V.P & R.P.P SCIENCE COLLEGE VALLABH VIDYANAGAR

F.Y.B.Sc (SEM II)

PHYSICS COURS NO. US02CPHY01

FIRST INTERNAL TEST

DATE: 13/03/2014 **TIME: 11AM TO 12PM**

THARSDAY **TOTAL MARK: 30**

Q-1 : Short question (write any three) **6**

1. Define : Solenoidal vector and irrotational vector.
2. Explain the terms scalar and vector.
3. Write any two drawbacks of simple pendulum.
4. write condition for maximum and minimum time period for compound pendulum.
5. Define : Event and observer.
6. Write any two properties of Luminiferous ether.

Q-2 : Long question

a. Derive the analytical form of scalar triple product. Also discuss the geometrical interpretation. **6**

b. Find volume of the parallelopiped for

$$\overrightarrow{A} = \hat{\imath} + 2\hat{\jmath} - \hat{k}, \overrightarrow{B} = \hat{\jmath} + \hat{k}, \overrightarrow{C} = \hat{\imath} - \hat{\jmath}$$ **2**

OR

a. State and prove Stoke's theorem. **6**

b. Prove that : $\vec{A} \times (\vec{B} \times \vec{C}) + \vec{B} \times (\vec{C} \times \vec{A}) + \vec{C} \times (\vec{A} \times \vec{B}) = 0$ **2**

Q-3 : What is a compound pendulum? Derive an expression for its periodic time. Obtain the length of an equivalent simple pendulum **8**

OR

Q-3 : What is simple pendulum? Derive an expression for the periodic time of a simple pendulum. **8**

Q-4 : a. Derive Galilean transformation and show that acceleration is invariant under Galilean transformation **6**

b. Define : Inertial frame of reference and Non-inertial frame of reference. **2**

OR

Q-4 : a. Derive the expression for Lorentz Fitzgerald length contraction. **6**

b. Draw only the experimental arrangement of Michelson-Morley experiment with proper nomenclature **2**