2015

M.Sc.

3rd Semester Examination

ELECTRONICS

PAPER—ELC-304

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

(Optical Communication and Information Processing)

Answer *Q. No. 1* and any *three* questions from the rest.

1. (a) What is Manchester coding in optical fiber communication system ?

   (b) What do you mean by intrinsic losses in optical fiber communication ?

(c) Why the two wave lengths 1·33 μm and 1·55 μm are important in case of single mode filter optic communication system ?

(d) What do you mean by Micro-bending & Macro-bending losses ?

(e) What is V number ? Explain its significance.

5×2

2. What do you mean by WDM system ? What are the advantages of WDM over TDM ? Discuss any one type of WDM system. $2+3+5$

3. What is directional coupler ? What do you mean by evanocent field ? Derive the minimum coupling length required to transfer maximum amount of energy.

$2+1+7$

4. (a) Define the internal quantum efficiency of a LED. Derive the expression for it.

(b) A radiative and non-radiative recombination life times of the minority carriers in the active region of a double hetero junction LED are 60 ns and 100 ns respectively. Determine the total carrier recombination life time and the internally generated power within the device when the peak emission wavelength is 0.87 μm for a drive current of 40 mA.

$(1+5)+4$

(Continued)

5. (a) What do you mean by Time Division Multiplexing (TDM)? Discuss different types of TDM system.

(b) Write some advantages of optical fiber in communication.

(2+4)+4

6. What do you mean by + SLM and – SLM? Draw and explain the operation of an optical half-adder using optical EX–OR gate and optical AND gate. Hence construct an optical full-adder from optical half-adder.

2+4+4

[Internal Assessment — 10]

(Turn Over)