

## Physics (Hons.) Paper-I

Answer five questions, selecting two questions each from Group-A and Group-B, in which Q.No. 1 is compulsory.

1. Answer any three of the following : LNMUonline.com
  - (a) What do you mean by Gaussian distribution function ?
  - (b) Show that gradient of a Scalar is vector.
  - (c) Calculate the work done in stretching a wire.
  - (d) What do you mean by surface energy and surface tension ?
  - (e) What are the postulates of special theory of relativity ?
  - (f) Explain intensity of sound wave.

### **Group-A**

2. State and prove Gauss' divergence theorem.
3. Deduce an expression for the couple required to twist a uniform solid cylinder. Show that the hollow cylinder has a greater torsional rigidity than a solid cylinder of same mass, length and material.
4. Define coefficient of viscosity. Describe the Rankine's method for measuring the coefficient of viscosity of a gas.
5. Derive expression for the difference of pressure on the two sides of a spherical surface.

### **LNMUonline.com Group-B**

6. Describe Michelson-Morley experiment and give the explanation of negative result obtained.
7. Derive an expression for the variation of mass of a particle moving with velocity. Discuss how the result has been verified experimentally.
8. Set up the differential equation for damped harmonic oscillation of a particle and obtain a solution for it.
9. What are group velocity and phase velocity ? Obtain an expression for the group velocity in a dispersive medium.