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

NEPWT—146—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(NEP-2020 Pattern)

PHYSICS

Paper–(SPHYC-503B)

(Fiber Optics and Lasers–I)

(Saturday, 14-12-2024) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Attempt any *three* questions from Q. No. **2** to Q. No. **6**.

(*iii*) *All* questions carry equal marks.

(*iv*) Symbols have their usual meaning in the subject.

1. Solve the following questions : 20

(*a*) Describe the basic structure of optical fiber. Explain different types of optical fiber

(*b*) Explain the modified chemical vapour deposition technique

(*c*) Explain the quantum theory of radiations

(*d*) Give the applications of lasers in meteorology.

P.T.O.

2. (*a*) What is acceptance angle of a fiber ? Find out the acceptance angle of a fiber if refractive index of the core and cladding is 1.55 and 1.50 respectively. 10

(*b*) Explain mode field diameter and spot size of an optical fiber. 10

3. (*a*) Describe in detail the vapour phase deposition technique for fiber synthesis. 10

(*b*) Write a note on liquid phase technique of fiber drawing. 10

4. (*a*) What are the properties of LASER light ? 10

(*b*) Write a note on Ruby laser. 10

5. (*a*) Explain the applications of LASER in optical communication. 10

(*b*) Give various medicinal and industrial applications of LASER. 10

6. Write short notes on the following : 20

(*a*) Numerical aperture

(*b*) Plasma activated CVD

(*c*) Optical Pumping

(*d*) Applications of lasers in ranging and navigation.