



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) Internal Examination - 2024
US01MAPHY01: Mechanics and Optics

Date: 3rd October 2024, Thursday
Time: 11:00 AM to 12:30 PM

Total marks :30

Q-1 Multiple Choice Questions

[06]

- (1) The restoring force per unit area is called _____.
(a) Elasticity (b) Plasticity (c) Stress (d) Strain
- (2) The Poisson's ratio cannot have the value _____.
(a) 0.2 (b) 0.3 (c) 0.4 (d) 0.6
- (3) _____ is not a ferromagnetic material.
(a) Quartz (b) Iron (c) Nickel (d) Cobalt
- (4) In Michelson interferometer when mirror M_1 and M_2 are exactly perpendicular, the shape of the fringes will be _____.
(a) Circular (b) Straight line (c) No fringe (d) Inclined
- (5) The resolving power of a prism depends on _____.
(a) base width (t) (b) $d\mu/d\lambda$ (c) Both (a) & (b) (d) None of these
- (6) High _____ is not one of the laser properties.
(a) Coherence (b) Directionality (c) Chromacity (d) Intensity

Long Questions:

- Q-2 Derive the formula for the work done per unit volume in stretching a wire. **[06]**
OR
- Q-2 Define Poisson's ratio (σ) and derive formula of it to determine for rubber tube experimentally, i. e. $\sigma = \frac{1}{2} \left(1 - \frac{1}{A} \frac{dV}{dL} \right)$ **[06]**
- Q-3 Discuss magnetostriction method for the production of ultrasonic in detail. **[06]**
OR
- Q-3 Describe Kater's reversible pendulum and derive expression for acceleration due to gravity for it. **[06]**
- Q-4 Explain principle, construction and working of Michelson interferometer. **[06]**
OR
- Q-4 Define resolving power of a prism and derive expression for it. **[06]**
- Q-5 Write a note on Nd:YAG laser. **[06]**
OR
- Q-5 Write a note on CO₂ laser. **[06]**

