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LB—42—2023

FACULTY OF SCIENCE

M.Sc. (Fourth Semester) EXAMINATION

APRIL/MAY 2023

PHYSICS

(Fiber Optics and Opitical Fiber Communication (PHY-401))

(Thursday, 4-5-2022)   **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. Describe meridional and skew types of rays. Calculate velocity of light in an optically active region of a substance at 650 nm and 700 nm. Compute corresponding wavelengths. Describe acceptance angle and acceptance cone.

       15

Or

(a)   What are different modes of propagation of light ? Explain each of them.   8

(b)   Discuss double crucible method for fabrication of fibers.   7

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

Or

(a)   Discuss electrical and optical bandwidths for dispersion in optical fiber.   8

(b)   Describe fiber LED coupling and spectral emission of LEDs.   7

3. Explain in detail optical fiber sensors and intensity modulated sensors. Describe transmitter for optical fiber communication.   15

P.T.O.

Or

(*a*) Discuss in detail micro bend strain intensity modulated fiber optic sensor. 8

(*b*) Describe digital laser transmitter. 7

4. Describe important applications of integrated optical fiber communication technology and long haul communication. 15

Or

(*a*) A step-index fiber has a core refractive index of 1.45. The cut-off angle for light entering the fiber from air is found to be 8°. Find numerical aperture of the fiber and refractive of the cladding of the fiber. 8

(*b*) A fiber has numerical aperture of 0.28. What is the cut-off angle in degrees for this fiber, if it is surrounded by vacuum ? 7

5. Write short notes on any *three* :

(*i*) A number of modes and cut-off parameters 5

(*ii*) Attenuation in optical fibers 5

(*iii*) Pulse code modulation 5

(*iv*) Near field scanning technique. 5