Force and Pressure

Marks: 40 **Time: 1 hr**

1. Choose the correct option 1×10=10

a. To reduce the pressure on a surface

Thrust should be increased	The area on which thrust acts should be increased.
The area on which the thrust acts should be decreased	The surface should be oiled

b. 1 atm =

101315 Pa	101325 Pa.
101335 Pa	101345 Pa

c. The moment of a force around a pivot is 50m. If the applied force is 20 N, how far is the pivot from the point where the force is applied?

2.5 m	2500 cm
250 cm	Both 1st and 3rd options.

d. Atmospheric pressure is measured using a

Hydrometer	Lactometer
Barometer.	Manometer

e. The standard unit of pressure is

Pascal.	Newton
Joule	Kilogram

f. The pressure exerted by liquid increased with

i. Increases in depth
ii. Decrease in depth
iii. Increase in density
iv. Decrease in density

i and ii	ii and iii
iii and iv	i and iii.

g. Liquid pressure is measured by using

Barometer	Hydrometer
Manometer.	lactometer

h. As we climb up a mountain, the atmospheric pressure

Increase	Decrease.
No change	Increase then decrease

i. What is the pressure exerted on a table by a1L water bottle with a base diameter of 7 cm? (1 Kgf = 10N)

2297.4 Pa	2597.4 Pa.
2897.5 Pa	2597.1 Pa

j. At sea level, the height of the mercury column in a barometer is

100 cm	76 cm.
90 cm	50 cm

2. Define the following 1 ½ ×4=6
   a. Moment of Force
   b. Newton
   c. Kilogram Force
   d. Force
3. Short answer type question 1×4=4
   a. What is Translatory Motion?
   b. What is pressure? Name the standard unit of pressure.
   c. What does the moment of a force depend on?
   d. State two factors that affect liquid pressure.
4. Long answer type question 2×5=10
   a. Why are caterpillar tracks fixed to bulldozers?
   b. Why nose bleeding is happening at high altitude?
   c. What is the relationship between the unit newton and kilogram- force?
   d. How do thrust and the area on which a force is applied affect pressure?
   e. Why liquid suck through straw when a straw is put into liquid.

5. Numerical Problems 2×5=10

a. A horse weighing 450 kg, with a hoof area of 40 cm (for one hoof), is standing next to an elephant weighing 4000 kg, with a foot area of 1250 cm (for one foot). Which of them exerts greater pressure on the ground (Assume 1 Kgf= 10 N)
b. A ballet dancer whose weight is 60 kg performs a move on one foot during which she applies a pressure of 1,500,000 Pa on the ground. Is she likely to be standing with her foot flat on the ground, or is she on tiptoe? (Assume 1 kgt= 10 N.)
c. The moment of force generated when a wheel is spun around its axis by pushing its rim is 50 Nm. If the wheel is 200 cm in diameter, what is the force applied on it?
d. The floor of an elevator is capable of withstanding a total pressure of 32,000 Pa. Suppose the total area of the feet of those standing in the elevator is 1500 cm?. What is the maximum total weight of people the elevator can carry?
e. Two identical cuboidal boxes of dimensions 10 cm x 5 cm x 2 cm and mass 10 kg are placed on wet soil. Box A is placed on the 10 cm x 5 cm side while box B is placed on the 5 cm x 2 cm side.
   i) Which box will exert greater pressure on the soil?
   ii) Which box will leave a deeper impression in the wet soil?