

विध्न विचारत भीरु जन, नहीं आरम्भे काम,
विपति देख छोड़े तुरंत मध्यम मन कर श्याम।
पुरुष सिंह संकल्प कर, सहते विपति अनेक,
'बना' न छोड़े ध्येय को, रघुबर राखे टेक।।

रचित: मानव धर्म प्रणेता

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PROPERTIES OF MATTER

Some questions (Assertion–Reason type) are given below. Each question contains STATEMENT – 1 (Assertion) and STATEMENT – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct. So select the correct choice :

Choices are :

- (A) Statement – 1 is True, Statement – 2 is True; Statement – 2 is a correct explanation for Statement – 1.
(B) Statement – 1 is True, Statement – 2 is True; Statement – 2 is **NOT** a correct explanation for Statement – 1.
(C) Statement – 1 is True, Statement – 2 is False.
(D) Statement – 1 is False, Statement – 2 is True.

237. **STATEMENT – 1**

Acceleration of particles is not the only effect of an applied force. There is another quite different effect. Bodies get deformed under the application of a force.

STATEMENT – 2

Deformation is nothing but a consequence of different accelerations of different particles of a body.

238. **STATEMENT – 1**

Leaves and small insects float on the surface of water buoyed up by Archimedes's principle.

STATEMENT – 2

They are not partially submerged. The objects are kept afloat by surface tension.

239. **STATEMENT – 1**

Weight of a empty balloon measured in air is w_1 . If air at atmospheric pressure is filled inside balloon and again weight of balloon is measured. Weight of balloon is w_2 in second case. Then w_2 is equal to w_1 .

STATEMENT – 2

Upthrust is equal to weight of the fluid displaced by the body.

240. **STATEMENT – 1**

When height of tube is less than liquid rise in the capillary tube, the liquid does not overflow.

STATEMENT – 2

Product of radius of meniscus and height of liquid in capillary tube always remains constant.

241. **STATEMENT – 1**

The water rises higher in a capillary tube of small diameter than in the capillary tube of large diameter.

STATEMENT – 2

Height through which liquid rises in a capillary tube is inversely proportional to the diameter of the capillary tube.

242. **STATEMENT – 1**

The angle of contact of a liquid decreases with increase in temperature.

STATEMENT – 2

With increase in temperature, the surface tension of liquid increases.

243. **STATEMENT – 1** : The stretching of a coil is determined by its shear modulus.
STATEMENT – 2 : Shear modulus change only shape of a body keeping its dimensions unchanged.
244. **STATEMENT – 1** : Strain is a unit-less quantity.
STATEMENT – 2 : Strain is equivalent to force.

Hint & Solution

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|----------|----------|----------|----------|
| 237. (B) | 238. (D) | 239. (A) | 240. (A) |
| 241. (A) | 242. (C) | 243. (A) | 244. (C) |

237. When we apply a force on a body, varying forces act over different particles resetting in different accelerations and hence different displacements of particles. This causes the body to get deformed.
238. In this case the object is completely on the surface of water and floats because of surface tension.
240. $h = \frac{2T}{Rdg} \Rightarrow hR = \frac{2T}{Rdg} \therefore hR = \text{constant}$
Hence when the tube is of insufficient length, radius of curvature of the liquid meniscus increases.
241. The height of capillary tube rise is inversely proportional to radius (or diameter) of capillary tube i.e. $h \propto \frac{1}{r}$, so far smaller 'r' the value of h is higher.
242. With increase in temperature surface tension of the liquid decreases and angle of contact also decreases.
243. Because the stretching of coil simply changes its shape without any change in the length of the wire used in coil. Due to which shear modulus of elasticity is involved.
244. Strain is the ratio of change in dimensions of the body to the original dimensions. Because this is a ratio, therefore it is a dimensionless quantity.