K17U 2551

Reg. No. : ....

Name : ....

I Semester B.Sc. Degree (CBCSS.-Reg./Supple./Improv.) Examination,
November 2017
Core Course in Physics
(2014 Admn. Onwards)
1B01 PHY : PHYSICS PRIMERS

Time : 3 Hours

Max. Marks : 40

Instruction : Write answers in **English** only.

SECTION – A

Answer **all**. Very short answer type. **Each** question carries **one** mark. (1×4=4)

1. A wave which requires a medium for their propagation is called _____.

2. A vector divided by its magnitude is called _____.

3. Heliocentric theory was put forward by _____.

4. The differential equation representing Simple Harmonic Motion _____.

SECTION – B

Answer **any seven**. Short answer type. **Each** question carries **two** marks. (2×7=14)

5. What is Gauss's divergence theorem ?

6. State Plank's quantum hypothesis.

7. Represent graphically the variation of kinetic energy, potential energy and total energy with displacement of a particle executing simple harmonic motion.

8. Define null vector and give 2 properties of it.

9. Distinguish between longitudinal and transverse wave.

10. What are Lissajous figures ?

11. What is Del operator ?

12. Write an expression for kinetic energy of a particle executing simple harmonic motion.

13. What is Fourier theorem ?

14. Write a note on contributions of Indian physicists in twentieth century.

SECTION – C

Answer **any four**. Short essay/problem type. **Each** question carries **three** marks.   (3×4=12)

15. Prove that div curl (F) = 0.

16. A tuning fork of frequency 512 Hz produced a plane wave in air having amplitude 0.5×10^{-3} mm. Calculate the energy density and intensity of the wave. (Velocity of sound in air 332 m/s and density of air = 1.29 kg/m^3)

17. The equation of a simple harmonic oscillator is given by $d^2x/dt^2 + 625x = 0$. Find the period and frequency of oscillation.

18. Express v^2 in spherical polar coordinates.

19. Derive the differential equation of wave motion in one dimension.

20. Prove that the given vectors $\vec{A} = i + 4j + 3k$ and $\vec{B} = 4i + 2j - 4k$ are perpendicular to each other.

SECTION – D

Answer **any two**. Long essay type. **Each** question carries **five** marks.   (5×2=10)

21. Obtain the transformation and reverse transformation equations between Cartesian coordinates and Spherical Polar coordinates.

22. Derive an expression for the velocity of longitudinal wave in a rod.

23. What is meant by standard model in high energy physics ? What are the various particle families in the standard model ? Explain Higgs mechanism.

24. Discuss in detail the two simple harmonic motions of equal periods in a straight line.

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