विघ्न 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।।

रचितः मानव धर्म प्रणेता
सद्गुरु श्री रणछोड़दासजी महाराज

UNITS, DIMENSIONS AND ERRORS

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.

1. **STATEMENT – 1**
In products and divisions, the number of significant figures in the final result should equal the factor with the least number of significant figures.

STATEMENT – 2
This ensures that the result of computation is not stated to unwarranted precision.

2. **STATEMENT – 1**
When an algebraic equation has been derived, it is advisable to check it for dimensional consistency.

STATEMENT – 2
This guarantees that the equation is correct.

3. **STATEMENT – 1**
Dimensions of pressure and energy density are same.

STATEMENT – 2
Both have same units in S. I. System.

4. **STATEMENT – 1**
4300 m has two significant figures.

STATEMENT – 2
Trailing zero in a digit with decimal is significant therefore 4.300 have four significant figure.

5. **STATEMENT – 1**
Product of 2.78 and 0.9996 is divided by 1.527. The result having 3 significant figures.

STATEMENT – 2
2.78 has least number of significant figures i.e., 3.

6. **STATEMENT – 1**
eV and Joule are the SI units of energy used in modern physics and mechanics respectively.

STATEMENT – 2
Different types of energies require different units in SI.

7. **STATEMENT – 1**
Pressure can be subtracted from pressure gradient.

STATEMENT – 2
Only like quantities can be added or subtracted from each other.

8. **STATEMENT – 1**
If the equation y = x + t, can not be true where x,y are distance and t is time.

STATEMENT – 2
Quantities with different dimensions cannot be added.

Hint & SOLUTION

1.	(A)	2.	(C)	3.	(A)	4.	(B)
5.	(A)	6.	(C)	7.	(C)	8.	(C)

2 Checking dimensional consistency does not guarantee the correctness of an equation for it ignores all dimensionless entities such as numbers.

3. $P = \frac{f}{A} = \frac{kg\,m/s^2}{m^2} = Kg\ m^{-1}\ s^{-2}$ $\frac{Energy}{Volume} = \frac{Joule}{m^3} = \frac{Kgm^2s^{-2}}{m^3} = kg\ m^{-1}\ s^{-2}.$

4. In 4.300 both trailing zero is significant.

5. Here 2.78 has least number of significant figures i.e., 3.
$\therefore$ after rounding off, the result is 1.82.

6. In SI every type of energy has one unit i.e., Joule (J).

7. In SI every type of energy has one unit i.e., Joule (J).