of a shear force on a body.   (02marks)
b) Describe an experiment to measure the density of an irregular solid that
    floats in water   (04 marks)

c) A block of wood of mass $24\,kg$ floats in water and the block has a
    total volume of $0.032\,m^3$. Find:
i) the volume of the block below the surface of water.   (03marks)
ii) the density of the wood.   (03marks)

END