

Roll No.

TPH-101

**B. TECH. (FIRST SEMESTER)
MID SEMESTER EXAMINATION, Nov., 2022**

ENGINEERING PHYSICS

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each sub-questions carries 10 marks.

1. (a) In an Young's double slit experiment, derive the expression for the fringe width of the interference pattern. (CO1)

OR

- (b) In a typical biprism experiment $b/a = 20$, and for sodium light ($\lambda = 5893 \text{ \AA}$) one obtains fringe width of 0.1 cm; here b is the distance between the biprism and the screen, a is the distance between virtual source to the biprism. Assuming $\mu = 1.5$, calculate the prism angle α .

2. (a) What are the Newton's rings ? Describe the conditions of formation of the Newton's rings. (CO1)

OR

- (b) In a Newton's rings set up, diameter of 18th dark ring is found to be 9.5 mm. The space between spherical surface and the flat slab is then filled with water ($\mu = 1.33$). Calculate the diameter of the 14th dark ring in new setup.

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(2)

3. (a) Derive an expression for the intensity distribution due to Fraunhofer diffraction at a single slit and discuss the condition for principal maxima and minima. (CO1)

OR

- (b) In a diffraction grating the sodium doublet (5890 \AA , 5896 \AA) is viewed in fourth order at 30° to the normal and is just resolved. Determine the grating element and the total width of the rulings.
4. (a) Discuss about the resolving power of the N-slit diffraction grating. (CO1)

OR

- (b) Write down the expression for intensity in N-slit Fraunhofer diffraction and hence obtain conditions for principal maxima and minima.
5. (a) Discuss the types of fiber optics. What is Numerical Aperture (NA); also discuss its significance. (CO2)

OR

- (b) An optical fiber has a numerical aperture of 0.25 in air and cladding refractive index of 1.5. Find the numerical aperture of the fiber in a liquid of refractive index 1.3.