

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER - 2024**

OPTICAL COMMUNICATION AND NETWORKING

[Maximum marks: 75]

[Time: 3 Hours]

PART A

I. Answer all the following questions in one word or one sentence. Each question carries 1 mark.

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	List the different types of optical fibers based on transmission mode.	M1.03	R
2	Define refractive index.	M1.01	R
3	List the optical sources in optical fiber communication.	M2.01	R
4	State why an APD is preferred over PIN diode for low level optical signal detection.	M2.01	R
5	State how an optical amplifier differs from electrical amplifier.	M3.01	R
6	Define dispersion in optical fiber.	M3.02	R
7	State the function of optical circulator.	M4.02	R
8	Expand the term SDH.	M4.02	R
9	State the function of beam splitter in optical fiber communication.	M4.02	R

PART B

II. Answer any eight questions from the following. Each question carries 3 marks.

(8 x 3 = 24 Marks)

		Module outcome	Cognitive level
1	Calculate the numerical aperture of a fiber with a core index of 1.65 and a cladding index of 1.55.	M1.01	A
2	Define numerical aperture and state its significance.	M1.01	R
3	A ray of light traveling in air is incident on a medium with refractive index of 1.5. Determine the angle of refraction if angle of incidence is 30°.	M1.01	A
4	Explain the modulation of LED.	M2.03	U
5	Draw the structure of edge emitting LED.	M2.02	R
6	Mention three features of WDM.	M3.03	R

7	Explain broadcast-and-select networks.	M4.03	U
8	Draw three types of couplers used in optical fiber communication.	M4.01	R
9	Explain optical modulation.	M4.04	U
10	Draw the diagram of optical isolator and state its function.	M4.02	R

PART C

Answer all questions. Each question carries seven marks.

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Explain the basic principle behind the light transmission in an optical fiber with figure.	M1.01	U
OR			
IV	Explain step index and graded index fibers. Draw their refractive index profiles.	M1.01	U
V	Explain absorption spontaneous emission and stimulated emission with diagram.	M2.01	U
OR			
VI	Draw and explain the basic structure of semiconductor laser diode.	M2.01	U
VII	Explain the principle of photodetection in avalanche photo diode with diagram.	M2.03	U
OR			
VIII	Draw the structure of PIN diode and explain its working as a photo detector.	M2.02	U
IX	Explain the working of EDFA with diagram.	M3.01	U
OR			
X	Explain the absorption losses and bend losses in optical fiber.	M3.02	U
XI	Draw and explain the block diagram of optical fiber communication system.	M3.03	U
OR			
XII	Explain the concept of Wavelength Division Multiplexing. Explain different forms of WDM.	M3.03	U
XIII	Explain the function of directional couplers. List their applications in optical fiber communication .	M4.02	U
OR			
XIV	Explain SONET and SDH.	M4.04	U
