

## ASSIGNMENT-II

NORTH GAUHATI COLLEGE

Department of Physics

3<sup>rd</sup> Semester HG/RC (CBCS)

Paper code: PHY-RC-3016/PHY-HG-3016, Thermal Physics & Statistical Mechanics

Total Marks: 20

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*(The figures in the margin indicate the full marks for the questions)*

1. 'Black body radiation is white' - explain. 2
  2. Discuss transport of momentum i.e. viscosity of gases. How does the viscosity depend upon temperature and pressure? 3
  3. Prove that for a perfect gas whose molecules have  $f$  degrees of freedom, the ratio of specific heats of the gas is given by  $\gamma = \frac{C_p}{C_v} = 1 + \frac{2}{f}$ . 3
  4. From Maxwell's velocity distribution law deduce the probability of a molecule having speed in the range  $c$  and  $c+dc$ . 4
  5. Draw energy distribution in a black body spectrum for different temperature. What important indications one gets from the curves. 3
  6. State and explain Wien's law of radiation. Show that Wien's law and Rayleigh-Jean's law are special cases of Plank's law. 5
- Or
- How does the mean free path  $\lambda$  and number of collisions of each molecule per unit time  $\nu$  depend on the absolute temperature of an ideal gas undergoing-
- a) An isochoric process
  - b) An isobaric process 5

### Nota Bene:

- Write your answers in A4 paper sheet mentioning clearly **your name, GU roll number, registration number, paper code etc.** at the front page of your answer sheet.
- You have to make a single PDF file of your answer sheets.
- You need to submit your respective PDF at the online portal of our college website or at the mail id: [ngcphysicsdept@gmail.com](mailto:ngcphysicsdept@gmail.com).
- The submission due date is on or before 10<sup>th</sup> August, 2021.