

27/5/19

9.30 - 10.30

H

Roll No.

TPH-201

**B. TECH. (SECOND SEMESTER)
END SEMESTER EXAMINATION, 2019**

(Non-CS-Branch)

ENGINEERING PHYSICS

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Show that in Newton's ring experiment the diameters of dark rings are directly proportional to the square root of natural numbers and also determine the wave length of sodium light.

- (b) An electron is bound by potential which closely approaches an infinite square well of width 2.5×10^{-10} m. Calculate the lowest three permissible quantum energies the electron can have. Where mass of the electron is 9.1×10^{-31} Kg.
- (c) Explain about principle, acceptance angle and numerical aperture and V number in fiber optics.

(2)

TPH-201

- (b) In a Fresnel's biprism experiment, we obtain 75 fringes in the field of view with Na light. What will be the number of fringes in the field of view with green light of wavelength 555 nm? Given wavelength of sodium light is 589 nm.
- (c) What is diffraction? Find the ratio of intensity secondary maxima and primary maxima in diffraction due to N slits.
2. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Define specific rotation. Describe the construction and working of a Laurent's half shade polarimeter, explain fully the action of the Laurent half shade polarimeter. How would you use it to determine the specific rotation of sugar solution?
- (b) What is retardation plates? Calculate the thickness of: (i) a quarter wave plate (ii) half wave plate (iii) full wave plate.
- (c) Find the intensity of a laser beam of 10 mW power and having a diameter of 1.3mm. Assume the intensity to be uniform across the beam.

F. No. : b-53

(3)

TPH-201

3. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Discuss all Maxwell's equation. Derive Maxwell's first equation from Gauss's law of electrostatics.
- (b) The relative permittivity of Ar at 0°C and one atmosphere is 1.000435. Calculate the polarizability of the atom.
- (c) What is nanotechnology? Explain about quantum well, wire and dot and application of nanotechnology.
4. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Discuss briefly construction and working of Michaelson-Morley experiment and mention its outcome.
- (b) An electron is confined to a box of length 10^{-8} m, calculate the minimum uncertainty in its velocity.
- (c) Explain the basic principle of holography. Give construction and reconstruction of image on hologram.
5. Attempt any *two* questions of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Derive time dependent and independent Schrodinger wave equation.

F. No. : b-53

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