

Dr. V.S.KRISHNA GOVERNMENT DEGREE AND PG COLLEGE
(An Autonomous Institution Affiliated to Andhra University
Reaccredited by NAAC with A Grade (3rd Cycle)
District Resource Centre and Centre for Research Studies
Maddilapalem, Visakhapatnam 530013, Andhra Pradesh



Programme: B.Sc. Honours in Physics (Major)

w.e.f. AY 2023-24 COURSE CODE 23PHYN21

**SEMESTER II COURSE 3: MECHANICS AND PROPERTIES OF
MATTER**

Theory

Credits: 3

3 hrs/week

Model Question Paper

Duration: 3Hrs

Max Marks: 60

Section A

Answer any five questions from the following (4M× 5 = 20M)

1. Show that curl of a conservative force is zero?
2. What is line integral, write its significance?
3. Explain conservation of energy and momentum?
4. Explain collisions in two dimensions?
5. Write a short note on Gyroscope?
6. Explain precession of equinoxes?
7. Show that central force can be written as negative gradient of potential energy?
8. Write a short note on GPS
9. Explain length contraction?
10. State the postulates of special theory of relativity?

Section B

Answer all the questions (8M× 5 = 40M)

- 11.(a) State and prove Gauss Divergence theorem in vectors

(OR)

(b) State and prove Stokes's theorem

- 12.(a) Define Variable Mass System? Derive an expression for the final velocity of the Rocket?

(OR)

(b) Define impact parameter and scattering cross section? Derive an expression for Scattering Angle

- 13.(a) Write rotational kinematic relations of a rigid body and derive equation of motion of a rigid body?

(OR)

(b) What are elastic constants of an isotropic solids and obtain their relations?

- 14.(a) Define Central Force? Obtain the equation of motion of a body under central force

(OR)

(b) State Kepler's Laws? Prove Kepler's first law of Planetary Motion

15. (a) Derive equations of Lorentz Transformations of Space and Time

(OR)

(b) Derive the Einstein Mass-Energy Relationship