

TDC-Part-I(Voc.) Exam.-2019

Time : 3 hours

Full Marks : 75

Candidates are required to give their answer in their own words as far as practicable.

The questions are of equal value.

Answer any six questions, Selecting at least two questions from Group-A, one question from Group-B and two questions from Group-C.

Group-A

1. What are the postulates of special theory of relativity? Derive Lorentz transformation relations.
2. What do you mean by mass-energy equivalence? Deduce the formula for relativistic variation of mass with velocity.
3. Derive Lagrangian equation of motion for a holonomic system.
4. What are different type of elastic constants? Establish relation between them.
5. What is the difference between ripple and gravity waves? Describe a method for determination of surface tension.

6. Derive poiseuille's formula for steady flow of a liquid through a narrow horizontal tube. Mention the corrections required in the formula.

Group-B

7. Distinguish between free, damped and forced vibrations. Solve the equation of motion of a body executing damped oscillation. <https://www.brabuonline.com>
8. State Fourier theorem and determine their Coefficients.

Group-C

9. What are black-body radiations? State and derive Kirchhoff's law of black body radiation.
10. What is mean free path? How it is experimentally determined?
11. State and prove Carnot's theorem.
12. Write short notes on the following
 - (a) Law of equipartition of energy
 - (b) First Law of thermodynamics with application
