

Guess Paper – 2014

Class – XII

Subject – PHYSICS

PHYSICS (OPTICS, DUAL NATURE, ATOMIC PHYSICS)

Q:1 Define the resolving power of a compound microscope. How does the resolving power of a compound microscope change when

- (i) refractive index of medium between the object and objective lens increases
- (ii) Wavelength of radiation used is increased?

Q:2 How would the angular separation of interference fringes in young's double slit experiment change when the distance of separation between the slits and the screen is doubled?

Q:3 Draw the graph between photoelectric current vs potential at different frequency but at constant intensity. Draw the graph between stopping potential vs frequency of radiation, what is slope of this graph represent.

Q:4 Explain the de Broglie explanation for Bohr's second postulates

Q:5 Give the Geiger Marsden experimental arrangement, define distance of closest approach

Q:6 Give the experimental arrangement of Davisson and Germer experiment.

Q:7 The wavelength λ of a photon and the de Broglie wavelength of an electron have the same value. Show that the energy of the photon is $2\lambda mc/h$ times the kinetic energy of the electron, where m , c and h have their usual meanings.

Q:8 Prove law of refraction with Huygens principle

Q:9 How maxima and minima is formed?

Q:10 The work function of caesium is 2.14 eV. Find (a) the threshold frequency for caesium, and (b) the wavelength of the incident light if the photo current is brought to zero by a stopping potential of 0.60 volt

Q:11 In a Young's double-slit experiment, the slits are separated by 0.28 mm and the screen is placed 1.4 m away. The distance between the central bright fringe and the fourth bright fringe is measured to be 1.2 cm. Determine the wavelength of light used in the experiment.

Q:12 Draw a labelled ray diagram of an astronomical telescope, forming the image at infinity.

An astronomical telescope uses two lenses powers 10 dioptre, 1 dioptre.

- (i) State with reason, which lens is preferred as objective and eye-piece.
- (ii) Calculate the magnifying power of the telescope, if the final image is formed at the near point.

(iii) How do the light gathering power and resolving power of a telescope change, if the aperture of the objective lens is doubled ?

Q:13 An angular magnification (magnifying power) of 30 is desired using an objective of focal length 1.25 cm and an eyepiece of focal length 5 cm. How will you set up the compound microscope ?

A myopic person has been using spectacles of power -1.0 dioptre for distant vision. During old age he also needs to use separate reading glass of power +2.0 dioptres. Explain what may have happened .

Q:14 Explain, using Huygens' principle ,how diffraction is produced by a narrow slit which is illuminated by monochromatic light. Show that central maximum is twice as wide as the other maxima and the pattern becomes narrower as the width of the slit is increased.

Q:15 (i) State Brewster's law. (ii) A small telescope has an objective lens of focal length 144 cm and an eyepiece of focal length 6.0 cm. What is the magnifying power of the telescope ? What is the separation between the objective and the eyepiece ?

Q:16 The ratio of intensity of maxima and minima in an interference pattern is 100:64. Calculate the ratio of intensities of the coherent source producing this pattern.

Q:17 What is diffraction of light? Draw a graph showing the variation of intensity with angle in a single slit diffraction experiment. Write one feature which distinguishes the observed pattern from the double slit interference pattern.

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