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Paper Code: TPH-101/102

End Semester Examination, 2018 (Back Paper)

B.Tech, I/II Semester  
Engineering Physics

Time: Three Hours

MM: 100

- Note:
- (i) This question paper contain 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.

Q1. (Attempt any two questions of choice from a, b and c) (Marks 10 x 2 = 20)

(a) In Newton's ring experiment, prove that the diameters of dark rings are directly proportional to the square root of natural numbers.

(b) A transmission grating having the grating element 1800 nm. Obtain the dispersive power of grating in the first order spectra around  $\lambda = 500$  nm.

(c) Find the resultant intensity of diffraction due to N slits.

Q2. (Attempt any two questions of choice from a, b and c) (Marks 10 x 2 = 20)

(a) Give construction, working and theory of ruby laser.

(b) The values of  $\mu_e$  and  $\mu_o$  for quartz are 1.5508 and 1.5418 respectively. Calculate the thickness of plate for  $\lambda = 5 \times 10^{-5}$  cm.

(c) Explain the working and theory of half shade polarimeter.

Q3. (Attempt any two questions of choice from a, b and c) (Marks 10 x 2 = 20)

(a) Derive Maxwell's four equations.

(b) In Newton's ring experiment, the diameters of 4<sup>th</sup> and 12<sup>th</sup> dark rings are 0.40 cm and 0.70 cm respectively. Find the diameter of 20<sup>th</sup> dark ring.

(c) What are the types of magnetic materials and also write the characteristic and properties of the materials.

Q4. (Attempt any two questions of choice from a, b and c) (Marks 10 x 2 = 20)

(a) Write the working of Michaelson Morley Experiment. Also explain the reason of failure of it.

(b) A particle of rest mass  $m_0$  moves with a speed of  $c/2$ . Calculate its mass, momentum and total energy.

(c) Derive the Lorentz transformation equations.

Q5. (Attempt any two questions of choice from a, b and c) (Marks 10 x 2 = 20)

(a) Explain de Broglie hypothesis. Find the wavelengths of electron, proton, alpha particle and molecule.

(b) Prove that electron can not exist inside the nucleus. The radius of the nucleus is about  $10^{-14}$  m.

(c) Derive time dependent and independent schrodinger wave equation.