Swotters Academy

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Test / Exam Name: Ch1 - Units And Measurement **Standard: 11th Science** **Subject: Physics**

Student Name: ..... **Section:** ..... **Roll No.:** .....

Questions: 27 | **Time: 01:45 hh:mm** | **Marks: 50**

Instructions

1. Make sure to write in the point formation. You handwriting should be neat and clean
2. New section on new page
3. Honesty is the best policy.

SECTION-A

Q1. Which of the following are not a unit of time? **1 Mark**

A Second. **B** Parsec. **C** Year. **D** Light year.

Q2. The physical quantities not having same dimensions are: **1 Mark**

A Momentum and Planck's constant. **B** Speed and $(\mu_0 \in_0)^{\frac{-1}{2}}$

C Speed and $\sqrt{\frac{p}{\rho}}$ **D** Surface tension and spring constant.

Q3. If momentum (P), area (A) and time (T) are taken to be fundamental quantities, then energy has the dimensional formula: **1 Mark**

A $(\mathrm{P^1A^{-1}T^1})$. **B** $(\mathrm{P^2A^1T^1})$.

C $(\mathrm{P^1A^{\frac{-1}{2}}T^1})$. **D** $(\mathrm{P^1A^{\frac{1}{2}}T^{-1}})$.

Q4. A dimensionless quantity: **1 Mark**

A May have a unit. **B** Never has a unit. **C** Always has a unit. **D** Doesn't exist.

Q5. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. **1 Mark**

Assertion: Out of two measurements l = 0 7. m and l = 0 70. m, the second one is more accurate.

Reason: In every measurement, the last digit is not accurately know.

A (a) Both A and R are true and R is the correct explanation of A. **B** (b) Both A and R are true but R is not the correct explanation of A.

C (c) A is true but R is false. **D** (d) A is false and R is also false.

Q6. The apparent shift in the position of an object with respect to another when one shift his eye sidewise is known as _____. **1 Mark**

Q7. Fill in the blanks by suitable conversions: **1 Mark**

1 kg m^2s^{-2} = _____g cm^2s^{-2}.

Q8. Fill in the blanks by suitable conversion of units: **1 Mark**

1kg m^2 s^{-2} = ...g cm^2 s^{-2}

Q9. The pairs of physical quantities that have the same dimensions are: **1 Mark**

Q10. Pressure is defined as: **1 Mark**

Q11. Which of the following set have different dimensions? **1 Mark**

Q12. Given that the value of G in the CGS system as 6.67 × 10^{-8} dyne cm^2g^{-2}, find the value in MKS system. **1 Mark**

Q13. Which of these is largest : astronomical unit, light year and par sec? **1 Mark**

Q14. What does SONAR stand for? **1 Mark**

Q15. Name four units used in the measurement of extremely short distances. **1 Mark**

SECTION-B

Q16. Is nuclear mass density dependent on the mass number? $(\mathrm{Given: r = r_0A^{\frac{1}{3}}})$ **2 Marks**

Q17. If x = a + bt + ct^2, where x is in metre and t in second, what are the units of a, b and c? **2 Marks**

Q18. Why parallax method cannot be used for measuring distances of stars more than 100 light years away? **2 Marks**

Q19. Rule out or accept the following formulae for kinetic energy on the basis of dimensional arguments: **2 Marks**

1. $\frac{3}{16}\mathrm{mv^2}$
2. $\frac{1}{2}\mathrm{mv^2 + ma}$

Q20. Answer the following: **2 Marks**

The mean diameter of a thin brass rod is to be measured by vernier callipers. Why is a set of 100 measurements of the diameter expected to yield a more reliable estimate than a set of 5 measurements only?

Q21. Write the dimensional formula for the following: **3 Marks**

1. Wein's constant.
2. Planck's constant.
3. Specific heat.
4. Latent heat.
5. Rydberg's constant.

Q22. It is known that the period T of a magnet of magnetic moment M vibrating in a uniform magnetic field of intensity H depends upon M, H and I where I is the moment of inertia of the magnet about its axis of oscillations. **3 Marks**

Show that T = $2\pi\sqrt{\frac{I}{MH}}$.

Q23. What is meant by parallax? How can we find the distance of a nearby star by parallax method? **3 Marks**

OR

Given measurement a_1, a_2, a_3 _____ a_n. With the help of these, explain absolute error, relative error and percent -age error.

Q24. State the principle of homogeneity of dimensions. Test the dimensional homogeneity of the following equation: **3 Marks**

$\mathrm{h = h_0 + v_0t + \frac{1}{2}gt^2}$.

SECTION-C

Q25. Why length, mass and time are chosen as base quantities in mechanics? **4 Marks**

Q26. Briefly explain how you will estimate the molecular diameter of oleic acid. **4 Marks**

Q27. If instead of mass, length and time as fundamental quantities, we choose velocity, acceleration and force as fundamental quantities and express their dimensions by V, A and F respectively, show that the dimensions of Young's modulus can be expressed as [FA^2 V^{-4}]. **5 Marks**