

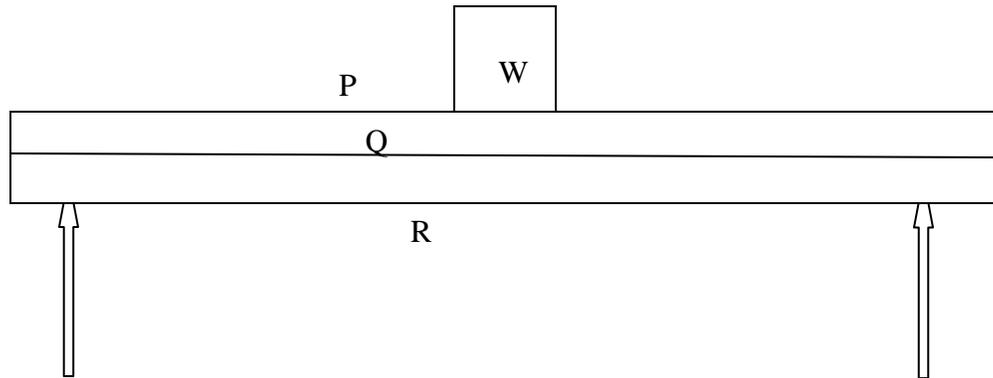
## S.4 PHYSICS P1 HOLIDAY WORK

**Instructions:** Attempt all questions and write answers to Section A in the space below:

1.		11.		21.		31	
2.		12.		22.		32	
3.		13.		23.		33	
4.		14.		24.		34	
5.		15.		25.		35	
6.		16.		26.		36	
7.		17.		27.		37	
8		18.		28.		38	
9.		19.		29.		39	
10.		20.		30.		40	

- Two forces of 5N and 12N act on a body at right angles. Find their resultant.  
A. 7N                      B. 13N                      C. 17N                      D. 169N
- A load of 500N is placed at 2m from a pivot of a sea saw. At what distance from the pivot should a weight of 250 N be placed to balance the sea-saw?  
A. 0.5m                      B. 1.0m                      C. 2.0m                      D. 4.0m
- A girl whose mass is 50 kg runs up a staircase 25m high in 5s. Find the power she develops  
A.  $\frac{50 \times 4W}{25}$                       B.  $\frac{50 \times 10W}{25 \times 4}$                       C.  $\frac{50 \times 25W}{4}$                       D.  $\frac{50 \times 10 \times 25W}{4}$
- In a liquid, pressure is  
A. transmitted in a specific direction                      B. transmitted in all direction  
C. decreased with depth                      D. decreased with density.
- A mass of 0.2 kg produces an extension of 8 cm in a spring. The force required to produce an extension of 6 cm is.  
A. 0.75N                      B. 1.50N                      C. 2.70N                      D. 24.00N
- Brownian motion experiment shows that molecules of gases are  
A. stationary                      B. in motion in one direction only  
C. in constant random motion                      D. more closely packed than molecules in liquids

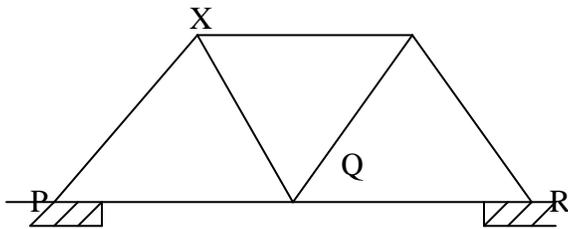
7. A ductile material is that which;  
 A. is fragile  
 B. is not elastic  
 C. can be moulded into any shape  
 D. easily breaks under compression
8. A body of mass  $m$  kg and at height  $h$  m from the ground has  
 A. total gravitational potential energy =  $mh$   
 B. the greatest gravitational potential energy at height  $h$   
 C. the greatest gravitational potential energy when it just drops to the ground  
 D. the least potential energy when at a height  $\frac{1}{2}h$  to the ground.
9. Which of the following can be used to measure the diameter of a bicycle spoke accurately?  
 A. Metre rule  
 B. Vernier caliper  
 C. Tape measure  
 D. Micrometre screw gauge
10. The beam shown below is being acted on by a weight  $W$ .



- The regions P, Q and R are respectively,  
 A. tension compression, neutral axis  
 B. neutral axis, compression, tension  
 C. compression, neutral axis, tension  
 D. tension, neutral axis, compression
11. A pump is rated at  $400W$ . How many kilograms of water can it raise in one hour through a height of  $72m$ ?  
 A.  $0.8$  kg  
 B.  $5.6$  kg  
 C.  $33.3$  kg  
 D.  $2000$  kg.
12. The maximum efficiency that can be obtained with four pulleys and a mechanical advantage of 3 is  
 A.  $100\%$   
 B.  $75\%$   
 C.  $12\%$   
 D.  $1.33\%$
13. When a pin hole camera is moved nearer an object, the size of the image.  
 A. Remains the same  
 B. becomes smaller  
 C. becomes larger  
 D. becomes diminished.

14. Reinforced concrete is stronger than ordinary concrete because concrete and steel are;  
 A. both brittle materials                      B. both ductile materials  
 C. strong in tension and compression respectively.  
 D. Strong in compression and tension respectively.
15. A bullet of mass 0.02 kg is fired with a speed of  $40\text{ms}^{-1}$ . Calculate its Kinetic energy.  
 A. 0.4J                      B. 0.8J                      C. 16J                      D. 32J
16. A bimetallic strip operates on the principle that metals  
 A. are heat controllers                      B. are good heat conductors  
 C. have different rates of expansion                      D. have the same rates of expansion

17.



Which of the girders above are ties?

- A. XQ, QY, PX, YR                      B. PQ, QR, XY                      C. XQ, QY                      D. PX, YR
18. Calculate the effort when a load of 72N is raised using a block system of five pulleys and efficiency 80.  
 A. 11.52N                      B. 18N                      C. 57.6N                      D. 288N
19. Which of the following physical properties changes when a body is moved from the earth to the moon?  
 A. Mass                      B. Volume                      C. Weight                      D. Density
20. 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.
21. If a mercury barometer reads 760 mm of mercury. What is the atmospheric pressure in  $\text{Nm}^{-2}$ ? (density of mercury is  $1.36 \times 10^4 \text{Kgm}^{-3}$ )  
 A.  $1.03 \times 10^4 \text{Nm}^{-2}$                       B.  $1.36 \times 10^4 \text{Nm}^{-2}$                       C.  $1.03 \times 10^5 \text{Nm}^{-2}$

- D.  $1.36 \times 10^5 \text{Nm}^{-2}$
22. A rectangular block of tine is 0.5 m long and 0.01m thick. Calculate the width if it has a mass of 0.365 Kg and density of  $7.3 \times 10^3 \text{Kgm}^{-3}$ .
23. A bullet of mass 150 g is fired with a speed of  $400\text{ms}^{-1}$ . The rifle recoils with a speed of  $10\text{ms}^{-1}$ . Find the mass of the rifle.  
 A. 0.3 kg                      B. 0.6 kg                      C. 3.0 kg                      D. 6.0 kg
24. 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
25. 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.
26. 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.
27. When a liquid is heated  
 A. its density decreases                      B. boiling occurs at all temperatures  
 C. its molecules move with the same speed.  
 D. Evaporation takes place throughout the liquid.
28. Mercury forms spherical drops when spilt on a wooden bench because it  
 A. is very viscous                      B. has a high density  
 C. has a high cohesive force                      D. has a low surface tension.
29. A notch in a material spreads more rapidly when the material is  
 A. in tension                      B. in compression                      C. prestressed                      D. reinforced.
30. The image of a distant object formed by a pin-hole camera is  
 i) real                      ii) diminished                      iii) erect  
 A. (i) only                      B. (i) and (iii)                      C. (i) and (ii)                      D. (i) and (iii)

31. Which of the following is not true about a body moving with a constant velocity?  
A. It's acceleration is zero  
B. It's momentum is constant  
C. It's kinetic energy is constant  
D. There's a resultant force on it.
32. An object 6 cm high is placed 24 cm from a tiny hole in a pin hole camera. If the distance from the hole to the screen is 8 cm, find the size of the image on the screen.  
A. 0.2 cm      B. 2.0 cm      C. 18.0 cm      D. 32.0 cm
33. A concave mirror may be used for all but one of the following:  
A. a magnifying mirror      B. a torch reflector  
C. a dentist's mirror      D. a car driving mirror
34. When does the eclipse of the moon occur?  
A. When the moon is between the sun and the earth.  
B. When the earth is between the sun and the moon.  
C. When the sun is totally eclipsed by the moon  
D. When a bright ring of sunlight shows around the edge of the moon.
35. The sharpness of the image formed by a pin hole camera depends on the  
A. brightness of the object      B. size of the pin hole  
C. shape of the pin hole      D. size of the object
36. 15. Which of the following is a list of primary colours.  
A. Red, magenta, green      B. Green, cyan, red  
C. Yellow, Green, Blue      C. Red, Blue, Green
37. 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.
38. Which of the following are primary colours.  
A. Red, green, yellow  
B. Blue, magenta, yellow  
C. Red, blue, green  
D. Yellow, blue, magenta
39. A pin is placed in front of a convex lens at a distance less than the focal length of the lens. The image formed is  
A: real, inverted, diminished      B: virtual, erect, magnified  
C: real, erect, diminished      D: virtual, inverted, magnified



40. An image 5 cm high is formed by a converging lens. If the magnification is 0.4, find the height of the object.

A: 2.0 cm

B: 4.6 cm

C: 5.4 cm

D: 12.5 cm

### SECTION B

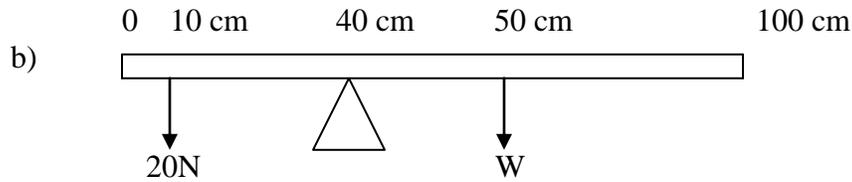
41. a) Define a joule.

(1 m)

b) A boy of mass 45 kg runs up a flight of 60 steps. Each step is 12 cm, find the work done against gravity by the boy. (3 m)

42. a) i) Define moment of a force

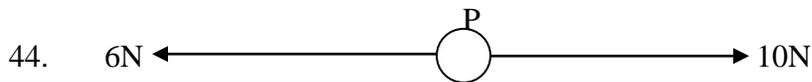
ii) State the principle of moments



A uniform metre rule is pivoted at the 40 cm mark as shown above. Its in equilibrium under its weight and a 20 N force acting at the 10 cm mark. Calculate W.

43. a) What is uniform velocity?

b) A car traveling at  $20 \text{ ms}^{-1}$  is accelerated for 10 s at  $2 \text{ ms}^{-2}$ . Calculate the total distance covered during this time.



Two forces of 6N and 10N act at the same time on a body P of mass 500g as shown above. Find the

i) resultant force on P.

ii) acceleration of P.

45. a) What is rectilinear propagation of light?

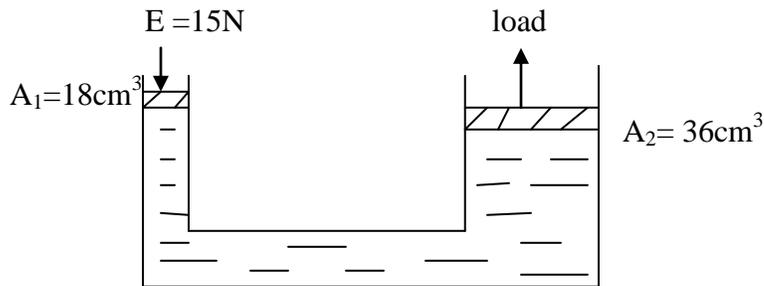
b) An opaque object is placed in front of a source of light. Draw ray diagrams to show the formation of a shadow when

i) a point source is used.

ii) an extended source is used.

46(a) Define pressure and state its S.I unit.

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The figure shows a hydraulic machine. Calculate the load on the big piston which can be lifted by a force of 15N.....

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47(a) Define the term specific latent heat of vaporization (01 mark)

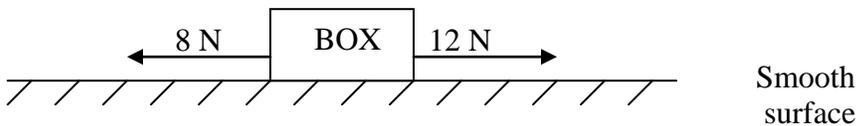
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(b) Calculate the amount heat needed to raise the temperature of 20kg of water from  $0^\circ\text{C}$  to  $100^\circ\text{C}$  given that the s.h.c of water is  $4200\text{Jkg}^{-1}\text{K}^{-1}$ .

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.....(03)

48. 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 acts on it, find the acceleration. (3 marks)

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

49. (a) What is a ductile material? (1 mark)

b) Give two examples of ductile materials.

(1 mark)

b) A load of 12 N stretches a spring by 80 mm. Find the weight which produces an extension of 60mm on the same spring.

(2 marks)

5

50(a) State Newton's third law of motion.

(1mark)

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(b) A ball of mass 0.75 kg rests on the surface of a level bench

(i) Draw a sketch showing the forces acting on the ball.

(1 ½ marks)

(ii) If the ball was raised 1.5m above the surface and then released, what would be its kinetic energy just before hitting the surface?

(1 ½ marks)

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END