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First - Mid Term Examination, 2016-17

B.Tech. I-Year, I Semester

AHP-1101: Engineering Physics

Time: 1 ½ Hrs **M. M: 20**

Section-A

Note: Attempt all five questions. **1× 5 =5**

I. Why two independent sources of light of same wavelength cannot show interference?

II. In a biprism experiment, if the monochromatic source of light is replaced by white light source, what would be the color of central fringe?

III. Distinguish between Fresnel and Fraunhofer classes of diffraction.

IV. Which optical phenomenon explains the transverse nature of light?

V. Explain the difference between ordinary and Extra-ordinary rays as produced by the double refracting crystal.

Section B

Note: Attempt any three questions. **2×3=6**

I. Two coherent waves having amplitudes 4 units and 2 units superimposed on each other with zero phase difference. Calculate the resultant intensity.

II. A monochromatic light of wavelength 5000Å from a narrow slit is incident on a double slit. If the overall separation of 20 fringes on a screen placed at 1.0 m away from the slit is 5.0cm, find the double slit separation.

III. In Fresnel's bi-prism experiment, the obtuse angle of the bi-prism is 178° and μ= 1.5. Interference fringes are found with source of wavelength 6000 Å located 10cm from the bi-prism and source to screen distance is 100cm. Find the maximum number of fringes that can be observed.

IV. A 20 cm long tube containing 100cm^3 of sugar solution rotates the plane of polarization by 10° .If the specific rotation of sugar is 60 deg $(dm)^{-1}$ $(gm/cc)^{-1}$ calculate the mass of sugar in solution.

Section C

Note: Attempt any three questions from section C. **3×3= 9**

I. Why the center of Newton's rings is found dark? Derive the expression for the diameter of the nth bright ring in reflected light.

II. Define the fringe width as observed in the Young's double slit experiment. Obtain the relevant formula for determining the fringe-width.

III. Derive an expression for the Intensity distribution due to Fraunhofer diffraction at single slit and find the directions of minima.

IV. Discuss theoretically the superposition of two linearly polarized light waves whose optical vectors are mutually perpendicular.