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Mid Term Examination, *Odd*-Semester, 2019-20

B.Tech. (all branches), I Year, I Semester

Subject Name		**Subject Code**
Engineering Physics	:	BPHS0001
Engineering Physics-I	:	BPHS0002
Engineering Physics-II	:	BPHS0003

Time: 2 Hours **Max. Marks:** 30

Section A

Note: Attempt all three questions. **3X2= 6**

1. Two identical light waves each of amplitude 3 units superimpose to each other with phase difference of 180° in a double slit experiment. Calculate the intensity of the resultant wave.
2. Write two distinctions between Fresnel and Fraunhofer diffractions.
3. Define specific rotation of an optically active substance.

Section B

Note: Attempt all three questions. **3X3= 9**

1. Two coherent sources of monochromatic light of wave length 6000 A° produce and interference on screen kept at a distance of 1 meter from them. The distance between two consecutive bright fringes on the screen is 0.5 mm. Find the separation between two coherent sources.
2. The plane of polarization of the plane polarized light is rotated through 6.5° in passing through a length of 2.0 decimeter of sugar solution of 5% concentration. Calculate the specific rotation of the sugar solution.
3. If the earth receives two cal min^{-1} cm^{-2} solar energy, what are the amplitudes of electric and magnetic fields of radiation. (Given Data : $\mu_o = 4\pi\times10^{-7}$ N/A^2 , $\varepsilon_o = 8.85\times10^{-12}$ C^2/N-m^2)

Section C

Note: Attempt any three questions. **3X5=15**

1. Find the expression for the diameters of dark circular rings as obtained in the Newton's rings experiments. Discuss how these rings can be used to determine the wave length of light.
2. Obtain expression for the intensity of principal maxima due to N-slits diffraction grating. Also find the direction of principal maxima.
3. Explain the phenomenon of double refraction in a calcite crystal. Drive a general equation due to superposition of two plane polarized waves having perpendicular vibrations.
4. Using Maxwell's equations in free space, show that the electro-magnetic waves travel with the speed of light in vacuum.

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