Ch.3: FORCE

B. Short/Long Answer Questions -

1. Name the term used for the push or pull.
=> The term used for the push or pull is force.

Q.2. Give one example each of a force as -
(i) a push :- To open a door, we push it.
(ii) as pull :- To move a grass roller on a lawn, it is pulled by a gardener.
(iii) a stretch :- On stretching a spring, it elongates.
(iv) a squeeze :- Change in shape of a sponge on squeezing.

Q.3. Explain the meaning of term force.
=> A force is that cause which changes the state of a body (either the state of rest or the state of motion or the direction of motion) or changes the size or shape of the body.

Q.4. What effect can a force have on a stationary body?
=> When a force is applied on a stationary body, the body begins to move.
e.g. - a car originally at rest when pushed, begins to move.

Q.5. What effects can a force have on a moving body?
=> The following events occur when force is applied to a moving body —

(i) When a force is applied on a moving body in a direction opposite to the direction of motion of the body, the body slows down or stops.

(ii) When a force is applied on a moving body in the direction in which it is moving, the body begins to move faster.

(iii) When a force is applied on a moving body in a direction other than its direction of motion, the direction of motion of the body changes.

Q.6. What effects can a force produce on a body which is not allowed to move ?

=> When a force is applied on a body which is not allowed to move, it gets deformed, i.e., the shape or size of the body changes.

Q.7. Give one example each to indicate that the application of a force

(a) Produces motion — A car originally at rest when pushed, begins to move.

(b) Stops motion — A moving bicycle, bus or train is stopped by applying the brakes.

(c) Slows down motion — The speed of a moving vehicle is slowed down by applying the brakes.

(d) Changes the direction of motion — A player applies force with a hockey stick to change the direction of motion of the ball.

(e) Deforms body — On squeezing a piece of rubber, its shape changes.

Q.8. State the effect produced by a force in the following cases:

(a) The sling of a rubber catapult is stretched — The shape and size of the catapult changes i.e., its length increases.

(b) A man pushes a heavy cart — The heavy cart begins to move.

(c) A player uses his stick to deflect the ball — The direction of the ball changes.

(d) A cyclist applies break — The speed of the moving cycle is slowed down or stops.

(e) A spring is compressed — There is change in size and shape of the spring.

Q.9. Name the two kinds of forces in nature.

=> The two kinds of forces in nature are

(i) Contact force (ii) Non-contact force.

Q.10. Name the type of force which acts in the following cases:

(a) A coolie lifts a luggage — Muscular force.

(b) A bicycle comes to rest slowly when the cyclist stops pedalling — Frictional force.

(c) A stone falls from a roof — Gravitational force.

(d) A comb rubbed with silk attracts bits of paper — Electrostatic force.

(e) A string hangs with a load — Tension force.

(f) A horse moves a cart — Muscular force.

(g) A magnet attracts an iron pin – Magnetic force

(h) A boy opens a door – Muscular force.
(i) An apple falls from a tree – Gravitational force.
(j) A man rows a boat – Muscular force.

Q.11: What do you mean by the gravitational force? Give an example to illustrate it.
=> The force of attraction on a body by earth is called gravitational force.

Ex. – The leaves and fruits fall from a tree downwards towards the ground.

Q.12. Define the term 'weight of a body'.
=> The weight of a body is the force by which earth attracts that body, so the weight of a body is also called its force due to gravity. It is the force of gravity on a body due to which it tends to fall vertically downwards.

Q.13. What do you understand by the term friction?
=> Friction is the force that opposes the relative motion between the two surfaces in contact with each other.

Q.14. Give an example to illustrate the existence of force of friction.
=> If we roll a ball on a plane ground, it moves up to a certain distance and then stops. Since a force can stop a moving body, so we can say that there must be a force acting on the ball which has stop them.

Q.15. What is the cause of friction?
⇒ The cause of friction is the interlocking of the irregular projections on the two surfaces in contact.

Q.16. State two factors which directly affect the force of friction.
⇒. Factors affecting the force of friction:—
(i) The smoothness of the surface :- The force of friction is more between rough surfaces and less between smooth surfaces. There will be no friction between two perfectly smooth surfaces. This is an ideal situation which is not practically possible.

(ii) The weight of the moving body on the surface :- Greater the weight of the moving body on a surface, more is the force of friction on the body by the surface.

Q.17. In which case will there be more friction between the truck and the road : when the truck is empty or when it is loaded ? Explain the reason.
⇒ When the truck is loaded there will be more friction between the truck and the road. Because, greater the weight of the moving body on a surface, more is the force of friction on the body by the surface.

Q.18. Which offers more friction on a body : a glass surface or a wooden surface ? Explain the reason.
⇒ Wooden surface offers more friction on a body. Because, the force of friction is more between rough surface and less between smooth surfaces.

Q.19. Name three kinds of friction.
=> Three kinds of friction —
(i) Static friction (ii) Sliding friction and
(iii) Rolling friction.

Q.20. List three disadvantages of friction.
=> Three disadvantages of friction are —
(i) Friction opposes the motion of a body, so it decreased the efficiency (i.e., more force is needed to move a body).

(ii) Friction causes wear and tear in the moving parts.
(iii) Friction produces heat.

Q.21. When you apply the brakes, the bicycle stops and the rim of the wheel becomes hot. Explain the reason.
=> When the brakes of the bicycle are applied, the bicycle stops due to the opposes motion of the force of friction and the rim of the wheel becomes hot due to friction between the brakes and the rim of the wheel which produces heat.

Q.22. The eraser gets smaller and smaller as you use it more and more. Explain the reason.
=> The eraser gets smaller and smaller as you use it more and more due to frictional force causing wear and tear of the eraser.

Q.23. List three ways of reducing friction.
=> Friction can be reduced by the following three ways ——
(i) By making the surfaces smooth :— The surfaces are made smooth by polishing them. The force of friction is less between smooth surfaces.

(ii) By use of lubricants :— Friction in machines is reduced by lubrication. Oil and grease are the commonly used lubricants.

(iii) By use of the ball bearing :— Rolling friction is much less than the sliding friction. Therefore, in place of wheels and axles, we use ball bearings to reduce friction.

Q.24. It is difficult to open an inkpot with greasy or oily hands. Explain.
=> When the hands are oily, then the oil acts as lubricant and reduce the friction. As frictional force is less, it is difficult to get grip of the inkpot and it becomes difficult to open it.

Q.25. It is difficult to walk on a wet road. Explain.
=> When the road becomes wet after rain, friction is reduced and hence, the road becomes slippery. & it is difficult to walk.

Q.26. Give three examples to illustrate that friction is a necessary evil.
=> (i) It is due to friction that we can write on a board by a chalk.

(ii) Friction is necessary to burn a matchstick.
(iii) Friction causes wear and tear in the moving parts and produces heat.

Q.27. Define —
(i) Static friction — The maximum force exerted by a surface on a body so long as it remains stationary is called the force of static friction.

(ii) Sliding friction — The minimum force required to keep the body moving over a surface such that it moves equal distance in equal intervals of time is called the force of sliding friction.

(iii) Rolling friction — The minimum force required to roll a body on a surface is called the force of rolling friction.

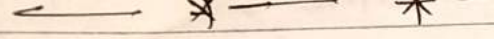
Q.28. Arrange the following in descending orders of magnitude : (i) static friction (ii) sliding friction (iii) rolling friction.
⇒ Static friction > sliding friction > rolling friction.

Q.29. A body needs a force F_1 just to start motion on a surface, a force F_2 to continue its motion and a force F_3 to roll on the surface. What is (i) the static friction (ii) sliding friction and (iii) rolling friction? State whether F_2 is equal, less than or greater than (i) F_1 and (ii) F_3.

⇒ F_1 = Static friction ; F_2 = Sliding friction and F_3 = Rolling friction.
Sliding friction is less than static friction and greater than rolling friction.

∴ F_2 is less than F_1 but greater than F_3.

$(F_1 > F_2 > F_3)$



Ch.3: FORCE (VI - PHYSICS)

(INSIDE QUESTIONS)

Saathi

Date ___/___/_____

Q.1. Define / Differentiate —

i) State of rest.
ii) State of motion.
iii) Balanced force.
iv) Unbalanced force.
v) Contact force.
vi) Non-contact force.

Q.2. Write the principle on which a spring balance works.

Q.3. State the S.I. unit of force.
How is it related to (i) kgf and (ii) gf.

Q.4. Magnitude of non-contact force depends on which factor.

Q.5. Explain three ways of increasing friction.

Q.6. How gravitational force is different from electrostatic and magnetic force.

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