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Questions:

Assertion and reason

1. Assertion: Rate of flow of a liquid represents velocity of flow.
Reason: The dimensions of rate of flow are $[M^0L^1T^{-1}]$.
Codes:
A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
C) If assertion is true but reason is false.
D) If the assertion and reason both are false.
E) If assertion is false but reason is true.

2. Assertion: Density is a derived physical quantity.
Reason: Density cannot be derived from the fundamental physical quantities.
Codes:
A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
C) If assertion is true but reason is false.
D) If the assertion and reason both are false.
E) If assertion is false but reason is true.

3. Assertion: Radar is used to detect an aeroplane in the sky
Reason: Radar works on the principle of reflection of waves.
Codes:
A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
C) If assertion is true but reason is false.
D) If the assertion and reason both are false.
E) If assertion is false but reason is true.

4. Assertion: L/R and CR both have same dimensions.
Reason: L/R and CR both have dimension of time.
Codes:
A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
C) If assertion is true but reason is false.
D) If the assertion and reason both are false.
E) If assertion is false but reason is true.

5. Assertion : Parallax method cannot be used for measuring distances of stars more than 100 light years away.
Reason : Because parallax angle reduces so much that it cannot be measured accurately.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

6. Assertion : The number of significant figures depends on the least count of measuring instrument.
Reason : Significant figures define the accuracy of measuring instrument.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

7. Assertion : Absolute error may be negative or positive.
Reason : Absolute error is the difference between the real value and the measured value of a physical quantity.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

8. Assertion : Avogadro's number is the number of atoms in one gram mole.
Reason : Avogadro's number is a dimensionless constant.
Codes:
(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.

9. Assertion: The unit used for measuring nuclear cross-section is 'barn'.
Reason: 1 barn 10^{-14} m^2.
Codes:
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false and R is also false.

10. Assertion: Force cannot be added to pressure.
Reason: The dimensions of force and pressure are different.
Codes:
a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c) If Assertion is true but Reason is false.
d) If both Assertion and Reason are false.

Multiple Choice Question

11. If n is the numerical value and u is the unit of physical quantity ρ, then _____.
(a) ρ = mu (b) ρ = mu (c) ρ = mu (d) ρ = mu

12. Out of the following derived quantity is _____.
(a) Time (b) Mass (c) Velocity (d) Length

13. Which of the following is not a unit of time.
(a) Solar year (b) Tropical year (c) Leap year (d) Light year

14. The percentage error in radius of a sphere is 2 percent. The percentage errors in surface area and volume of sphere are respectively.
(a) 4% and 3% (b) 4% and 3% (c) 4% and 3% (d) 4% and 3%

15. atch List-I with List-II and select the correct answer by using the codes given below:

List-I (Item)	List-II (Units of length)
A. Distance between earth and stars	1. Microns
B. Interatomic distance In solid	2. Angstroms
C. Size of nucleus	3. Lightyear
D. Wavelength of infrared Laser	4. Kilometer

(a)

A	B	C	D
5	4	2	1

(b)

A	B	C	D
3	2	4	1

(c)

A	B	C	D
5	3	4	2

(d)

A	B	C	D
4	5	3	1

16. The SI units of magnetic field is _____.
(a) weber per metre^2 (b) newton per coulomb per (metre per second) (c) newton per ampere per metre (d) all the above

17. The dimensions of entropy are _____.
(a) $M^0L^{-1}T^0K$ (b) $M^0L^{-2}T^0K^2$ (c) $MLT^{-2}K$ (d) $ML^2T^{-2}K^{-1}$

18. The surface area of a solid cylinder of radius 2.0 cm and height A cm is equal to 1.5 x 10^4 $(mm)^2$, Here, A refers to _____.
(a) 0.9 cm (b) 10 cm (c) 30 cm (d) 15 cm

19. Young's modulus of steel is 1.9 x 10^{11} N / m^2. When expressed in CGSunits of dyne / cm^2, it will be equal to ($1N = 10^5$ dyne, $1 m^2 = 10^4 cm^2$)
(a) 1.9 x 10^{10} (b) 1.9 x 10^{11} (c) 1.9 x 10^{12} (d) 1.9 x 10^{13}

20. Among the given following units which one is not unit of length?
(a) Angstrom (b) Fermi (c) Barn (d) Parsec

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21. A device which is used for measurement of length to an accuracy of about 10^{-4}m, is _____.
(a) screw gauge (b) spherometer (c) Vernier callipers (d) Either (a) or (b)

22. The ratio of the volume of the atom to the volume of the nucleus is of the order of _____.
(a) 10^{15} (b) 10^{25} (c) 10^{20} (d) 10^{10}

23. The mean length of an object is 5 cm. Which of the following measurements is most accurate?
(a) 4.9 cm (b) 4.805 cm (c) 5.25 cm (d) 5.4 cm

24. N divisions on the main scale of a vernier callipers coincide with (N + 1) divisions on the vernier scale. If each division on the main scale is of a unit, determine the least count of instrument.
(a) $\frac{a}{(N+1)}$ (b) $\frac{3a}{4(N+1)}$ (c) $\frac{a}{(N+1)^2}$ (d) $\left(\frac{a}{N+1}\right)^2$

25. We measure the period of oscillation of a simple pendulum. In successive measurements, the readings turn out to be 2.63 s, 2.56 s and 2.42 s. Calculate the mean absolute error.
(a) 0.076 s (b) 0.42 s (c) 0.92 s (d) 0.10 s

26. Equivalent resistance of two resistors R_1 = 100 ± 3Ω and R_2 = 200 ± 4 Ω in series is _____.
(a) (250 ± 7) Ω (b) (320 ± 6) Ω (c) (300 ± 7) Ω (d) (300 ± 1)- Ω

27. Which of the following sets have different dimensions?
(a) Dipole moment, Electric field and Electric flux (b) Pressure, Young's modulus, Stress (c) Heat, Work, Energy (d) Emf, Potential difference and potential.

28. Obtain the dimensional equation for universal gas constant _____.
(a) $[ML^2T^{-2}mol^{-1}K^{-1}]$ (b) $[\mathrm{ML^3\,T^{-1}\,mol^{-2}\,K^{-2}}]$ (c) $[\mathrm{M^2LT^{-1}\,mol^{-1}\,K^{-1}}]$ (d) $[\mathrm{M^3LT^{-2}\,mol^{-1}\,K^{-2}}]$

29. In the formula x = $3yz^2$, x and z have dimensions of capacitance and magnetic induction, respectively. The dimensions of y in MKS system are _____.
(a) $[M^{-2}L^{-2}T^4A^4]$ (b) $[\mathrm{M^{-3}\,L^{-3}\,T^4\,A^5}]$ (c) $[M^{-3}L^{-2}T^8A^4]$ (d) $[\mathrm{M^{-1}\,L^{-4}\,T^2\,A^4}]$

30. The dimensional formula of Avagadro's number is _____.
(a) $[\mathrm{M^1\,L^1\,T^1}]$ (b) $[\mathrm{mole^{-1}}]$ (c) [mole] (d) $[\mathrm{M^0\,L^1\,T^0}]$

31. Which of the following is not a dimensional constant?
(a) Gravitational constant (b) π (c) Planck's constant (d) Gas constant (R)

32. . On checking the dimensional consistency of equation, it is based on the principle of _____.
(a) homogeneity of equations (b) homogeneity of dimensions (c) homogeneity of expressions (d) homogeneity of formula

33. Find the value of 12.9 g- 7.05 g.
(a) 5.84 g (b) 5.8 g (c) 5.86 g (d) 5.9 g

34. The velocity v of a particle is given in terms of time t is $v = at + \frac{b}{t+c}$ The dimensions of a, b, c are _____.
(a) L^2 ; TLT^{-2} (b) LT^2 ; LT; L (c) lT^{-2} ; L; T (d) L; LT; T^2

35. Which of the following sets cannot enter into the list of fundamental quantities in any system of units?
(a) Length, time and velocity (b) Length, mass and velocity (c) Mass, time and velocity (d) Length, time and mass.

36. The unit of charge is: _____.

(a) Ampere (b) Coulomb (c) Ampere/sec (d) Ampere-second

37. The pairs of physical quantities that have the same dimensions are: _____.

(a) Reynolds number and coefficient of friction (b) Latent heat and gravitational potential (c) Curie and frequency of light wave (d) Planck's constant and torque.

38. Photon is quantum of radiation with energy E = hv where v is frequency and h is Planck's constant. The dimensions of h are the same as that of _____.

(a) Linear impulse (b) Angular impulse (c) Linear momentum (d) Angular momentum

39. Which of the following ratios expresses pressure?

(a) Force/Area (b) Energy/ Density (c) Energy/ Area (d) Force/Volume

40. Which of the following are not a unit of time?

(a) Second (b) Parsec (c) Year (d) Light year

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