OBJECTIVE I

1. When Nells Bohar shook hand with Werner Heisenberg, what kind of force they exerted ?

(a) Gravitational (b*) Electromagnetic (c) Nuclear (d) Weak

Sol. B

Electromagnetic force.

2. Let E,G and N represents the magnitude of electromagnetic, gravitional and nuclear forces between two electrons at a given separation . Then

(a) $N < E < G$ (b) $E > N > G$ (c) $G > N > E$ (d*) $E > G > N$

Sol. D

Electromagnetic force > Gravitational force > Nuclear force

3. The sum of all electromagnetic forces between different particles of a system of charged particles is zero.

(a) Only if all the particles are positively charged.

(b) Only if all the particles are negatively charged.

(c) Only if half the particles are positively charged and half are negatively charged.

(d*) irrespective of the signs of the charges.

Sol. D

Force is a vector quantity is also depend upon direction.

4. A 60 kg man pushes a 40 kg man by a force of 60 N. The 40 kg man has pushed the other man with a force.

(a) 40N (b) 0 (c*) 60N (d) 20N

Sol. Due to action reaction pair they will be equal in magnitude.

OBJECTIVE II

1. A neutron exerts a force on a proton which is

(a*) gravitional (b) electromagnetic (c*) nuclear (d) weak

Sol. AC

Neutron is an uncharged particle. Neutron not exerts electromagnetic force on a proton. Only exerts gravitational and nuclear force on a proton.

2. A proton exerts a force on a proton which is

(a*) gravitional (b*) electromagnetic (c*) nuclear (d) weak

Sol. ABC

Proton is a charges particle, it can exerts gravitational, electromagnetic & nuclear force on a proton.

3. Mark the correct statements :

(a) The nuclear force between two protons is always greater than the electromagnetic force between them.

(b*) The electromagnetic force between two protons is always greater than the gravitional force between them.

(c*) The gravitional force between two protons may be greater than the nuclear force between them.

(d*) The electromagnetic force between two protons may be greater than the nuclear force acting between them.

Sol. BCD

Nuclear force is much stranger than the coulomb force when distance between the two particles is less than 10^{-14} m.

So we can say gravitational force & electromagnetic force between two protons may be greater than the nuclear force acting between them.

4. If all matter were made of electrically neutral particles such as neutrons,

(a*) there would be no force of friction. (b*) there would be no tension in the string

(c*) it would not be possible to sit on a chair (d) the earth could not move around the sun.

Sol. ABC

Earth move around the sun due to Gravitational force.

5. Which of the following systems may be adequately described by classical physics ?

(a*) motion of a cricket ball (b*) motin of a dust particle

(c) a hydrogen ato (d) a neutron changing to a proton.

Sol. AB

In the classical physics described the Newton's Laws of Motion, Newton's Law of gravitation, Maxwell's electromagnetism, Laws of thermodynamics and the Lorentz force.

The formulation of classical physics is quite accurate for heavenly bodies like the sun, the earth, the moon etc.

For particle much smaller than 10^{-6} m (such as atoms, nuclei etc.) these rules do not work well.

6. The two ends of a spring are displaced along the length of the spring. All displacement have equal magnitudes. In which case or cases the tention or compression in the spring will have a maximum magnitude ?

(a*) the right end is displaced toward right and the left end towards left.

(b) both ends are displaced towards right.

(c) both ends are displaced towards left.

(d*) the right end is displaced towards left and the left end towards right.

Sol. AD

In case of tension (expansion)

Þ The right end is displaced towards right and the left end towards left.

In case of compression

Þ The right end is displaced towards left and the left end towards right.

7. Action and reaction

(a*) act on two different objects (b*) have equal magnitude

(c*) have opposite directions (d*) have resultant zero.

Sol. ABCD