

## Chapter 3 - Force and Pressure

### A. Objective Questions

#### 1. Write true or false for each statement

(a) The S.I. unit of force is kgf.

**Solution:** False.

(b) A force always produces both the linear and turning motions.

**Solution:** False.

(c) Moment of force = force  $\times$  perpendicular distance of force - from the pivoted point.

**Solution:** True.

(d) Less force is needed when applied at a farther distance from the pivoted point.

**Solution:** True.

(e) For a given thrust, pressure is more on a surface of large j area.

**Solution:** False.

(f) The pressure on a surface increases with an increase in the thrust on the surface.

**Solution:** True.

(g) A man exerts same pressure on the ground whether he is standing or he is lying.

**Solution:** False.

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(h) It is easier to hammer a blunt nail into a piece of wood than a sharply pointed nail.

**Solution:** False.

(i) The S.I. unit of pressure is pascal.

**Solution:** True.

(j) Water in a lake exerts pressure only at its bottom.

**Solution:** False.

(k) A liquid exerts pressure in all directions.

**Solution:** True.

(l) Gases exert pressure in all directions.

**Solution:** True.

(m) The atmospheric pressure is nearly  $10^5$  Pa.

**Solution:** True.

(n) Higher we go, greater is the air pressure.

**Solution:** False.

## 2. Fill in the blanks

(a)  $1 \text{ kgf} = \underline{10 \text{ N}}$  (nearly)

(b) Moment of force = force  $\times$  distance of force from the point of turning

(c) In a door, handle is provided farthest from the hinges.



- (d) The unit of thrust is **newton**.
- (e) Thrust is the **normal** force acting on a surface.
- (f) Pressure is the thrust acting on a surface of **unit** area.
- (g) The unit of pressure is **pascal**
- (h) Pressure is reduced if **area of surface** increases.
- (i) Pressure in a liquid **increases** with the depth.
- (j) The atmospheric pressure on earth surface is nearly  **$10^5$  Pa**.

3. Match the following:

**Column A**

**Column B**

- |                          |                               |
|--------------------------|-------------------------------|
| (a) Camel                | (i) broad and deep foundation |
| (b) Truck                | (ii) broad feet               |
| (c) Knife                | (iii) six or eight tyres      |
| (d) High building        | (iv) sharp cutting edge       |
| (e) Thrust               | (v) atm                       |
| (f) Moment of force      | (vi) N                        |
| (g) Atmospheric pressure | (vii) N m                     |

**Solution:**

**Column A**

**Column B**

- |                     |                               |
|---------------------|-------------------------------|
| (a) Camel           | (ii) broad feet               |
| (b) Truck           | (iii) six or eight tyres      |
| (c) Knife           | (iv) sharp cutting edge       |
| (d) High building   | (i) broad and deep foundation |
| (e) Thrust          | (v) N                         |
| (f) Moment of force | (vii) N m                     |

(g) Atmospheric pressure (v) atm

4. Select the correct alternative:

(a) SI. unit of moment of force is

1. N
2. N cm
3. kgfm
4. N m

**Solution:** 4. N m

(b) To obtain a given moment of force for turning a body, the force needed can be decreased by

1. applying the force at the pivoted point
2. applying the force very close to the pivoted point
3. applying the force farthest from the pivoted point
4. none of the above

**Solution:** 3. applying the force farthest from the pivoted point

(c) The unit of thrust is

1. kgf
2. kg
3. g
4.  $\text{ms}^{-1}$

**Solution:** 1. kgf

(d) The unit of pressure is

1.  $N \times m$
2. kgf
3.  $Nm^{-2}$
4.  $kgf\ m^2$

**Solution:** 3.  $Nm^{-2}$

(e) The pressure and thrust are related as

1. Pressure = Thrust
2. Pressure = Thrust x Area
3. Pressure = Thrust/Area
4. Pressure = Area/Thrust

**Solution:** 3. Pressure = Thrust/Area

(f) A body weighing 5 kgf, placed on a surface of area  $0.1\ m^2$  exerts a thrust on the surface equal to

1. 50 kgf
2. 5 kgf
3.  $50\ kgf\ m^{-2}$
4.  $5\ kgf\ m^{-2}$

**Solution:** 3.  $50\ kgf\ m^{-2}$

(g) The feet of lizards act like

1. moving pads
2. drilling pads
3. suction pads
4. none of the above

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**Solution:** 3. suction pads

(h) Pressure exerted by a liquid is due to its

1. weight
2. mass
3. volume
4. area

**Solution:** 1. weight

(i) Pressure inside a liquid increases with:

1. increase in depth
2. decrease in depth
3. decrease in density
4. none of the above

**Solution:** 1. increase in depth

(j) The atmospheric pressure at sea level is nearly

1. 10 Pa
2. 100,000 Pa
3. 100 Pa
4. 10,000 Pa

**Solution:** 2. 100,000 Pa

(k) Nose bleeding may occur at a high altitude because

1. the atmospheric pressure decreases



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2. the oxygen content of atmosphere decreases
  3. the atmospheric pressure increases
  4. there are strong air currents at the high altitude

**Solution:** 1. the atmospheric pressure decreases



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