

- a) plane
b) spherical
c) cylindrical
d) arbitrary shape
- (viii) In lasing action, the spontaneous emission does not depend on
a) the number of atoms present in the excited state
b) the intensity of the incident light
c) both intensity and number of atoms
d) none of these
- (ix) Select the color of the laser output in ruby laser from the following
a) violet
b) blue
c) red
d) green
- (x) The ratio of Einstein's A and B coefficient is proportional to
a) ν
b) ν^2
c) ν^3
d) $1/\nu$
- (xi) Write the S.I unit of Luminance
a) Candela
b) Lux
c) Candela/m²
d) Candela/m
- (xii) Lux is equal to
a) 1 lumen/m²
b) 1 lumen/cm²
c) 1 candela/m²
d) 1 candela/cm²
- (xiii) Which of the following colors is least scattered by fog, dust of smoke?
a) Violet
b) Blue
c) Red
d) Yellow
- (xiv) Which of the following is used for the formation of holograms?
a) X-ray
b) Visible Light
c) Infrared
d) Laser light
- (xv) In holography we record
a) both the phase and intensity from the different parts of the three dimensional object
b) only the phase of different parts of the object
c) only the intensity from the different parts of the object
d) none of these

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Show that the energy is conserved in interference. (3)
3. Write down the conditions of the Tyndall effect. (3)
4. Calculate the refractive index of glass if the light of 550 nm wavelength is completely plane polarized when reflected at an angle of 60°. (3)
5. The colour of the sky is blue. Explain the reason. (3)

6. Stimulated emission is used in laser action instead of spontaneous emission. Justify your answer. (3)

OR

Distinguish between ordinary light and laser light. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. State and explain the inverse square law as applied in photometry. (5)

8. Classify different types of scattering of light. (5)

9. Explain the process to reconstruct of the image from a hologram. (5)

10. Derive the intensity due to single slit Fraunhofer diffraction. (5)

11. An unpolarized light of intensity I_0 is incident on two perfect linear polarizers oriented at 45° with each other. Estimate the intensity of the transmitted light. (5)

12. Calculate the ratio of population inversion of the two states in thermal equilibrium at 300 K. The wavelength corresponding to the energy gap between the two states is 600 nm. (5)

OR

In a He- Ne laser transition from E_3 to E_2 level gives a laser emission of wavelength 632.8 nm. If the energy of the E_2 level is 15.2×10^{-19} J, Calculate the required pumping energy, if there is no energy loss in He- Ne laser. (5)
