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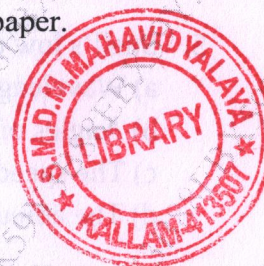
SUBJECT CODE NO: - BB-2521
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc (CBCGS)(Pattern 2022) T.Y SEM VI
Examination November / December 2025
Physics-XXIII Optical fibre and Communication

[Time: 1:30 Hours]**[Max. Marks: 40]**

Please check whether you have got the right question paper.

N. B

- 1) All questions are compulsory.
- 2) Draw the neat diagram whenever necessary.
- 3) All questions carry equal marks



Q1 Solve any one

- A) Define optical fiber, Explain in detail stepped-index monomode fiber. 10
- B) Explain the need of optical communication. Also explain total internal reflection and it's significance in the functioning of optical fiber. 10

Q2 Solve any one

- A) Explain in detail modified chemical vapour deposition process of fiber fabrication. 10
- B) What is Rayleigh scattering? Explain signal distortion in optical wave guide. 10

Q3 Answer the following questions –

05

- A) Write a note on glass fiber. 05
- B) An optical fiber has a core refractive index $n_1=1.48$ and a cladding refractive index $n_2=1.46$. Calculate the numerical aperture (NA) of the fiber and find the acceptance angel (θ) of the fiber. 05

OR

- A) Differentiate between vapour phase Axial Deposition (VAD) and modified chemical vapour deposition (MCVD), 05
- B) If Rayleigh scattering contributes an attenuation of 0.35 dB/Km in an optical fiber, calculate the total Rayleigh scattering loss over a 25 km span. 05

Q4 Choose the correct Answer

10

1. In which of the following applications are optical fibers commonly used?
 - a) Electrical Transformers
 - b) Musical instruments
 - c) Communication system
 - d) Nuclear reactors.
2. What is the typical diameter of the core in single-mode optical fibers?
 - a) 50 to 100 microns
 - b) 8 to 10 microns
 - c) 200 to 300 microns
 - d) 1 to 2 microns

3. What gas is commonly used in the OVPO process?
 - a) Nitrogen
 - b) silicon tetrachloride (SiCl_4)
 - c) Ammonia
 - d) Argon
4. Which of the following methods is known for producing high precision refractive index profiles?
 - a) VAD
 - b) MCVD
 - c) OVPO
 - d) PACVD
5. Snell's law describes the relationship between
 - a) Wavelength and frequency of light
 - b) Angles of incidence and refraction of light between two media.
 - c) The speed of light in vacuum versus in a medium
 - d) The amount of light absorbed in a medium
6. Which phenomenon is essential for light to be guided within an optical fiber?
 - a) Absorption
 - b) Transmission
 - c) Reflection
 - d) Total internal reflection.
7. What is the typical unit for measuring attenuation in optical fibers?
 - a) Watts/kilometres
 - b) Milliwatts
 - c) Decibels per kilometre
 - d) Lumens per meter.
8. Rayleigh scattering in optical fibers primarily depends on:
 - a) The temperature of the fiber
 - b) The geometric shape of the fiber
 - c) The wavelength of the transmitted light
 - d) The index of refraction or the cladding
9. Which of the following is associated with bending losses in optical fibers
 - a) Both micro bending and macro bending
 - b) only macro bending
 - c) only micro bending
 - d) None of the above
10. An optical fiber has an attenuation of 0.2 dB/km. How much signal loss will be there if a signal Travels through 5 km of fibers?
 - a) 10 dB
 - b) 5 dB
 - c) 1 dB
 - d) 3 dB

