

5. Two forces of $\sqrt{6}N$ and $\sqrt{12}N$ act on a body at right angles. Find their resultant.
- A. $\sqrt{18}N$ B. $18N$ C. $\sqrt{180}N$ D. $180N$
6. A bullet of mass 0.1 kg is fired from a rifle of mass 5 kg , the rifle recoils with a velocity of 16 ms^{-1} . Calculate the velocity with which the bullet is fired.
- A. 66 ms^{-1} B. 110 ms^{-1} C. 210 ms^{-1} D. 800 ms^{-1}
7. Capillary rise in a tube dipped in water is due to
- A. surface tension
 B. high vapour pressure
 C. adhesive force being greater than cohesive force
 D. the atmospheric pressure acting on the surface of the water
8. An object of mass 2kg moving at 5 ms^{-1} , collides with another object of mass 3 kg which is at rest. Find the velocity of the two bodies if they stick together after collision.
- A. 1.0 ms^{-1} B. 2 ms^{-1} C. 6 ms^{-1} D. 5.0 ms^{-1}
9. Three of the fundamental physical quantities are
- A. mass, temperature, volume C. length, time and weight
 B. length, time and mass D. mass, time and density
10. A force of 50 N moves an object through a distance of 200 m in 40s . Find the power expended
- A. 100 W B. 160 W C. 200 W D. 250 W
11. Which one of the following is not true about a body moving with a constant velocity?
- A. Its acceleration is zero B. Its momentum is constant
 C. Its kinetic energy is constant D. There is a resultant force on it
12. A uniform metre rule of weight W is pivoted at the 20 cm mark and a load of 60 N is hang at the zero mark. If the ruler balances horizontally find the weight of the ruler.
- A. 24 N B. 40 N C. 70 N D. 100 N
13. A stick with one end immersed in water appears bent at the water surface because of
- A. diffraction B. reflection C. interference D. refraction
14. 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
15. In a pin hole camera, sharper and taller images are obtained by
- A. widening the hole and moving the object further
 - B. narrowing the hole and moving the object nearer
 - C. using a longer camera with a wider hole
 - D. using a shorter camera with a narrower hole
16. An object is placed at a distance of 20 cm from a converging mirror of focal length 15 cm. The type of image formed is
- A. inverted and magnified
 - B. upright and diminished
 - C. inverted and diminished
 - D. upright and magnified
17. A body of mass 20 kg moves with a uniform velocity of 4 ms^{-1} from rest. Find its momentum.
- A. 5 kgms^{-1}
 - B. 80 kgms^{-1}
 - C. 160 kgms^{-1}
 - D. 320 kgms^{-1}
18. Calculate the effort when a load of 72 N is raised using a block system of five pulleys and efficiency
- A. 11.52 N
 - B. 18 N
 - C. 57.6 N
 - D. 288 N
19. Which of the following statement is false?
The pressure in 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 the depth and density
 - C. at any one point acts equally in all directions
 - D. increases with depth
20. A needle may float on a clean water but sinks when some detergent is added to water because the detergent
- A. reduces the density of water
 - B. increase adhesive force between the needle and water molecules
 - C. lower the surface tension of water
 - D. makes water surface slipperly
21. Which of the following belong to the second class of levers in machines?
- A: Pliers
 - B: human arm
 - C: beam balance
 - D: bottle opener.
22. A force of 1 N acts on a mass of 0.05 kg initially at rest. It's acceleration is

- A. 0.05 ms^{-2} B. 0.5 ms^{-2} C. 2 ms^{-2} D. 20 ms^{-2}
23. A tape is pulled through a ticker timer which has a frequency of 50 Hz. If the distance between successive dots is 2 cm, calculate the speed of the body.
A. 0.01 cm s^{-1} B. 50 cm s^{-1} C. 100 cm s^{-1} D. 250 cm s^{-1}
24. Which of the following form mechanical energy?
A. Electrical energy and kinetic energy
B. Potential energy and nuclear energy
C. Nuclear energy and kinetic energy
D. Potential energy and kinetic energy
25. Convert 25 cm^3 into m^3
A. 2.5×10^5 B. 2.5×10^2 C. 2.5×10^{-1} D. 2.5×10^{-5}

SECTION B

26. An object of mass 2 kg is moving with a velocity of 1 ms^{-1} . It is then acted on by a force of 5 N through a distance of 16 m. Calculate:
- a) the acceleration produced by the force

 - b) the final velocity of the object

 - c) the work done by the force
27. a) Define the terms as related to lenses
- i) Principal focus

 - ii) Optical centre.
- b) An object 4 cm high is placed vertically on the principal axis of a converging lens of focal length 10 cm, if the object is 15 cm from the lens.

(i) locate by an accurate ray diagram the position of the image.

(ii) find the magnification

28(a) (i) State the principle of moments.

(ii) State the conditions for a body to be in equilibrium.

b) (i) What is meant by centre of gravity.

(ii) A uniform rod of length 4.0 m is pivoted at 1.0m mark. If the weight of the rod is 120 N find the force F which can be hang at 0m mark for the system to be in equilibrium.

29.(a) When you look vertically down into a pond, the pond appears to be shallower than it really is. Draw a ray diagram to illustrate this phenomenon. Mark clearly the position of the bottom on your diagram and where the bottom appears to be. (02 marks)

(b) A swimming pool whose real depth is 16m appears to be 12m deep. Calculate the refractive index of the water in the swimming pool. (02 marks)

30. a) State what is observed in a smoke cell when studying Brownian motion.

b) Explain what would be observed if the temperature of the smoke cell is reduced.

31. a) Define the term velocity ratio.

b) A wheel and axle machine has efficiency of 45%. If the radii of the wheel and axle are 20 mm and 2 mm respectively, find

(i) Velocity ratio

- (ii) Mechanical advantage

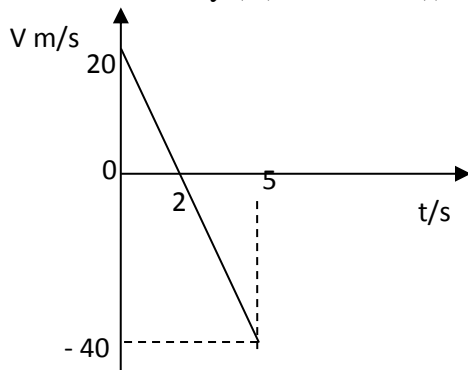
SECTION C

32. (a) Define the following terms as applied to concave mirrors .
- i) Focal length ii) Aperture (2)
 - b)i) With aid of a ray diagram. Explain why a parabolic mirror is preferred to a concave mirror for use in torches. (3)
 - ii) An object is placed 20cm in front of a concave mirror of radius of curvature 30cm. Find the distance of the image from mirror by construction. (4)
 - (c) (i) State the laws of reflection. (2)
 - ii) Give any two properties of images formed by a plane mirror. (1)
 - (d) (i) What is meant by refraction of light? (1)
- (ii) Calculate the angle of incidence for a ray of light passing from air to water if the angle of refraction is 20° and refractive index of water is 1.33. (3)

33. a) Define the following terms as applied to motion

- i) Uniform acceleration ii) Speed (2)

- b) A stone is thrown vertically upwards from a platform x metres high. The graph below shows the variation of velocity (V) with time (t) of the stone.



- (i) What is the maximum height reached? (3)
 - (ii) Find the height x of the platform (2)
- c) i) What is meant by linear momentum (1)

ii) State the law of conservation of linear momentum (1)

d) A dog of mass 8kg chases a bicycle rider at a speed of 20ms^{-1} . The mass of the rider and the bicycle is 48kg and is moving at a speed of 5ms^{-1} . If the dog rams and sticks into the spokes of the bicycle, find their common velocity after, and state the type of the collision involved in this situation. (5)

e) Explain why a person holding a fast moving ball has to pull his hands backward as he catches the ball.

END