

## Test No. 4

### Chapter Name: EM Wave and Ray Optics

1. Describe an astronomical telescope. Derive expression for its magnifying power and final image is at infinity and at least distance of distinct vision. **5**
2. Derive an expression for the total magnification of a compound microscope. Explain why both the objective and the eye piece of a compound microscope must have short focal lengths? How can magnifying power be increased? Also draw the suitable ray diagram for compound microscope. **5**
3. What are the uses of X – rays, UV rays and infrared rays? **1.5**
4. Show that the average energy density of the electric field equals the average energy density of the magnetic field in an electromagnetic wave. **3**
5. Why are infrared radiations referred to as heat wave also? Name the radiations which are next to these radiations in electromagnetic spectrum having (i) shorter wavelength (ii) longer wavelength **1**
6. State any four properties of the EM wave. **2**
7. Identify the EM wave whose wavelength lie in the range: **2.5**
  - a)  $10^{-12} \text{ m} < \lambda < 10^{-8} \text{ m}$
  - b)  $10^{-3} \text{ m} < \lambda < 10^{-1} \text{ m}$
  - c)  $10^{-11} \text{ m} < \lambda < 10^{-14} \text{ m}$
  - d)  $10^{-4} \text{ m} < \lambda < 10^{-6} \text{ m}$ .Write one use of them
8. An EM wave  $Y_1$ , has a wavelength of 1 cm while another EM wave  $Y_2$  has a frequency of  $10^{15}$  Hz. Name these two types of waves and write one useful application for each. **2**