C 11 - UNIT I – PHYSICAL WORLD AND MEASUREMENT - SRT 2

1. Match the following:

Column I		Column II	
A	J.C. Bose	P	Inelastic scattering of light by molecules
B	C.V. Raman	Q	Quantum statistics
C	M.N. Saha	R	Ultra short radio waves
D	S.N. Bose	S	Thermal ionization

(1) A – Q , B – P, C – S , D - R

(2) A – R , B – P, C – S , D - Q

(3) A – P , B - Q , C – R , D – S

(4) A – R , B – P , C – Q , D – S

2. Match the following:

Column I		Column II	
A	Electron microscope	P	Detection of cosmic radio waves
B	Giant Meter wave Radio Telescope	Q	Magnetic confinement of plasma
C	Fusion test reactor	R	Population inversion.
D	LASER	S	Wave nature of electrons

(1) A – R , B – S , C – P, D - Q

(2) A – S , B – R, C – Q , D - P

(3) A – S , B – R , C – P , D - Q

(4) A–S, B – P, C – Q , D – R

3. Which of the following statements is correct?

(1) Aero plane is based on Newton's laws of motion and Steam engine on Bernoulli's theorem.

(2) Hydroelectric power is based on law of thermodynamics and rocket propulsion on Bernoulli's theorem.

(3) Computers are based on digital logic of electronic circuits, while electric generator on Faraday's laws of electromagnetic induction.

(4) Nuclear reactor is based on law of thermodynamics and SONAR on optical interference.

4. Arrange the following basic forces in the increasing order of relative strength

a. Gravitational force
b. Electromagnetic force
c. Weak nuclear force
d. Strong nuclear force

(1) a, b, c, d (2) a, c ,b, d (3) d ,c, b, a (4) d, a, b, c

5. The solid angle subtended by the periphery of an area 1cm^2 at a point situated symmetrically at a distance of 5 cm from the area is____

(1) 2 x 10^{-2} sterdian (2) 4 x 10^{-2} sterdian

(3) 6 x 10^{-2} sterdian (4) 8 x 10^{-2} sterdian

6. If 'h' is planks constant and 'I' is moment of inertia then the dimensions of $\frac{h}{I}$ are same as those of ____

(1) frequency (2) velocity (3) angular momentum (4) time

7. The position of a particle at time t is given by the relation, $x(t) = \left(\frac{v_0}{\alpha}\right)(1 - e^{-\alpha t})$, where v_0 is a constant and $\alpha > 0$. The dimensions of v_0 and α are respectively___

(1) $M^0L^1T^{-1}$ and T^{-1} (2) $M^0L^1T^0$ and T^{-1}
(3) $M^0L^1T^{-1}$ and LT^{-2} (4) $M^0L^1T^{-1}$ and T

8. The dimensional formula for molar thermal capacity is same as that of_____

(1) gas constant (2) Stefan's constant

(3) Boltzmann constant (4) specific heat

9. Assertion: Dimensional constants are the quantities whose values are constant.

Reason: Dimensional constants are dimensionless

(1) If both assertion and reason ore true and the reason is the correct explanation of the assertion.

(2) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(3) If assertion is true but reason is false.

(4) If the assertion and reason both are false.

10. Statement- 1 : Velocity gradient has the dimensions of frequency.
Statement- 2 : Velocity gradient is rate of change of velocity with displacement.

(A) Statement-1 is true, Statement-2 is true and Statement-2 is correct explanation of Statement-1.
(B) Statement-1 is true, Statement-2 is true but Statement-2 is not correct explanation of Statement-1.
(C) Statement-1 is true, but Statement-2 is false.
(D) Statement-1 is false, but Statement-2 is true.

(1) A (2) B (3) C (4) D

11. A quantity X is given by $\in_0 \mathbf{L}\frac{\Delta \mathbf{V}}{\Delta \mathbf{t}}$ where $\in_0$ is the permittivity of free space, L is a length, $\Delta \mathbf{V}$ is potential difference and $\Delta \mathbf{t}$ is time interval. The dimensional formula for X is the same as that of____

(1) resistance (2) charge (3) voltage (4) current

12. Which of the following represents the unit volt ?

(1) joule $(\text{second})^{-1}$ (2) watt $(\text{ampere})^{-1}$
(3) watt $(\text{coulomb})^{-1}$ (4) coulomb $(\text{joule})^{-1}$

13. If C and L denote capacitance and inductance respectively, then the dimensions of LC are____

(1) $\mathrm{M^0L^0T^0}$ (2) $\mathrm{M^0L^0T^2}$ (3) $\mathrm{M^2L^0T^2}$ (4) $\mathrm{MLT^2}$

14. According to Joule's law of heating, heat produced in a current carrying resistor is given by the equation $\mathbf{H = I^2Rt}$, where Iis current, R is resistance and t

is time. If the errors in the measurement of I, R and t are 3%, 4% and 6% respectively then error in the measurement of H is___

(1) + 17% (2) $\pm$16% (3) $\pm$ 19% (4) $\pm$ 25%

15. A physical quantity 'a' can be determined by measuring the parameters b, c, d and e using the relation $\mathbf{a = \frac{b^{\alpha}c^{\beta}}{d^{\gamma}e^{\delta}}}$. If the maximum errors in the measurement of b, c, d and e are $\mathbf{b_1\%}$, $\mathbf{c_1\%}$, $\mathbf{d_1\%}$ and $\mathbf{e_1\%}$ then the maximum error in the value of 'a' determined by an experiment is _____

(1) $(b_1 + c_1 + d_1 + e_1)$ % (2) $(b_1 + c_1 - d_1 - e_1)$ %

(3) $(\alpha b_1 + \beta c_1 - \gamma d_1 - \delta e_1)$% (4) $(\alpha b_1 + \beta c_1 + \gamma d_1 + \delta e_1)$%

16. The respective number of significant figures for the numbers 6.320, 6.032, 0.0006032 are___

(1) 3, 4, 8 (2) 4, 4, 8 (3) 4, 4, 4 (4) 4, 3, 4

17. If L = 2.331 cm, B = 2.1cm, then with due regard to significant figures the value of L + B =_____

(1) 4.431cm (2) 4.43 cm (3) 4.4 cm (4) 4cm

18. Two rods with lengths 12.321cm and 10.3 cm are placed side by side. The difference in their lengths is____

(1) 2.02 cm (2) 2.0 cm (3) 2 cm (4) 2.025 cm

19. The mass of a body is measured as 2.00 x 10^3Kg. Its significant figures are___

(1) 6 (2) 3 (3) 1 (4) 2

20. The circular scale of a screw gauge has 200 divisions. When it is given 4 complete rotations, it moves through 2mm. The least count of screw gauge is_____

(1) 0.25×10^{-2}cm (2) 0.25×10^{-3}cm

(3) 0.001cm (4) 0.001mm

21. Who invented the cyclotron?

(1) James Chadwick (2) James Clerk Maxwell

(3) Michael Faraday (4) Ernest Orlando Lawrence

22. electron volt is a unit of

(1) Charge (2) Potential difference

(3) Momentum (4) Energy

23. If ϵ_0 is permittivity of free space and E is electric field, then the dimensions of $\frac{1}{2}\epsilon_0 E^2$ are____

(1) MLT^1 (2) ML^2T^{-2} (3) $ML^{-1}T^{-2}$ (4) ML^2T^{-1}

24. If μ_0 and ε_0 denote the permeability and permittivity of free space, the dimensions of $\mu_0\,\varepsilon_0$ are_____

(1) LT^{-1} (2) $L^{-2}T^2$ (3) $M^{-1}L^{-3}Q^2T^2$ (4) $M^{-1}L^{-3}I^2T^2$

25. In an experiment the percentage error in the measurement of current is 4% and in the measurement of voltage is 2%. The percentage error in the measurement of power will be ____

(1) 4 (2) 8 (3) 2 (4) 6