

MCT
MANJARA CHARITABLE TRUST
RAJIV GANDHI INSTITUTE OF TECHNOLOGY

DATE: - 18/02/2017

TERM TEST NO.1

Marks: 30

Sub: Applied physics – II

Time: $1\frac{1}{2}$ hrs

Q.1. Solve any 5 questions from the following.

(3 marks each)

- a) Explain the use of optical resonator in laser source? What is its resonating length?
- b) Distinguish between spontaneous emission and stimulated emission in case of laser?
- c) Define acceptance angle & internal critical angle in case of optical fiber? Write conditions for TIR?
- d) Write the conditions for steady interference pattern? Explain the necessity of extended source of light to observe thin film interference?
- e) In Newton's rings experiment the diameter of 5th dark ring is reduced to half of its value after placing a liquid between plane glass plate and convex surface. Calculate the refractive index of liquid?
- f) Explain the use of optical fiber as temperature sensor?
- g) If the acceptance angle of an optical fiber in air is 30° , calculate its acceptance angle in water of R.I. 1.33?

Q.2. a) Explain the construction and working of Nd-YAG laser with the help of energy level diagram and give its applications? (5)

b) Explain antireflection film? Derive amplitude and phase condition? (5)

c) White light is reflected from an oil film of thickness 0.01 mm and refractive index 1.4 at an angle of 45° to the vertical. If the reflected light falls on the slit of a spectrometer, calculate the number of dark bands seen between wavelengths 4000 AU to 5000 AU? (5)

OR

Q.2. a) Derive the conditions of interference light of with in a thin film of uniform thickness in reflected system? (5)

b) What is holography? Explain the use of laser light in holography technique? (5)

c) Two glass plates enclose a wedge shaped air film touching at one edge are separated by a wire of 0.03 mm diameter at distance 15 cm from the edge. Monochromatic light of wavelength 6000 AU is incident normally on the film. Calculate the fringe width? (5)

OR

c) A glass wedge having angle 0.01 radian is illuminated normally by light of wavelength 5890 AU. At what distance from the edge of the wedge will the 12th dark fringe be observed by reflected light? (5)

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