

# PHYSICS

## Paper – I

Time Allowed : **Three Hours**

Maximum Marks : **200**

### Question Paper Specific Instructions

**Please read each of the following instructions carefully before attempting questions :**

There are **EIGHT** questions in all, out of which **FIVE** are to be attempted.

Questions no. **1** and **5** are **compulsory**. Out of the remaining **SIX** questions, **THREE** are to be attempted selecting at least **ONE** question from each of the two Sections A and B.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

All questions carry equal marks. The number of marks carried by a question/part is indicated against it.

Unless otherwise mentioned, symbols and notations have their usual standard meanings.

Assume suitable data, if necessary and indicate the same clearly.

Neat sketches may be drawn, wherever required.

Answers must be written in **ENGLISH** only.

### Useful Constants :

Electron charge ( $e$ )	= $1.602 \times 10^{-19}$ C
Electron rest mass ( $m_e$ )	= $9.109 \times 10^{-31}$ kg
Proton mass ( $m_p$ )	= $1.672 \times 10^{-27}$ kg
Vacuum permittivity ( $\epsilon_0$ )	= $8.854 \times 10^{-12}$ farad/m
Vacuum permeability ( $\mu_0$ )	= $1.257 \times 10^{-6}$ henry/m
Velocity of light in free space ( $c$ )	= $3 \times 10^8$ m/s
Boltzmann constant ( $k$ )	= $1.380 \times 10^{-23}$ J/K
Electron volt (eV)	= $1.602 \times 10^{-19}$ J
Planck's constant ( $h$ )	= $6.626 \times 10^{-34}$ Js
Stefan's constant ( $\sigma$ )	= $5.67 \times 10^{-8}$ Wm <sup>-2</sup> K <sup>-4</sup>
Avogadro number ( $N$ )	= $6.022 \times 10^{26}$ kmol <sup>-1</sup>
Gas constant ( $R$ )	= $8.31 \times 10^3$ J kmol <sup>-1</sup> K <sup>-1</sup>
exp (1)	= 2.718