S.No: 145 BATCH: 2017 & 2018 Reg. No.:

END OF SEMESTER EXAMINATIONS, APRIL / MAY – 2019
MODERN OPTICS
SUBJECT CODE: 17P3PH07

MAJOR : M.Sc. (Physics) SEMESTER : II
TIME : 3 HOURS MAX. MARKS : 70

SECTION – A (10 x 1 = 10)

Answer ALL the Questions:

1. The Brewster angle is expressed as
   a) $\tan^{-1}(n_2/n_1)$ b) $\tan^{-1}(n_1/n_2)$ c) $\tan(n_1/n_2)$ d) $\tan(n_2/n_1)$
2. Constructive interference happens when two waves are
   a) out of phase b) zero amplitude c) in phase d) in front
3. The efficiency of nonlinear optical processes is determined by
   a) resonance b) self focusing c) phase matching d) susceptibility
4. The construction process in holography involves
   a) interference b) diffraction c) both (a) & (b) d) coherence
5. In an optical fiber, the Numerical aperture is applicable in describing the ability of light _____
   a) collection b) scattering c) dispersion d) polarization
6. Define total internal reflection.
7. What is coherent length?
8. What do you mean by phase matching?
9. Give any two application of Holography.
10. What is the difference between step index and graded index?

SECTION – B (5 x 4 = 20)

Answer ALL the Questions:

11. a) Explain the physical significances of group velocity.

    (OR)

    b) Deduce an expression for Brewster angle with neat diagram.
12. a) Briefly explain the term visibility of fringe.

    (OR)

    b) Explain the principle of multiple beam of interferometer.
13. a) What you mean by multiple beam of interferometer?

    (OR)

    b) Explain the process of reconstruction of hologram.
14. a) Deduce the expression for linear optical susceptibility.

    (OR)

    b) Explain the quantum theory of Raman Effect.
15. a) Explain the different modes of optical fiber.

    (OR)

    b) With neat diagram, explain the term local area network (LAN).

SECTION – C (5 x 8 = 40)

Answer ALL the Questions:

16. a) With aid of Jones calculus method arrives an expression for matrix representation of polarization.

    (OR)

    b) Deduce an expression for amplitude of reflection and refraction waves.
17. a) Give an account on spatial coherence.

    (OR)

    b) With relevant theory arrive an expression for multiple beam interference phenomena.
18. a) Explain the following laser system with neat sketch
    i. *He Ne laser*
    ii. CO_2 *laser*

    (OR)

    b) Given an account on holography.

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19. a) Deduce the expression for the sun frequency generation in non-linear optical phenomena.

(OR)

b) With a neat diagram explain the principle construction working of laser Raman photo meter.

20. a) Explain in detail of the following

i. Fiber fabrication any one method

ii. Mechanical properties of fiber

(OR)

b) Explain with neat sketch about the principle, construction and working of fiber optic communication system.

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