

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

## TEST -2 EXAMINATION- Oct 2017

B.Tech(BT/BI) I<sup>st</sup> Semester

COURSE CODE: 17B11PH111

MAX. MARKS:25

COURSE NAME: Basic Engineering Physics

COURSE CREDITS:04

MAX. TIME: One Hour Thirty Minutes

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*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

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- Q.1.** Show the non-existence of electron in the nucleus using uncertainty principle. 2.5
- Q.2.** What is the construction and use of Fresnel biprism? Draw the ray diagram to obtain interference pattern from the slit to the screen. 2.5
- Q.3.** In Newton's ring experiment find out the diameter of the dark fringes and discuss the spacing between the fringes. Give any one application of Newton's ring experiment in detail. 4
- Q.4.** Discuss Fraunhofer diffraction from double slits with the help of the diagrams, its diffraction profile and missing orders. 4
- Q.5.** Derive the equation to obtain elliptically and circularly polarized light from the superimposition of two mutually perpendicular linearly polarized waves. 4
- Q.6.** In Young's experiment, the wavelength of monochromatic light used is  $6000 \text{ \AA}$ . The optical path difference between the rays from the two coherent sources at point P on the screen is  $0.0085 \text{ mm}$  and at a point Q on the screen is  $0.0020 \text{ mm}$ . How many bright and dark bands are observed between the two points P and Q. 2
- Q.7.** In Fraunhofer diffraction due to a narrow slit, a screen is placed  $1.8 \text{ m}$  away from the lens obtain the pattern. If the slit width is  $0.18 \text{ mm}$  and the first minimum lie  $5.2 \text{ mm}$  on either side of the central maxima, find the wavelength of light. 2
- Q.8.** When one of the slit in Young's experiment is covered with a transparent sheet of thickness  $3.5 \times 10^{-3} \text{ cm}$ , the central fringe shifts to a position originally occupied by the  $30^{\text{th}}$  fringe. If the wavelength is  $6000 \text{ \AA}$ , find the refractive index of the sheet. 2
- Q.9.** Consider interference between waves from two sources of intensities  $I$  and  $4I$ . Find the intensity at a point where phase difference is (i)  $\pi/2$  and (ii)  $\pi$ . 2