Roll No. .....

24003

B. Tech 1st Semester (Common for All Branches) Examination – December, 2017

PHYSICS - I

Paper : Phy-101-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. 1 is ***compulsory***.

1. (a) Why Newton's rings are circular ?

   (b) What is Rayleigh's limit of resolution ?

   (c) Discuss silent characteristics of Laser ?

   (d) What is polarized and unpolarized light.

   (e) Give some application of fibre optics.

   (f) What is isotopic effect in superconductor ?

   (g) Why high frequency lasers are difficult to construct ?

(h) The binding energy of electron to proton (i.e. of hydrogen atom) is 13.6 MeV. Find the loss of mass in the formation of one atom.

(i) For a gas the value of dielectric constant at 0° C is 1.000038 .calculate the electric susceptibility (χe) at this temperature.

(j) What is Meissner effect ? $2 \times 10 = 20$

UNIT – I

2. What are the Newton's rings ? Why they are circular ? Explain the formation of Newton's rings in reflected light ? 20

3. Difference between Fraunhofer and Fresnel diffraction. Explain the phenomenon of diffraction - through a single slit. 20

UNIT – II

4. (a) Discuss Einstein's coefficients. Derive relation between them. 12

(b) Write a short note on semiconductor laser ? 8

5. (a) Give the construction and working of a Lorentz half shade polarimeter. What is main drawback ? 15

(b) What is difference between spontaneous and stimulated emission ? 5

UNIT – III

6. (a) State and prove gauss law in-dielectrics ? 10

(b) Deduce an expression for energy store in dielectric in electrostatic field. 10

7. What is acceptance angle and numerical aperture ? Discuss in detail the various modes in fiber optics. 20

UNIT – IV

8. (a) What is the postulate of special theory of relativity ? Using them, derive equation of variation of mass with velocity. 15

(b) If kinetic energy of a body is twice to rest mass energy. Find out its velocity. 5

9. Drive the London equations and discuss how its solution explains Meissner effect. 20