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K19U 3193

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CBCSS- Supplementary / Improvement)

Examination, November-2019

(2014- 2018 Admissions)

CORE COURSE IN PHYSICS

1B01 PHY : PHYSICS PRIMERS

Time : 3 Hours

Max. Marks :40

Write answers in English only

**SECTION - A**

I. Answer **ALL** - Very short answer type - Each question carries **ONE** mark. **(4×1=4)**

1. Vectors  $\vec{A}$  and  $\vec{B}$  are such that  $|\vec{A}+\vec{B}|=|\vec{A}-\vec{B}|$ . Then the angle between them is\_\_\_\_\_.
2. Quantum theory of radiation was proposed by\_\_\_\_\_.
3. A vector which satisfies the condition  $\nabla \times \vec{E}=0$  is \_\_\_\_\_.
4. A wave which requires a medium for their propagation is called\_\_\_\_\_

**SECTION -B**

II. Answer any **seven** - Short Answer Type- Each question carries **Two** marks. **(7×2=14)**

5. State stoke's theorem?
6. State plank's quantum hypothesis.
7. Represent graphically the variation of kinetic energy, potential energy and total energy with displacement of particle executing simple harmonic motion

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8. Define null vector and give 2 properties of it.
9. State the postulates of special theory of relativity.
10. What are Lissajous figures?
11. Distinguish between phase velocity and group velocity.
12. What are the conditions of applicability of Fourier theorem.
13. What is scalar triple product?
14. Write a note on Expanding Universe.

### SECTION -C

- III. (Answer any **four** - short Essay / problem type - Each question carries **Three** marks) **(4×3=12)**

15. What is simple harmonic motion? Derive an expression for it.
16. A tuning fork of frequency 512 Hz produced a plane wave in air having amplitude  $0.5 \times 10^{-3}$  mm. Calculate the energy density and intensity of the wave. (Velocity of sound in air 332m/s and density of air =  $1.29 \text{ kg/m}^3$ )
17. A particle is moving in a straight line with simple harmonic motion, its velocity has the values 3 m/s and 2 m/s when its distance from the mean position is 1 m and 2 m respectively. Find the time period of motion.
18. Prove that  $\text{div curl } (F)=0$ .
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

- IV. Answer any **Two**- Long essay type- Each question carries **Five** marks **(2×5=10)**

21. Obtain the transformation and reverse transformation equations between Cartesian co-ordinates and Spherical polar co-ordinates.
22. Derive an expression for the velocity of transverse wave in a stretched string.
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. Derive an expression for the time period of a compound pendulum.