This question paper contains **2** printed pages]

WT—44—2024

FACULTY OF SCIENCE

M.Sc. (Second Year) (Fourth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

PHYSICS

Paper PHY-401

(Fiber Optics and Optical Fiber Communication)

(Wednesday, 11-12-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three Hours *Maximum Marks*—75

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

1. What is optical fiber ? Discuss propagation of light in an optical fiber. Explain acceptance angle and acceptance cone. 15

Or

(*a*) Discuss meridonal and skew rays. 7

(*b*) What are different modes of propagation of light ? 8

2. Explain impurity loss and Rayleigh scattring losses in optical fibers. Discuss characteristics of photodetectors. 15

Or

(*a*) What is spatial emission pattern of LASER ? 7

(*b*) Discuss structure of LED in optical fiber. 8

P.T.O.

3. Discuss diffraction grating sensors and interferometric sensors. Explain digital LASER transmitter in optical fiber communication system. 15

Or

(*a*) Discuss LED analog modulation in optical fiber communication system. 7

(*b*) Explain in detail internal effect intensity modulated sensor in fiber optics. 8

4. Describe important application of integrated optic fiber technology and coherent optical fiber communication system. 15

Or

(*a*) Describe measurement of numerical aperture (NA) and measurement of fiber attenuation in an optical fiber. 7

(*b*) Describe measurement of Mode Field Dimeter (MFD) by far field scanning and near field scanning techniques. 8

5. Write short notes on (any *three*) : 15

(*a*) Double crucible method

(*b*) Characteristics of photodetectors

(*c*) Fiber based modem-transreceiver

(*d*) Long-haul communication system.