

S.Y.B.SC. SEM – III (CBCS - 2016 Course) : WINTER - 2018

SUBJECT: PHYSICS: OPTICS

Day: Monday
Date: 22/10/2018

W-2018-0714

Time: 11.00 A.M. To 02.00 P.M.
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw diagrams **WHEREVER** necessary.
 - 4) Use of calculator and log table is **ALLOWED**.
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Q.1 Answer any **TWO** of the following (12)

- a) Draw a ray diagram of Huygen's eyepiece, label it and find the condition for equivalent focal length.
- b) Explain Stoke's treatment.
- c) With necessary diagram explain the working of He-Ne laser.

Q.2 Answer any **TWO** of the following (12)

- a) Explain the process of production of plane polarized light by reflection.
- b) Derive Lens makers formula.
- c) Define resolving power of the instrument. Explain Rayleigh's criteria for resolution.

Q.3 Answer any **TWO** of the following (12)

- a) Obtain the condition $2\mu t \cos r = m\lambda$ for destructive interference in the reflected system of rays from a thin film.
- b) The focal length of each lens of Ramsden's eye piece is 4 cm. Calculate the equivalent focal length of eye piece and locate the positions of the cardinal points.
- c) Draw a ray diagram to show the image formation in a compound microscope. Derive an expression for its magnifying power.

Q.4 Answer any **THREE** of the following (12)

- a) State four points of comparison between Fresnel's diffraction and Fraunhofer's diffraction.
- b) Explain the types of retardation plates.
- c) Two thin convex lenses each of focal length 8 cm are kept co-axially and separated by distance 20 cm from each other. Find the position of principal points.
- d) Explain the theory of plane transmission grating.

P.T.O.

Q.5 Answer any **FOUR** of the following

(12)

- a) State any three applications of Brewster's law.
- b) Explain the determination of the refractive index of a liquid using Newton's rings.
- c) Define the following: (i) Positive crystal (ii) Negative crystal
- d) State three points of difference between Ramsden's eye piece and Huygen's eye piece.
- e) In Newton's ring experiment, the diameter of the 10th dark ring is found to be 4 mm. The radius of curvature of the plano-convex lens is 100 cm. Assuming the intervening medium to be air, calculate the wavelength of light.
- f) A parallel beam of sodium light is allowed to be incident normally on a plane grating having distance 0.20×10^{-5} m between its corresponding points. A second order spectral line is observed to be deviated by 30° . Calculate the wavelength of the spectral line.

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