PG/IIS/ELC-205/11 (Pr.)

M.Sc. 2nd Semester Examination, 2011

ELECTRONICS

(Optoelectronics Lab)

PAPER—ELC-205

(Practical)

Full Marks : 50

Time : 3 hours

Answer any **one** question

The figures in the right-hand margin indicate marks

1. Draw I-V characteristics of LEDs of two different colours and hence compare the results of the two in respect of

   (*a*) Working formula/theory. 5

   (*b*) Circuit diagram. 2

   (*c*) Implementation of the circuit. 3

(*d*) Data for I-V characteristics. 9 + 9

(*e*) Drawing of graphs. 5

(*f*) Comparison and discussion of the results obtained. 2

2. Draw the applied voltage Luminous intensity characteristics of the supplied LEDs of two different colours and hence compare the results obtained in respect of

Experimental Marks Distribution

(*a*) Theory/Working formula. 5

(*b*) Circuit diagram. 2

(*c*) Implementation of the circuit. 3

(*d*) Data for L -V characteristics. 8 + 8

(*e*) Drawing of graph. 5

(*f*) Comparison and discussion of the results obtained. 4

3. Draw the characteristics of the given LDR at two light intensities. Calculate LDR resistance in both cases. Compare the resistances at the two intensities.

Experimental Marks Distribution

(*a*) Theory with working formula.	5
(*b*) Circuit diagram.	2
(*c*) Implementation of the circuit.	3
(*d*) Data for characteristics curve.	7 + 7
(*e*) Drawing of graph.	5
(*f*) Calculation of resistance.	2
(*g*) Comparison and discussion of the results obtained.	4

4. Find the numerical aperture of the given optical fibre. Calculate the acceptance angle of the same fibre.

Experimental Marks Distribution

(*a*) Working formula.	6
(*b*) Data for numerical aperture.	20

(*c*) Calculation of numerical aperture. 1

(*d*) Calculation of acceptance angle. 1

(*e*) Discussion of the results obtained. 1

5. Measure the diameter of a narrow wire by diffraction of LASER beam. Measure the diameter by another method. Compare the results obtained by the two methods.

Experimental Marks Distribution

(*a*) Working formula. 5

(*b*) Data for diffraction band on both sides of the central maximum. 16

(*c*) Calculation of diameter. 2

(*d*) Diameter measurement by other method. 8

(*e*) Comparison of results obtained and discussion. 4

6. Study the optical conversion of 4-bit digital signal to its analog form by R - 2R ladder network.

Experimental Marks Distribution

(*a*) Theory and Working formula.	5
(*b*) Circuit diagram.	2
(*c*) Implementation of the circuit.	3
(*d*) Data for different digital inputs.	18
(*e*) Drawing of graph.	5
(*f*) Discussion of results obtained.	2

7. Given a narrow wire of known diameter (use any conventional method to measure it) determine the wavelength of light by diffraction of LASER beam.

Experimental Marks Distribution

Theory	— 05
Data and Result	— 25
Discussion	— 05

8. Determine the diameter of a LASER beam at its input face by studying diffraction of LASER beam around a sharp edge on an optical bench.

Experimental Marks Distribution

Theory	— 05
Data and Result	— 25
Discussion	— 05

Marks Distribution

LNB	— 05
Viva-voce	— 10
Experiment	— 35
Total	— 50