Total No. of printed pages = 3

EC 131801

Roll No. of candidate | | | | | | | | | | |

2020

B.Tech. 8th Semester End-Term Examination

ECE

OPTICAL COMMUNICATION

Full Marks – 50 Time – Two hours

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 (any *five*) and any 3 (*three*) from the rest.

1. Fill in the blanks : $(5 \times 1 = 5)$

   (i) The refractive index of core is _____ than cladding.

   (ii) Graded index fibres have a _____ refractive index in the core.

   (iii) Multimode SI fibre has large _____ and large _____.

   (iv) The _____ fibres are not mostly used for optical fiber communication.

   (v) When optical fibers are to be installed in a working environment, the most important parameter to be considered is _____.

[Turn over

(vi) Optical fibers for communication use are mostly fabricated from _____.

(vii) _____ results from small lateral forces exerted on the fibre during the cabling process.

(viii) The diffusion of hydrogen into optical fibre affects the _____.

(ix) A measure of amount of optical fibre emitted from source that can be coupled into a fibre is termed as _____.

(x) A permanent joint formed between two different optical fibres in the field is known as _____.

2. (a) Draw block diagram of fibre optic communication system and describe the functions of each component. (10)

(b) Write the applications of optical fibres and also mention some advantages of optical fibre communication system. (5)

3. (a) With proper diagram explain the ray transmission in optical fibre both for SI and GRIN fibres. (10)

(b) What do you mean by acceptance angle? Derive the expression for acceptance angle. (5)

4. (a) Explain electric field distribution for several of the lower order guided modes in symmetrical slab waveguide. (10)

(b) What is V-number? Derive the expression for V-number and the number of modes supported in a fibre. (5)

5. (a) What is chromatic dispersion? Explain briefly the two main causes of intramodal dispersion. (10)

   (b) What are bending losses? Explain its different types. (5)

6. (a) Explain with neat diagram the construction and working of Avalanche Photo Diode (APD). (10)

   (b) Differentiate between S-LED and E-LED. (5)

7. (a) What is fibre splicing? Explain with suitable diagram the different methods of splicing. (10)

   (b) What are optical connectors? What are the principal requirements of a good connector? (5)

8. (a) What are optical amplifiers? Describe the amplifier mechanism of Erbium Doped Fibre Amplifier briefly. (10)

   (b) Explain the working principle of OADM. (5)

9. Write short notes on (any *three*) : $(3 \times 5 = 15)$

   (a) SONET

   (b) WDM

   (c) LED

   (d) Laser Drive Circuit

   (e) Numerical Aperture.

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