THE TEXTILE ASSOCIATION (INDIA)
G.M.T.A. (REVISED) EXAMINATION – 2015
SECTION - A PAPER-A-1

ENGINEERING PHYSICS

Date: 24.12.2015 Marks: 100 Time: 10.00 am to 1.00 pm

Instructions:
1. Attempt SIX questions out of which Q1 is compulsory
2. Answer each next question on new page
3. Figure to the right indicate full marks
4. Illustrate your answers with sketches and flow chart wherever necessary
5. Use of non programmable electronic pocket calculator permissible
6. Mobile and any other communication devices are not allowed in exam hall.
7. Assume suitable data wherever necessary

Q1 Attempt any TEN of the following
   i. Mention the types of elasticity.
   ii. State and explain Stoke’s law.
   iii. The spherical shape of a rain drop is due to
        (a) Density of the liquid (b) gravity (c) atmospheric pressure (d) surface tension
   iv. A needle floats on the surface of water because of
        (a) lighter weight (b) adhesive force (c) viscosity (d) surface tension
   v. The velocity of sound will be greatest in
        (a) water (b) air (c) vacuum (d) metal
   vi. Define Ultrasonic.
   vii. What is Pizo-electric effect?
   viii. Define LASER and Mention two characteristic of LASER.
   ix. What is Meissner effect?
   x. Mention the difference between Dielectric and Insulator.
   xi. Mention the two uses of UV and IR radiation in textiles.
   xii. Define photoelectric effect.
   xiii. Define permeability.

Q2 a. What is free surface energy? Find the relation between surface tension and free surface energy

b. Derive Poiseuille’s formula for the rate of flow of a liquid through a capillary tube.

c. Explain the phenomenon of magnetostriction. How will you produce high frequency sound waves with its help?

Q3 a. Define Refractive Index. Derive an expression for magnifying and resolving power.

b. Mention two Coherent sources. Describe and explain the formation Newton’s rings in reflected light.

c. What is plane polarized light? Describe the construction and working of a Nicol prism.
Q4  a. Explain the classification of magnetic materials.
    b. Write a note on soft and hard magnetic materials.
    c. Write a note on types of electromagnetic radiation and mention its properties.

Q5  a. What are X-rays? How are they produced?
    b. What is meant by crystal lattice? Define (i) Unit cell (ii) Space lattice (iii) Miller indices.
    c. Describe briefly the seven crystal systems.

Q6  a. Write a note on uses of photo sensors in the textile field.
    b. Explain the principle and working of optical fibers.
    c. Explain the basic principle of Holography. Mention its applications.

Q7  a. Explain the terms: (i) spontaneous emission (ii) Stimulated emission (iii) Population inversion
    b. Explain the construction and working of He-Ne Laser with energy level diagram.
    c. Discuss the Type I and Type II superconductors.

Q8  a. Give the Principle, construction and working of scanning and transmission electron microscope
    b. Define noise and explain the control of noise in brief.