



INDIAN SCHOOL SOHAR
UNIT TEST 2017-18

CLASS XI

DATE: 21.05.17

PHYSICS

Maximum Marks: 50

Time allowed: 2 hours

General Instructions:

- I. All questions are compulsory. There are 19 questions in all.
- II. This question paper has **five** sections: Section A, Section B, Section C, Section D and Section E.
- III. Section A contains **four** questions of **one** mark each, Section B contains **four** questions of **two** marks each, Section C contains **eight** questions of **three** marks each, Section D contains **one** value based question of **four** marks and Section E contains **two** questions of **five** marks each.
- IV. There is no overall choice. However, an internal choice has been provided in **one** question of **two** marks, **one** question of **three** marks and all the **two** questions of **five** marks weightage. You have to attempt only **one** of the choices in such questions.

Section – A

1. Name two Indian born physicists who have been awarded Nobel Prize in Physics? 1
2. State the number of significant figures in the following:
 - a. 0.0700m^2 b. 3.303Nm^2 . 1
3. Name two domains of physical world? 1
4. State two conservation laws from nature? 1

Section – B

5. What do you mean by accuracy and precision in a measurement? Explain with suitable examples. 2

OR

What is the order and order of magnitude in the charge and mass of the electron?

6. A potential difference of $V = (100 + 2)$ volt to a resistance R gives a current $I = (10 + 0.5)$ A. Find percentage error in R if $R = V/I$. 2
7. The parallax angle of planet on two places of earth is 20 seconds. If the two places are situated diametrically on the equator, find the distance of the planet from the earth. The radius of the earth is 6400km. 2
8. Consider the equation $\frac{1}{2}mv^2 = mgh$, where m is the mass of the body, v its velocity, g is the acceleration due to gravity and h is the height. Check whether this equation is dimensionally correct. 2

Section – C

9. 8.34g of a substance occupies 1.8 cm^3 . Determine its density and relative density and express them to correct significant figures. 3

10. (a) A unit of length is chosen such that the speed of light in vacuum is unity. What is the distance between the Sun and the Earth in terms of new unit if light takes 8min and 20 s to cover this distance?
 (b) The nearest star to our solar system is 4.29 light years away. How much is this distance in terms of parsec. (1 parsec = $3.08 \times 10^{16} m$) 3
11. If heat dissipated in a resistance can be determined from the relation: $H = I^2 R t$ joule. If the maximum error in the measurement of current, resistance and time are 2%, 1% and 1% respectively, what would be the maximum error in the dissipated heat? 3
12. a) Name any three physical quantities having the same dimensions and also give their dimensions.
 b) If $X = a + bt^2$, where X is in meter and t is in second. Find the unit of a and b? 3
13. In Van der Waals equation $(P + a/V^2)(V - b) = RT$, Determine the dimensions of a and b. 3
14. Deduce the dimensional formulae for the following physical quantities.
 (A) Gravitational constant.
 (B) Power
 (C) Stress
 (D) Surface tension. 3
15. A physical quantity X is given by $X = A^2 B^3 / C \sqrt{D}$, If the percentage errors of measurement in A, B, C and D are 4%, 2%, 3% and 1% respectively, then calculate the % error in X.

OR

Define Least Count of a measuring instrument. What is Least Count error? How least count is related the precision of the measurement. 3

16. Match the correct one from each column

A	B	C
1. Edwin Hubble	a. Relativity	i. Nuclear reactor
2. Albert Einstein	b. Uncertainty principle	ii Polonium
3. Marie.S.Curie	c. Expanding Universe	iii Weak and e.m Force
4. Enrico Fermi	d. Unification of forces	iv Photoelectric Effect
5. W.Heisenberg	e. controlled fission	v Telescope
6. Abdus salam	f. Natural Radioactivity	vi Quantum Mechanics

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Section – D

17. (a) A small hair piece has fallen into the eye of Suresh. It caused itching sensation in the eye of Suresh seeing that Hari, who is a friend of Suresh, took him to the eye specialist. The Doctor removed it. Suresh expressed his gratitude to Hari. Comment upon the values of Hari.
 (b) A student measure the thickness of a human hair by looking at it through a microscope of magnification 100. He makes 20 observations and finds that the average width of the hair in the field of view of the microscope is 3.5mm. What is the estimate on the thickness of hair? 4

Section – E

18. (a) Explain:
 (i) Absolute error (iii) Mean absolute error
 (ii) Relative error (iv) percentage error.
 (b) The length of a rod measured in an experiment was found to be 2.48m, 2.46, 2.50m and 2.48m and 2.49m, find the average length, the absolute error in each observation and % error.

OR

Name the four basic forces in nature. Write a brief note of each; hence compare their strengths and ranges.

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19. State homogeneity principle. What do you mean by dimensional equation? The velocity v of water waves may depend on their wavelength λ ; the density of water ρ and the acceleration due to gravity g . find the relation between these quantities by the method of dimensions. What are the limitations of dimensional analysis?

OR

Explain the terms:

- (a) (i) displacement (ii) Average velocity
(iii) Instantaneous velocity (iv) average speed.
- (b) Draw position – time graph for uniform motion and how do find out average velocity from x-t graph for non uniform motion
- (c) A body can have zero average velocity but not zero average speed. Comment.

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