K15U 0593

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CCSS – Reg./Supple./Improv.) Examination, November 2015
Core Course in Physics
1B01 PHY : PHYSICS PRIMERS
(2014 Admn. Onwards)

Time : 3 Hours

Max. Marks : 40

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

SECTION – A

Answer **all** questions. Very short answer type, **each** question carries **1** mark.

1. Light radiation of frequency υ is quanta of energy E = _____
2. Albert Einstein was awarded Nobel prize for _____
3. The semiconductor device which was known as "wonder child of electronics" is _____
4. The operator ∇^2 is called _____

(4×1=4)

SECTION – B

Answer **any seven**. Short answer type, **each** question carries **2** marks.

5. "Magnetic monopole doesnot exist", show it mathematically.
6. State Stokes theorem.
7. Distinguish between Transverse wave and Longitudinal wave with example.
8. Explain S.H.M. and give one example.
9. "Universe is expanding". Illustrate with Hubble's law.
10. Briefly explain L.H.C Experiment.
11. What do you mean by "Chandrasekhar limit" ?

P.T.O.

12. Derive the differential equation for one dimensional wave motion.

13. State and explain Fourier theorem.

14. State the postulates of Einstein's Special Theory of Relativity. **(7×2=14)**

SECTION – C

Answer **any four**. Short essay/problem type, **each** question carries **3** marks.

15. Analyse Square wave using Fourier theorem.

16. Given f (x, y, z) = r, Evaluate ∇r.

17. Equation of a progressive wave is y = A cos 240 (t – x/32), where x and y are in meters. Find :
    1) Velocity
    2) Frequency
    3) Phase difference between two points 0.5 m apart.

18. Prove that $\nabla.(\nabla \times F)=0$.

19. Explain Ultra Violet Catastrophy.

20. Give the volume element for Cylindrical coordinate system and hence find out the volume of a cylinder of radius R. **(4×3=12)**

SECTION – D

Answer **any two**. Long essay type, **each** question carries **5** marks.

21. Discuss the development of quantum mechanics from the limitations of Classical mechanics.

22. Check product rule $\nabla.\left(\vec{A}\times\vec{B}\right)=\vec{B}.(\nabla\times\vec{A})-\vec{A}.(\nabla\times\vec{B})$ by calculating each term separately for the functions $\vec{A}$ = xi + 2yj + 3zk and $\vec{B}$ = 3yi – 2xj

23. Explain composition of two rectangular simple harmonic motions of same time period and Lissajous figure.

24. Explain longitudinal waves in gases. **(2×5=10)**
