



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE

(AUTONOMOUS) (Grant-in-Aid)

Affiliated to Sardar Patel University

VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester-1) External Examination - 2024

Subject Code: US01IDPHY01

Subject Name: Laser and Optical Instruments

Date: 21-11-2024, (THURSDAY)

Time: 11:00 AM to 12:30 PM (1.5 HRS.)

Total marks: 25

Note: (i) All the symbols have their usual meanings.

(ii) Figures at the right side of questions indicate full marks.

Que.-1 Write the most appropriate answer from the following multiple-choice questions. [05]

- The working principle of Rayleigh's interferometer is based on division of _____.
 (a) wavelength (b) amplitude (c) wave front (d) frequency
- The equation for resolving power of grating is _____.
 (a) $\frac{1.22\lambda}{2\sin\alpha}$ (b) nN (c) $\frac{n}{N}$ (d) $t\frac{d\mu}{d\lambda}$
- In Michelson interferometer, circular fringes are obtained if the position of M'_1 and M'_2 is _____.
 (a) perpendicular (b) parallel (c) crossed (d) overlapping
- In ND:YAG laser _____ is used for pumping.
 (a) xenon lamp (b) neon lamp (c) krypton flash lamp (d) electrical discharge
- _____ is not a main component of laser.
 (a) pumping source (b) rectifier (c) optical resonator (d) active medium

Que.-2 (a) With necessary diagram, explain construction and working of Jamin's interferometer. [06]
 (b) Enlist the applications of interference. [04]

OR

Que.-2 (a) Derive an expression for resolving power of a microscope. [06]
 (b) With necessary diagram, explain types of fringes obtained with Michelson's interferometer. [04]

Que.-3 (a) Explain process of stimulated absorption, spontaneous emission and stimulated emission. [06]
 (b) Enlist the methods of pumping used in laser and explain them in brief. [04]

OR

Que.-3 (a) Explain CO₂ laser in detail. [06]
 (b) Enlist the properties of laser. [04]

_____ X _____

