

S.Y.B.SC. SEM – III (2014 COURSE) : SUMMER - 2018
SUBJECT: PHYSICS : OPTICS

Day: **Tuesday**
Date: **17/04/2018**

S-2018-0708

Time: **12.00 NOON TO 02.00 PM**
Max Marks. 40

N.B.

- 1) All questions are **COMPULSORY**.
 - 2) Draw diagrams **WHEREVER** necessary.
 - 3) Use of non programmable calculator is **ALLOWED**.
 - 4) Figures to the right indicate **FULL** marks.
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Q.1 Answer any **TWO** of the following **(10)**

- a) Draw a ray diagram to show an image formation in compound microscope. Obtain the expression for its magnifying power.
- b) Derive lens maker's formula for a thin lens.
- c) Explain the phenomenon of interference in thin film due to transmitted light. Obtain the expression for minima and maxima for transmitted light.

Q.2 Answer any **TWO** of the following **(10)**

- a) Distinguish between Fresnel and Fraunhofer type of diffraction.
- b) Draw a ray diagram of Huygen's piece. Label it and find the condition for equivalent focal length.
- c) What is a retardation plate? Give construction and theory of quarter wave plate and half wave plate.

Q.3 Answer any **TWO** of the following **(10)**

- a) State Brewster's Law and explain how it can be used to produce the plane polarized light.
- b) What is a Zone plate? Derive an expression for its focal length.
- c) Explain the working principle of Laser. Also give two applications of it.

Q.4 Answer any **FIVE** of the following **(10)**

- a) State two points of difference between interference and diffraction.
- b) State Rayleigh's criterion for resolution.
- c) What are positive and negative crystals? Give one example of each.
- d) Calculate the focal length of a double convex lens for which the radius of curvature of each surface is 25 cm and refractive index of the material of lens is 1.5.
- e) Define cardinal points of a system of co-axial lenses.
- f) The polarizing angle for air and transparent material is 60° . Calculate the refractive index of the material. What is the angle of refraction in the medium.
- g) Calculate the magnifying power of a magnifying glass of 5 cm focal length. Distance of distinct vision is 25 cm.