535/2
PHYSICS
PAPER 2
2 ¼ HRS

UCE PRE-REGISTRATION EXAMS 2016

INSTRUCTIONS

- **Attempt any five questions**
- **Mathematical tables, slide rules and silent non-programmable electronic**
- **Calculators may be used.**
- **These values of physical constants may be useful to you.**
- **Acceleration due to gravity = $10ms^{-2}$**
- **Density of water = $1000kgm^{-3}$**
- **Density of air = $1.25kgm^{-3}$**
- **Specific heat capacity of water = $4200Jk^{-1}K^{-1}$**

1. a) State Newton's laws of motion. (3mks)

b)

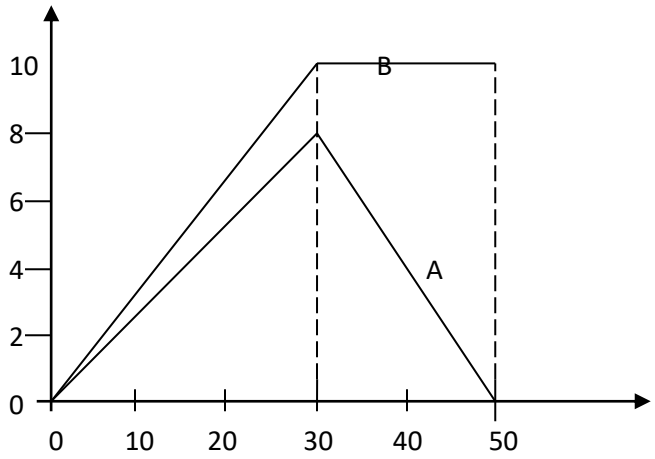

Fig.1

fig.1 above represents variations of velocity with time of two athletes A and B

i) describe the motion of A and B (4mks)

ii) find the distance covered by B in 50s (3mks)

c) an inclined plane of length 8m is used to raise a load of mass 20kg through a vertical height of 2m. if an effort of 80N is used to move the load up the frictionless slope at a constant speed, determine;

i) The work done on the load (2mks)

ii) The work done by the effort (2mks)

iii) The efficiency of the system. (2mks)

2. (a) i) state Archimede's principle. (1mk)
ii) An object weighs 30N in air and 20N when immersed in water. If the same object weighs 22N when immersed in emthylated spirit, find the density of the spirit. (5mks)
b) i) explain why a ship is able to float on water in spite of being made of metal. (3mks)
ii) Describe what happened when air is blown into a ballon and the ballon is released. (3mks)
c) i) Define pressure. (1mk)
ii) The difference between the atmospheric pressure at the top and bottom of a mountain is $1 \times 10^4 Nm^{-2}$. Determine the height of the mountain. (3mks)

3. a) Distinguish between;
i) a real image and a virtual image. (2mks)
ii) a magnified and a diminished image. (2mks)
b) i) with the aid of a diagram show how a converging mirror can form an erect and magnified image. (2mks)
ii) State one application of such a mirror. (1mk)
c) an object is placed at right angles to the principal axis of a converging mirror of focal length 10cm. a real image of height 5cm is formed 30cm from the mirror. By instruction, find;
i) The position of the object (3mks)
ii) The height of the object (1mk)
iii) the magnification (1mk)
d) i) distinguish between secondary and primary colours giving one example of each. (2mks)
ii) Explain the appearance of a red tie with blue spots when observed in red light. (2mks)

4. a) Define each of the following terms as applied to wave motion.
i) Wave front
ii) Amplitude
iii) Frequency
iv) Wave length

b) An FM radio station operates at 100m m band. Calculate

i) The frequency (2mks)

ii) The period (2mkks)

c) a vibrator in a ripple tank vibrates at 5Hz. If the distance between 10successive troughs is 37.8cm, find the

i) Wave length (2mks)

ii) The velocity (2mks)

d) Circular waves are produced from a point source a point source and are propagating towards a concave reflection in a ripple tank at a velocity of $0.5ms^{-1}$. If the wave length of wave is 0.5m

i) Sketch a diagram to show the incident and reflected waves. (2mks)

ii) Determine the frequency of the waves. (2mks)

5. a) define the specific latent heat of vaporization (1mk)

b) A calorimeter of mass 350g and specific heat capacity $840Jkg^{-1}K^{-1}$ contains 143.0g of water at 7^0C. Dry steam of mass 5.6g at 100^0C is bubbled through the water and rises the temperature of water to 29^0C.

Determine:

i) heat gained by the water and the calorimeter. (4mks)

ii) the specific latent heat of vaporization. (3mks)

c) i) state the pressure law. (1mk)

ii) the pressure of a fixed volume of an ideal gas at 24^0C is $1.0 \times 10^5Nm^{-2}$. Determine the pressure of the gas when the temperature is raised to 100^0C. (3mks)

d) Explain each of the following with reference to physical principles involved.

i) When water in a conical flask is heated. The level of the water falls before it rises. (2mks)

ii) When we take water at 0^0C and begin to heat it, the water contracts instead of expanding over a temperature range of 0^0C to 4^0C, above 4^0 C it expands. (2mks)

END