

## S.4 PHYSICS EXERCISE 02

- You are advised to personally do this tutorial first, discuss your results with it anyone, if possible; and then check out the solutions that will follow tomorrow, with **Exercise 03**
- This exercise is marked out of **41**

1. The sensitivity of a thermometer can be increased by
  - A. Increasing the volume of the bulb
  - B. Increasing the amount of liquid in the thermometer
  - C. Decreasing the thickness of the stem wall
  - D. Decreasing the diameter of the bore of the capillary tube
2. In a pinhole camera, sharper and taller images are obtained by
  - A: widening the hole and moving the object farther
  - B: narrowing the hole and moving the object nearer
  - C: using a longer camera with a wider hole
  - D: using shorter camera with a narrower hole
3. Pressure in solids depends on
  - A. Density of the material
  - B. Mass of the solid
  - C. Area of contact
  - D. Mass of the solid
4. Which one of the following statements explains why the weather is warmer on a cloudy night and quite cold on a clear night?
  - A. clouds produce heat
  - B. air pockets in the cloud makes clouds good insulators.
  - C. there is no convection during cloudy nights
  - D. the sky absorbs heat from the ground
5. When potassium dichromate dissolves at the bottom of water container, it spreads slowly throughout water by a process called
  - A. Evaporation
  - B. Capillarity
  - C. Diffusion
  - D. Convection

**SECTION B**

1. (a) Define the following terms

(i) **Work** (01 mark)

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(ii) **Renewable sources** of energy (01 mark)

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(b) Outline the energy changes that take place when a bulb lights from a dry cell. (02marks)

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2. (a) Define the following terms as applied to waves:

(i) **frequency** (01 mark)

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(ii) **amplitude** (01 mark)

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(b) Water waves travel through a distance of **5m** in **0.5** seconds. If the distance between two successive crests is 10 cm, calculate the frequency of the source. (02 marks)

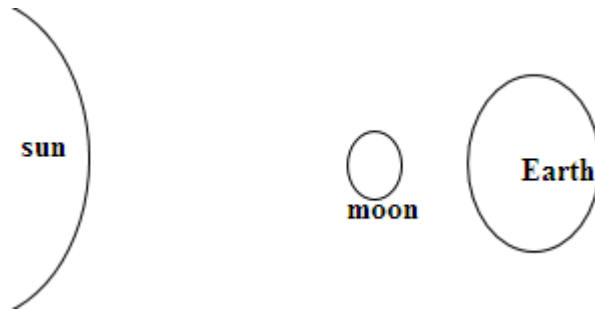
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3. (a) State the laws of **reflection** of light (02 marks)

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(b) The figure below shows celestial event.



(i) Name the event (01 mark)

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(ii) Draw rays to show the event (02 marks)

4. (a) Define the term **convection**. (01 marks)

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(b) Explain why convection occurs faster in gases than liquids at the same temperature

(02 marks)

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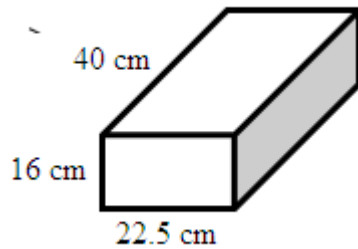
5. (a) Define the term **pressure**.

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(b) The figure below shows a box of mass 25 kg.



Calculate the maximum pressure that can be exerted by the box on a horizontal table.

(03 marks)

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6. (a) Define the term **surface tension**. (01 mark)

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(b) State the effect of the following on the surface tension of water.

(i). **Increasing** temperature (01 mark)

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(ii). **Addition** of more water (01 mark)

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(c) Sketch the effect of dipping a **narrow tube** into a plastic cup containing water.

(01 mark)

7. (a) Distinguish between **scalar** quantities and **vector** quantities. (01 mark)

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(b) Explain what happens to the **density of a liquid** as it is heated. (02 marks)

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(c) Determine the density, in  $\text{kgm}^{-3}$  of **60 g** of a solid that occupies a volume of **15  $\text{cm}^3$**   
(01 mark)

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**8.** (a) What is meant by **background radiation**? (01 mark)

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(b) State any two sources of background radiation. (01 mark)

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(c) A radioactive source  $X$  decays by emission of an  $\alpha$  –particle to produce a new nuclide  ${}_{17}^{34}\text{P}$ . Using a decay equation for  $X$ , describe the composition of  $X$   
(02 marks)

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**9.** (a) What is meant by terminal velocity? (01 mark)

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(b) What happens to the upthrust experienced by a body in a fluid as the fluid is heated?  
(01 marks)

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(c) A hollow metal sphere has a radius of 21 cm. It floats in water such that the water surface is along its equatorial plane. (Half of it submerged). Determine the upthrust on the metal sphere. (Density of water =  $1000 \text{ kgm}^{-3}$ ,  $\pi = \frac{22}{7}$ ).

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(d) What happens to the metal sphere when the water is slightly heated?

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**END**