Roll Number:

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-I Semester (BT/BI)

COURSE CODE (CREDITS): 25B11PH112 (04) MAX. MARKS: 35

COURSE NAME: Basic Engineering Physics

COURSE INSTRUCTORS: Dr. Ragini Raj Singh MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Calculators allowed

Q.No	Question	CO	Marks
Q1	**(a)** Differentiate between spontaneous and stimulated emission. **(b)** Discuss population inversion in LASERS with proper equations. **(c)** Write two applications each of the use of laser in treatment and diagnosis **(d)** Estimate the possibility of stimulated dimension at 300 K and λ= 550 nm. [K=1.38 x 10^{-23}]	3	**4x2=8**
Q2	**(a)** Discuss the types of the optical fibers on the basis of (i) material (ii) modes. **(b)** What are the basic attenuation mechanisms in optical fibers discuss any one in detail **(c)** Compute the numerical aperture enhances the acceptance angle for an optical fiber given that n_1 equals to 1.50 and n_2 equals to 1.48 respectively. **(d)** An step index fiber has core and cladding refractive index as 1.555 and 1.550 respectively calculate the maximum radius allowed for the fiber if it is supporting only one more at a wavelength 1150 NM also calculate the numerical aperture the critical angle and the maximum acceptance angle. **(e)** The optical power after propagating through a fiber of 2 km length is reduced to 25% of its value compute the fifer loss in dB/Km.	4	**5x2=10**

Roll Number:

Q3	**(a)** What do you understand by excess pressure in a sphere derive the relation for that? **(b)** Discuss any one method to measure surface tension, with its advantages and disadvantages. **(c)** Discuss shape of liquid meniscus with appropriate equations and diagrams and also explain the angle of contact. **(d)** 10 droplets of water, each of radius 0.4 mm, coalesce into a single drop. Find the change in total surface energy.[Surface tension=0.072 N/m] **(e)** A capillary tube of radius 0.4 mm is dipped in a liquid of surface tension 0.05 N/m and relative density 1 gm/cc. Calculate the height of the capillary rise, if the angle of contact is 12 degree. [g=9.8 m/s^2]	5	**5x2=10**
Q4	**(a)** What are the different types of fluid flow? What do you understand by Reynolds number? Discuss its formula and allied parameters. What are the approximated values of Reynolds number that decides type of fluid flow? **(b)** Define dynamic and kinematic viscosities? What is stokes law related to viscosity? **(c)** Calculate the horizontal force required to move a metal plate of area 2 x 10^{-2} m^2 with a velocity of 4.5 x 10^{-2} m s^{-2} when it rests on a layer of oil 1.5x 10^{-3} m thick. η = 2 Nsm^{-2}.	5	**2.5** **2.5** **2**