AJEET SONI

Roll No. .....

Total No. of Questions : 5] [Total No. of Printed Pages : 3

EW-82

B.Tech. IInd Semester (CSE, IT. & Elect.)

Examination, 2022

Engineering Physics

Paper - BE-201

Time : 3 Hours] [Maximum Marks : 60

Note :- All questions are compulsory and carry equal marks.

1. Obtain three dimensional time independent Schrodinger's wave equation from the time dependent Schrodinger's equation.

OR

What do you understand by eigen-value and eigen-function ?

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Solve the Schrodinger wave equation for a particle in infinite square well and obtain its eigen-values and eigen-fuctions.

2. Describe Fraunhofer diffraction due to a single slit and deduce the positions of maxima and minima.

OR

(a) In Newton's ring experiment, the diameter of the 15th ring was found to be 0.590cm and that of the 5th rign was 0.336cm. If the radius of the Plano-convex lens is 100 cm, calculate the wavelength of light used.

(b) A biprism is placed at 0.05m from a Slit illuminated by sodium light λ=5890^{0}A. The width of the fringes obtained on screen 0.75 m the biprism is 9.424×10^{-4} m. What is the distance between the coherent sources ?

3. What is betatron ? Derive the betatron condition for successful acceleration of electron. Briefly describe its principle, Construction and function of alternating magnetic field.

OR

(a) In a certain cyclotron, the maximum radius that the path

of a deuteron may have before it is deflected out of the magnetic field is 20cm. Calculate the velocity of the deuteron at the radius.

[Mass of deuteron = $3.34\ 10^{-27}$kg, Magnetic Field = 1500 Gauss]

(b) Why do we say that the nuclear behaves like a liquid drop ?

4. Write short notes on following :

(a) Intrinsic and extrinsic semiconductors

(b) Effective Mass

OR

Write short notes on Hall effect and its application.

5. What is the basic condition in which stimulated emission dominate ? Describe the construction and working of Ruby laser.

OR

What is meant by the acceptance angle for an optical fiber ? Derive the expression for the numerical aperture of the step index fiber.

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