Andhra University

B.Sc under CBCS with effect from academic year 2015-16

Semester -1

Physics-Mechanics and Properties of Matter

Time: 3 Hours Max. Marks: 75

Section –A

Answer any FIVE questions 5x5 = 25 marks

1. Evaluate curl grad Φ, where Φ is scalar function.
2. State and prove the principle of conservation of angular momentum.
3. A Rocket when empty weight 500 kg and it is filled with 40,000 kg of fuel. The exhaust velocity of the burnet gas is 2 km/s. Find the maximum velocity attained by the Rocket.
4. Explain the working of Gyroscope.
5. What are the different types of loads?
6. What are geosynchronous satellites?
7. Derive Einstein's mass- energy relation.
8. Calculate the velocity of rod while its length will appear 80% of its original length

Section –B

Answer ALL questions 5x10 = 50 marks

9. State and Prove Gauss Divergence theorem.

OR

Explain Curl of vector field, State and prove Stokes theorem.

10. Derive equation of motion of a Rocket by considering Rocket as a system of variable mass and deduce velocity of Rocket.

OR

Derive the expression for Rutherford's scattering cross section.

11. Define Young's modulus, Bulk modulus and Rigidity modulus. Derive the relation between them.

OR

What is symmetric top and processional motion? Calculate processional velocity of the top.

12. What are central forces? Give some examples. Show that central forces are Conservative

OR

State Kepler's laws of planetary motion and prove Kepler's first law of motion.

13. Describe the Michelson-Morley experiment and explain the physical significance of the negative result.

OR

State postulates of special theory of relativity and obtain Lorentz transformations.