

Name ..... Adm. No. ....

School .....

Date .....

Sign .....

**PHYSICS**  
October 2016  
Time: 2 Hours

## FORM 2 EXAMINATION

**PHYSICS**  
October 2016  
Time: 2 Hours

### INSTRUCTIONS TO CANDIDATES

- \* Write your name and admission number in the spaces provided above.
- \* Sign and write the date of the examination in the spaces provided above.
- \* Answer **ALL** questions in the spaces provided.
- \* All working must be clearly shown.
- \* Mathematical tables may be used.

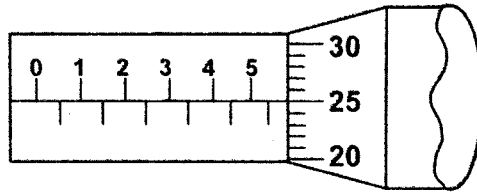
### For Examiner's Use Only

Section	Questions	Maximum score	Candidate's score
A	1 - 21	50	
B	22	10	
	23	10	
	24	10	
	25	10	
	26	10	
<b>Total score</b>		100	

**SECTION A : (50 MARKS)**

Attempt all the questions in this section in the spaces provided.

1. A spherical ball bearing was held between the anvil and the spindle of a micrometer screw gauge, the readings with the ball bearing in position is shown by figure 1 below.



Determine its diameter.

(2 marks)

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2. A bus carrying sitted passengers is more stable than a bus carrying standing passengers. Explain.

(2 marks)

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3. Explain why it is not advisable to use boiling water to sterilize a clinical thermometer.

(2 marks)

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4. A student examined some smoke particles in a smoke cell covered with a thin glass plate under a microscope. The particles were illuminated and observed to move in a random motion. Explain this random motion.

(1 mark)

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5. A glass slab of density  $2.5\text{g/cm}^3$  measures  $20\text{cm} \times 10\text{cm} \times 5\text{cm}$ . Calculate the maximum pressure in  $\text{N/m}^2$ , it can exert on a flat horizontal surface.

(3 marks)

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6. A current of 0.5A flows in a circuit. If the charge that crosses a certain point is 120 coulombs, determine the time in seconds the current flows. (2 marks)

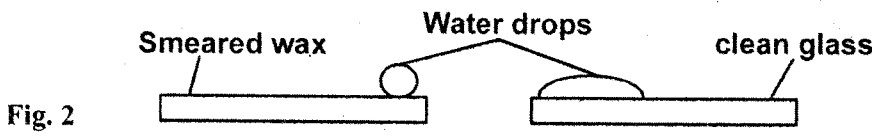
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7. Figure 2 below shows water drops on two surfaces. In (a) below the glass surface is smeared with wax while in (b) the glass surface is clean.



Explain the difference in the shapes of the drops. (2 marks)

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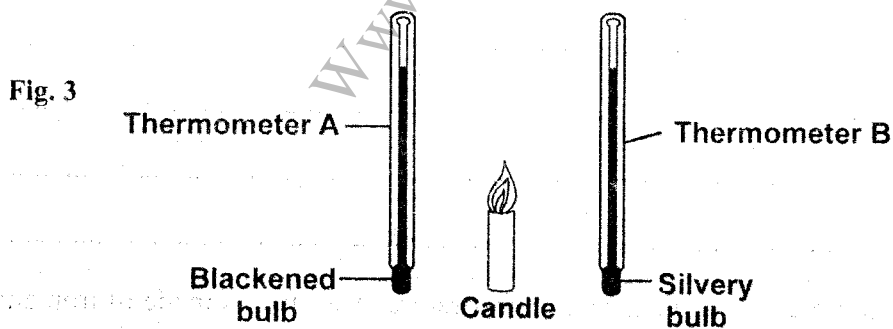
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8. State two defects of a simple cell and explain how each defect can be minimized. (3 marks)

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9. Figure 3 shows the identical thermometers. Thermometer A has a blackened bulb while thermometer B has a silvery bulb. A candle is placed equidistant between the two thermometers.



State with a reason the observation made after sometime.

(2 marks)

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10. Define the term centre of gravity.

(1 mark)

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11. A highly charged negative rod is gradually brought close to the cap of a positively charged electroscope. It is observed that the leaf collapses initially and then diverges. Explain the observation. (2 marks)

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12. One method of producing a weak magnet is to hold a steel rod in the North-South direction and then hammer is continuously for sometime using the domain theory of magnetism, explain how this method works. (3 marks)

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13. Distinguish between electromagnetic waves and mechanical waves. Give an example of each waves. (3 marks)

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14. A cube of ice rests on a bimetallic strip at room temperature. The strip is made of iron and copper as shown in figure 4.

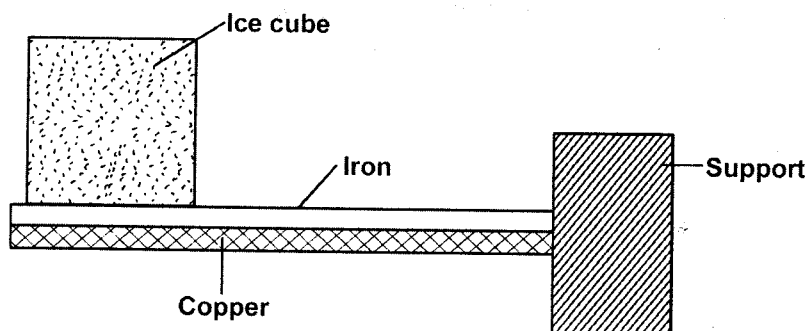


Fig. 4

i) Draw the diagram of the bimetallic strip after sometime. (1 mark)

ii) State and explain what happens to the bimetallic strip. (2 marks)

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15. Figure 5 below shows a U-tube manometer attached to a gas supply. If the atmospheric pressure is 100,000Pa, determine the pressure of the gas supply. (Density of water = 1000kg/m<sup>3</sup>) (3 marks)

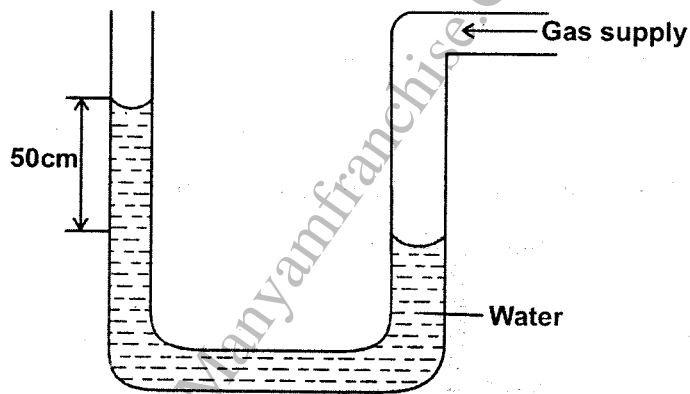


Fig. 5

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16. Ventilations in a house are normally placed high on a wall near the ceiling. Explain. (2 marks)

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17. Figure 6 below shows a uniform metre rule balanced on a pivot.

(3 marks)

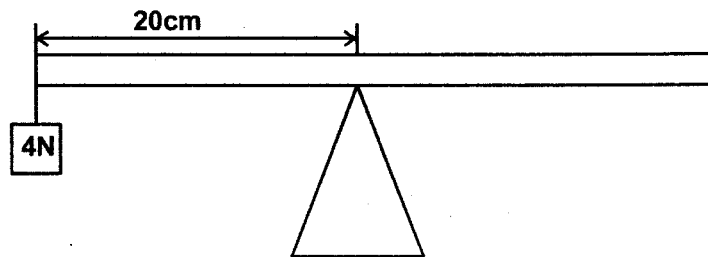


Fig. 6

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18. State two advantages of alkaline accumulator over the lead acid accumulator.

(2 marks)

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19. Figure 7 shows identical springs suspended on rigid support with a weight hanging from the lower ends.

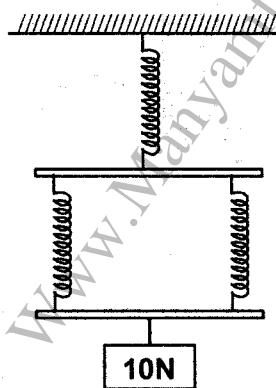


Fig. 7

If the spring constant of each spring is 200N/m. Determine the total extension produced by the 10N weight.

(3 marks)

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20. Water flows with a velocity of 6m/s in a 16cm diameter pipe. The water enters a narrow pipe of diameter 8cm. Calculate the velocity of the water in the narrow pipe. (3 marks)

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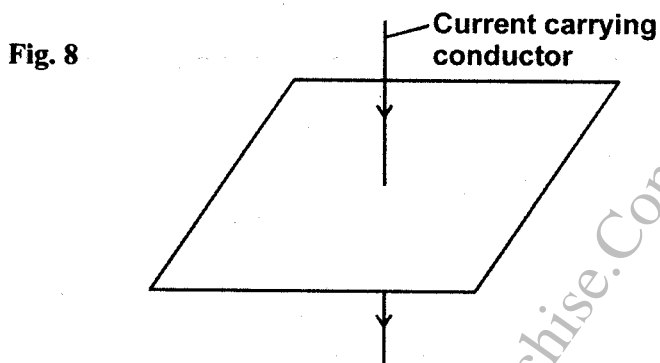
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21. Figure 8 below shows a current carrying conductor.



- i) Draw and indicate the direction of the magnetic field pattern around the conductor. (2 marks)
- ii) State the rule you have used to determine the direction. (1 mark)

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**SECTION B : (50 MARKS)**

**Attempt all the questions in this section in the spaces provided.**

22. a) State the meaning of the following terms are related to waves. (3 marks)
- i) Amplitude

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- ii) Velocity

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- ii) Frequency

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b) Figure 9 below shows a displacement-time graph for a progressive wave.

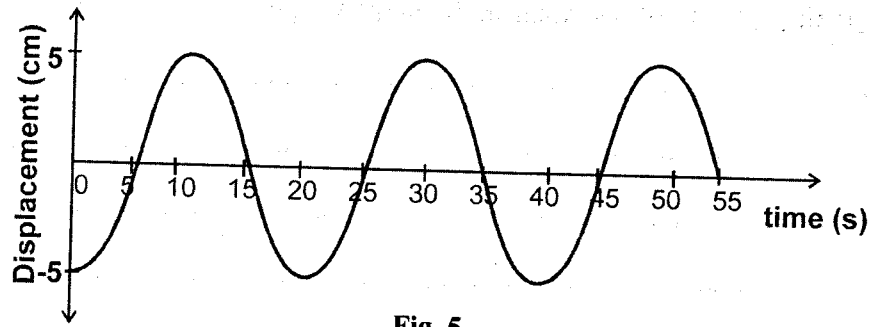


Fig. 5

i) State the amplitude of the wave.

(1 mark)

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ii) Determine the frequency of the wave.

(3 marks)

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iii) Given that the velocity of the wave is 20m/s, determine its wavelength.

(3 marks)

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23. a) In an experiment to determine the thickness of an oil molecule, a drop of oil is allowed onto the surface of still water with lycopodium powder spread over the surface. The oil spreads to form a circular patch.

i) State the two functions of the lycopodium powder.

(2 marks)

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ii) In such an experiment a drop of oil, of volume  $0.012\text{cm}^3$  spread into a patch of diameter 28cm, determine the thickness of the oil molecule in metres. Express your answer in standard form.

(3 marks)

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iii) State two assumptions made in the experiment.

(2 marks)

b) A drop of oil has a diameter of 0.4mm. Calculate the volume of the drop.

(3 marks)

24. a) State the three states of matter.

(3 marks)

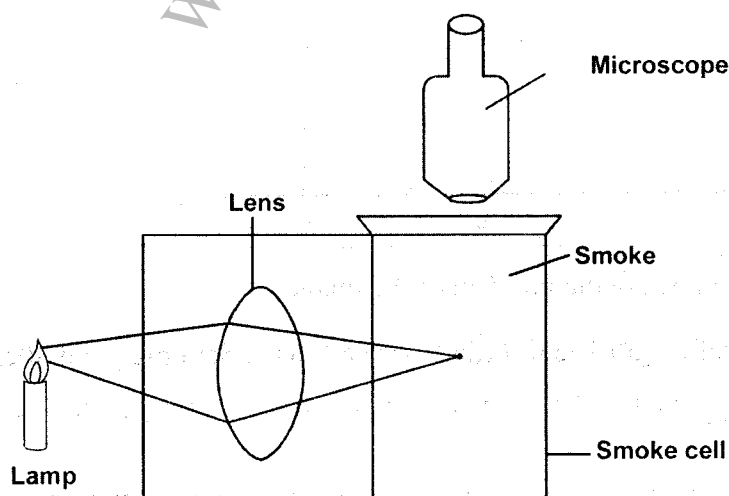
b) i) Define the term diffusion.

(1 mark)

ii) Explain why diffusion is faster in gas than in liquids.

(1 mark)

c) Figure 10 below shows the set up to study the Brownian motion.



i) State the role of the lens.

(1 mark)

ii) Explain the observation made in the smoke cell.

(2 marks)

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iii) State the effect of increasing the temperature of the smoke cell.

(1 mark)

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d) State the kinetic theory of matter.

(1 mark)

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25. a) State the meaning of the following terms as related to the mirrors.

(2 marks)

i) Principal focus

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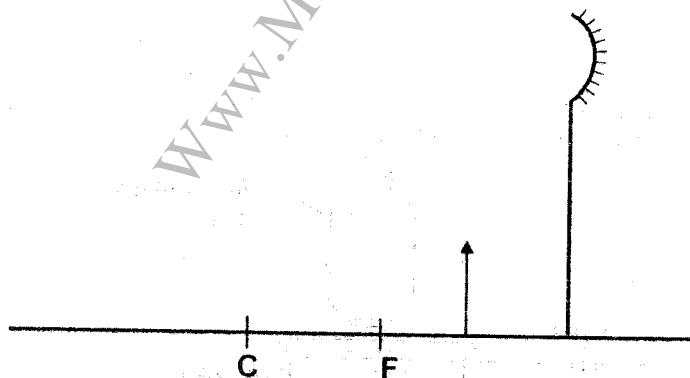
ii) Centre of curvature

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b) Figure 11 shows an object O placed in front of a concave mirror.

Fig. 11



By means of a ray diagram show the position of the image I.

(2 marks)

e) A concave mirror of focal length 10cm forms a virtual image 5cm high and 30cm from the mirror.

Calculate:

i) The position of the object.

(2 marks)

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ii) The height of the object

(2 marks)

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iii) The magnification of the image.

(1 mark)

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d) State one advantage of using a convex mirror as a driving mirror compared to the plane mirror.

(1 mark)

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26. a) i) State what you understand by the term electromagnet.

(1 mark)

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ii) State three factors affecting electromagnet.

(3 marks)

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b) i) Figure 12 shows a wire carrying current whose direction is into the paper. The wire is placed in the magnetic field.

Fig. 12



Indicate on the figure the direction of the force acting on the wire.

(1 mark)

ii) State the effect on the force as a result of increasing the strength of the magnet.

(1 mark)

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c) Distinguish between soft and hard magnetic material.

(2 marks)

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d) State any two applications of electromagnets.

(2 marks)

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