(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 7 Sub. Code : 0 1 4 8

Exam. Code : 0 0 0 2

B.A./B.Sc. (General) 2nd Semester

(2054)

PHYSICS

Paper : A (Mechanics-II)

Time Allowed : Three Hours] [Maximum Marks : 44

Note :— Attempt **five** questions in all, selecting **two** questions each from Unit-I and Unit-II. Q. NO. 7 of Unit-III is compulsory. From Q. No. 7 attempt any **eight** parts.

UNIT—I

1. (a) Derive Eulers' equations of rotation of rigid body about a fixed point. 6

   (b) List some application of gyroscope. Define it. 3

2. (a) What is Coriolis force ? Discuss its effect on a freely falling body. 7

   (b) Calculate the fringe shift in Michelson-Morley experiment. Given that d = 11m, V = 20 km/sec., $\lambda = 4\times10^{-5}$ cm. 2

3. (a) What is a rigid body ? Derive the expression for Kinetic energy of rotation of a rigid body about principal axes. 6

(b) What are the quantities, which are invariant under Galilean transformation ? Define Galilean invariance. 3

UNIT—II

4. State the postulates of special theory of relativity. Derive the Lorentz transformation equations for two inertial frames when they reduce to Galilean transformation. 9

5. (a) Derive an expression for relativistic variation of mass with velocity. 6

(b) How much younger an astronaut appear to an earth observer, if he returns after 10 years having moved with a velocity 0.8 c ? 3

6. (a) Derive Einstein's mass energy equivalence relation. 6

(b) Kinetic energy of a particle is 3 times its rest mass energy. What is the velocity ? 3

UNIT—III

7. (a) What do you understand by the term precession ?

(b) Explain the statement : Inertia tensor is symmetric.

(c) What was the aim of Michalson Morley experiment ?

(d) Find the Latitude at which the plane of vibration of Focault's Pendulum does not rotate at all.

(e) What is the energy liberated when 1 kg of mass is completely converted into energy ?

(f) What is Four vector Formulation ?

(g) Why length contraction is not observed in daily life ?

(h) Calculate the ratio of mass to its rest mass when it moves with velocity 0.6 c.

(i) Define principal axes of Inertia. $8 \times 1 = 8$