

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

(2) Answer any **four** questions out of remaining **six** questions.

1. Answer the following in brief :-

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|--------|--|----|
| (a)    | Discuss the basic block diagram of optical communication system.   | 5  |
| (b)    | What are direct and indirect semiconductors ? Which types are suitable to be used as optical sources and detectors.  | 5  |
| (c)    | How does the optical signal propagate through the GIF.   | 5  |
| (d)    | What is the difference between coherent and non-coherent optical transmission ?  | 5  |
| 2. (a) | Explain the 'Different Modes' that can be supported by an optical fiber.   | 10 |
| (b)    | Using simple ray theory concept, discuss the transmission of light through single mode fiber. What is the major advantage of this type of fiber ?                                  | 10 |
| 3. (a) | 'Optical signal distortion limits the information carrying capacity of the fiber' Justify the comment.   | 10 |
| (b)    | List the important factors responsible for power loss in optical fiber. Explain each factor briefly.   | 10 |
| 4. (a) | What are the general requirements of a good optical source ? Describe the technique used to give both electrical and optical confinement in injection lasers.                      | 10 |
| (b)    | Draw the structure of APD alongwith electrical field profile that exist in the various regions. Explain its working and also explain why it is also called RAPD.                   | 10 |
| 5. (a) | Describe two methods of splicing individual fibers together. What are some advantages and disadvantages of each method ?   | 10 |
| (b)    | Discuss a popular non-destructive technique for attenuation measurement.   | 10 |
| 6.     | Describe three methods of preform fabrication. Include starting materials, heat sources, fabrication temperatures used and the technique used to make the preform for each method. | 20 |
| 7.     | Write short notes on any <b>four</b> :—  | 20 |
| (a)    | Rise time budget   |    |
| (b)    | Measurement of dispersion  |    |
| (c)    | Radiative losses in optical fiber.   |    |
| (d)    | PIN diode  |    |
| (e)    | Double heterogenous LED.   |    |