

Name:.....

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PHYSICS

PAPER

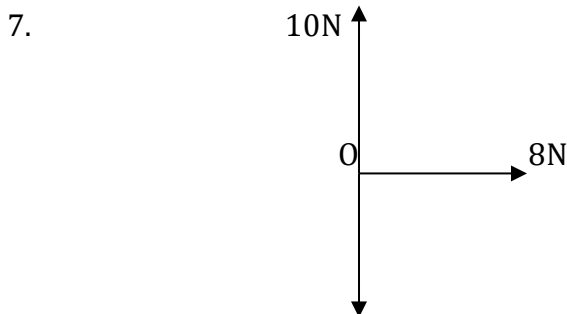
ALL SAINTS S.S HOME LEARNING TEST

INSTRUCTIONS

- Write your name and stream clearly in the spaces above.
- Section A contains 40 objective type questions.
- You are required to write the correct answer A, B, C or D against each question in the box on the right-hand side of each page.
- Section B contains 10 structured questions.
- Acceleration due to gravity = 10 ms^{-2} .

SECTION A

1. The three basic quantities of measurements are
A. mass, frequency and power B. time, density and pressure
C. area, electric current and volume D. length, mass and time.
2. A concave mirror may be used as
i) a magnifying mirror ii) a torch reflector iii) a driving mirror.
A. (i) only B. (i) and (ii) only C. (ii) and (iii) only
D. (i), (ii) and (iii)
3. The force that gives a body of mass 1 kg an acceleration of 1 ms^{-2} is called
A. Weight B. Newton C. Gravity D. Friction
4. Which of the following is a scalar quantity?
A. speed B. Velocity C. Acceleration D. displacement
5. A body of mass 25kg falls freely from a height of 10m to the ground. Calculate its velocity
as it hits the ground
A. 4.47 ms^{-1} B. 10.0 ms^{-1} C. 14.14 ms^{-1} D. 2500 ms^{-1}
6. The size of the image formed in a lens camera can be increased by
i) Increasing the object distance ii) using a lens of shorter focal length
iii) Decreasing the object distance
A. (i) only B. (ii) Only C. (i) and (ii) only D. (ii) and (iii) only



4N

Fig. 2

Forces of 10N, 8N and 4N act on an object, O as shown in Figure 2. Find the Magnitude of the resultant force on O.

- A. 10.0 N B. 16.1 N C. 22.0 N D. 100.0 N

8. Diffuse reflection occurs when

- A. a parallel beam of light is reflected in all directions
B. a parallel beam of light falls on a highly polished surface
C. a parallel beam of light is reflected as a parallel beam
D. the angles of incidence of the rays of the beam are equal to the angles of reflection.

9. The most suitable instrument for measuring the outer diameter of a test tube is

- A. a ruler B. a tape measure
C. vernier calipers D. a micrometer screw gauge

10. Which of the following properties change when is moved from earth to the moon

- A. Mass B. Volume
C. Weight D. density

11. An engine exerts a force of 200N at a speed of 15ms^{-1} . Find the power in KW it develops

- A. 3 B. 30,000 C. 300 D. 3000

12. A ray of light traveling from a dense to a denser medium is,

- A. refracted towards the normal B. refracted away from the normal
C. always reflected back to the same medium
D. always transmitted without being reflected.

13. The principle of conservation of energy states that

- A. energy is the ability to do work.
B. energy is composed of kinetic and potential energy
C. energy will always be converted from one form to another
D. energy cannot be created or destroyed but it can be changed from one form into another.

14. The smell of perfume at one corner of a room reaches another corner by way of

- A. diffusion B. evaporation
C. Brownian motion D. osmosis.

15. A man takes one minute to lift 4 bags of sugar each of weight 50N through a height of 1.5 m. Calculate the power expended.

- A. 1.25W B. 5.0W
C. 75.0W D. 300.0W

16.



Fig. 1

Two forces of 15 N and 35 N acts on a block placed on a smooth table as shown in Figure 2. Find the resultant force on the block.

- A. 20 N B. 50 N

C. 525 N

D. 1000 N

17. The image formed in a plane mirror is

- i) at the same distance behind as the object is in front ii) laterally inverted
iii) magnified and virtual.

- A. (i) and (ii) only B. (i) and (iii) only C. (ii) and (iii) only
D. (i), (ii) and (iii)

18 A load of 500N is placed at 2m from a pivot of a seasaw. At what distance from the pivot should a weight of 250N be placed to balance the seasaw?

- A. 0.5m B. 1.0m
C. 2.0m D. 4.0m

19. It is easier to use a claw hammer to remove a nail from a piece of wood if the handle is longer because the

- A. effort applied becomes bigger
B. turning effect becomes bigger
C. fulcrum is between the effort and the load.
D. anticlockwise moments will balance clockwise moments

20. In the crushing can experiment, the can collapses because

- (i) the can contracts on cooling
(ii) pressure outside is greater than pressure inside
(iii) the steam condenses to produce water and water vapour at high pressure.

- A. (ii) only B. (iii) only C. (ii) and (iii) only D. (i), (ii) and (iii)

21. Light traveling in air is incident on a medium at an angle of 60° . Find the refractive index, if the angle of refraction is 30° .

- A. 0.50 B. 0.58 C. 1.73 D. 2.00

22. Surface tension in a liquid may be weakened by

- A. lowering the temperature C. increasing the amount of liquid
B. adding soap solution D. increasing the density of the liquid

23. In a hydraulic press, the area of the piston on which the effort is applied is made small in order to;

- A. obtain a pressure as large as possible.
B. facilitate the movement of the piston downwards.
C. transmit pressure equally throughout the liquid.
D. transmit a force as large as possible to the load.

24. The principle of conservation of energy states that

- A. energy is the ability to do work.
B. energy is composed of kinetic and potential energy
C. energy will always be converted from one form to another
D. energy cannot be created or destroyed but it can be changed from one form into another.

25. Which of the following properties of a solid would change if it were transported from earth to the moon?

- A. Mass B. Volume C. Weight D. Density

26. A car engine exerts a force of 500 N in moving the car 1000 m in 200 s. What is the power developed by the engine?

- A. 500,000 W B. 1500 W C. 2500 W D. 500 W

27. The efficiency of a machine is expressed as

- A. $\frac{\text{Distance moved by effort}}{\text{Distance moved by load}} \times 100$ B. $\frac{\text{Velocity ratio}}{\text{mechanical advantage}} \times 100$
C. $\frac{\text{Work output}}{\text{Work input}} \times 100$ D. $\frac{\text{Work input}}{\text{Work output}} \times 100$

28. A girl seated near a charcoal stove receives the heat by:

- A. diffraction B. conduction C. convection D. radiation

29. Given that the critical angle of glass is θ , what is the refractive index of glass?

- A. $\frac{\sin \theta}{\sin 90^\circ}$ B. $\frac{\sin \theta}{90}$ C. $\frac{1}{\sin \theta}$ D. $\frac{90}{\theta}$

30. When oil of volume $6 \times 10^{-3} \text{ cm}^3$ is dropped on a clean water surface, it forms a circular patch of one molecule of diameter 2 cm. Find the thickness of oil.

- A. $4.77 \times 10^{-4} \text{ cm}$ B. $14.32 \times 10^{-4} \text{ cm}$ C. $1.91 \times 10^{-3} \text{ cm}$ D. $5.24 \times 10^2 \text{ cm}$

31. A concave mirror can be used as a shaving mirror because when an object is placed between the focus and the pole, the image formed is

- A. magnified, virtual and erect B. magnified, real and inverted
C. diminished, real and inverted D. diminished, virtual and erect.

32. Find the force required to give a mass of 500 g an acceleration of $2 \times 10^{-2} \text{ ms}^{-2}$

- A. $1 \times 10^{-2} \text{ N}$ B. $1 \times 10^1 \text{ N}$ C. $1 \times 10^2 \text{ N}$ D. $1 \times 10^4 \text{ N}$

33. Which of the following statements is false? The pressure in a liquid

- A. at any one point in a liquid would not change even when more liquid is added
B. at any one point depends only on depth and density
C. at any one point acts equally in all directions
D. increases with depth.

34. Water wets glass because

- A. adhesion forces between water and glass molecules are less than cohesion forces
B. adhesion forces between water and glass molecules are more than cohesion forces
C. surface tension forces between water and glass molecules are more than adhesion forces
D. surface tension forces are less than cohesion forces.

35. In Brownian motion experiment, the

- A. smoke particles are seen moving about with uniform velocity
B. motion observed is caused by the air molecules colliding with the smoke particles
C. size of particles are found to increase the motion
D. smoke cell has vacuum within it.

36. Which one of the following groups consists of vectors only?

- A. Momentum, acceleration, work, energy
B. Speed, Velocity, displacement, energy

- C. Displacement, velocity, acceleration, force
- D. Velocity, work, power, momentum.

37. A hippopotamus can easily walk on mud without sinking while a goat will sink because

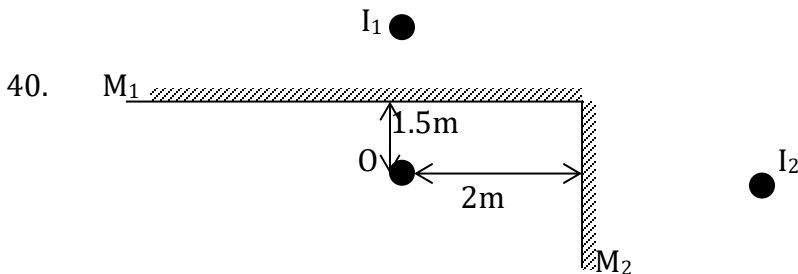
- A. a hippopotamus has more weight than a goat
- B. the center of gravity of the hippopotamus is lower than that of a goat
- C. a hippopotamus exerts more pressure than a goat
- D. a hippopotamus exerts less pressure than a goat

38. Oil sprayed over stagnant water kills mosquito larvae by

- A. covering the water surface and cutting off air supply
- B. increasing the surface tension of water and the larvae sink
- C. reducing the surface tension of water and the larvae sink
- D. reducing the density of water and the larvae sink.

39. The stability of a bus is reduced when a heavy load is placed on its roof rack because

- A. the total weight is increased
- B. the pressure upon the tyres is increased
- C. the maximum speed is reduced
- D. the center of gravity is raised.



The images of an object O placed 1.5m and 2m from plane mirrors M_1 and M_2 respectively are I_1 and I_2 . Find the shortest distance between I_1 and I_2 .

- A. 2.5m
- B. 3.5m
- C. 5.0m
- D. 7.0m

SECTION B

Answer all questions in this Section. All working must be clearly shown in the spaces provided.

41. a) Define work

(1 mark)

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b) A body is raised above the ground and then released. State the subsequent energy changes that occurred.

(2 marks)

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42. a)

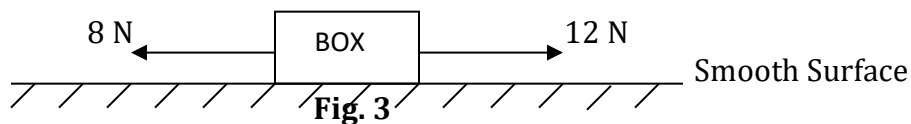


Fig 3

Figure 3 shows a box of mass 2.0 kg on a smooth surface. If forces of 12 N and 8 N act on it, find the acceleration.

(2 marks)

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b) Why does a stone released in space fall? (1 mark)

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43.

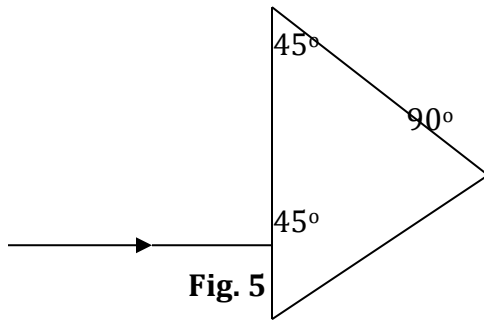


Figure 5 shows a ray of light incident normally on a glass prism in air. The critical angle of the prism is 42° .

- a) Complete the ray diagram to show the path of the light as it emerges from the prism. (1 marks)
- b) Calculate the refractive index of the glass of the prism. (2 marks)

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44. a) What is meant by a light ray? (1 mark)

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b) State two differences between the image formed in a pinhole camera and that formed by a plane mirror. (2 marks)

Pinhole camera	Plane mirror
1.	
2.	

45) i) State the laws of refraction.

(2 marks)

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ii)

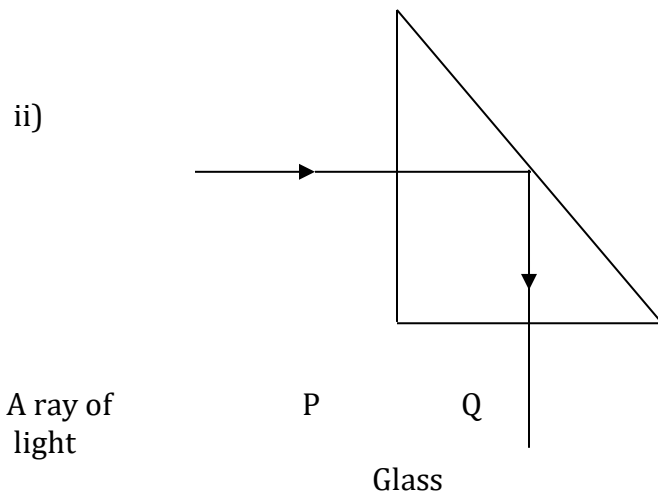


Fig. 6

Figure 6 shows a ray of light incident on a right angled prism of refractive index 1.5. Explain why the ray of light follows the path shown.

(4 marks)

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46. a) What is rectilinear propagation of light?

(1 mark)

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b) An opaque object is placed in front of a source of light. Draw ray diagrams to show the formation of a shadow when

i) A point source is used.

(2 marks)

ii) An extended source is used.

(2 marks)

47. Define the term Efficiency as used in machines.

(1 mark)

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b) i) Give two reasons why machines are never 100% efficiency.

(2 marks)

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ii) How can one improve on the efficiency of a machine?

(1 mark)

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48. i) Define **Pressure** and state the SI units.

(2 marks)

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ii) A rectangular solid block has sides 100cm x 0.6m x 0.5m, and rests on a horizontal flat surface. If the density of the iron is 8000 kg m^{-3} , calculate the minimum pressure which the block can exert on the surface.

(3 marks)

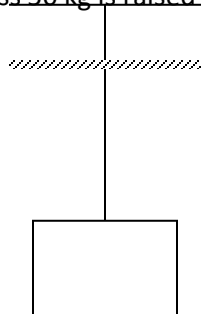
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49. (a) Define the term force.

(1 mark)

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(b) A crate X of mass 50 kg is raised by a rope as shown below.



(i) Mark and name the forces acting on the crate above. (1 mark)

(ii) Mention two effects a force may have on a body (2 marks)

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50. A boy of mass 10 kg climbs a staircase of 4 steps each of height 10 cm in 25 seconds.

Calculate:

(a) the work the boy does. (2 marks)

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(b) the power the boy develops. (2 marks)

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END