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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2025

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	Define acceptance angle.	M1.02	R
2	List the types of fiber based on refractive index profile.	M1.03	R
3	Name the light sources used in fiber optics.	M2.01	R
4	Expand the term LASER.	M2.01	R
5	Write the use of photodiode in fiber optics.	M2.03	R
6	State dispersion in optical fibers.	M3.02	R
7	Expand DWDM.	M3.04	R
8	State the use of splicer.	M4.01	R
9	Write the use of optical fiber connector in the field of optical fiber communication.	M4.01	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	Light is incident from air into a glass fiber with a refractive index of 1.42. If the angle of incidence is 18°, what is the angle of refraction?	M1.01	A
2	List three applications and advantages of optical fiber.	M1.03	R
3	Compare single mode and multimode fiber.	M1.03	U
4	Explain the significance of numerical aperture in optical fiber with diagram.	M1.02	U
5	Draw the structure of surface emitting LED.	M2.01	R
6	State the difference between micro and macro bending loss in optical fiber with diagram.	M3.02	R

7	Explain the function of fiber coupler.	M4.02	U
8	Explain the function of optical modulator.	M4.02	U
9	State the function of an optical circulator with diagram.	M4.02	R
10	Explain how a wavelength-routed network differs from broadcast-and-select network.	M4.04	U

PART C
Answer all questions. Each question carries seven marks.

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.40 and a cladding refractive index of 1.37. Determine critical angle at the core-cladding interface, numerical aperture for the fiber and the acceptance angle in air for the fiber.	M1.02	U
	OR		
IV	Explain total internal reflection with diagram.	M1.01	U
V	Explain the theory of laser action with diagram.	M2.01	U
	OR		
VI	Explain the principle of photo detection in **PIN** photodiode with diagram.	M2.03	U
VII	Draw and explain laser diode structure.	M2.01	U
	OR		
VIII	Explain the principle of photo detection in avalanche photodiode with diagram.	M2.03	U
IX	Draw and explain the block diagram of optical fiber communication system.	M3.03	U
	OR		
X	Explain the working principle of semiconductor optical amplifier with diagram.	M3.01	U
XI	Explain the working principle of EDFA with diagram.	M3.01	U
	OR		
XII	Explain different types of dispersion losses in optical fiber.	M3.02	U
XIII	Explain the concept of Broadcast-and-select optical network with diagram.	M4.04	U
	OR		
XIV	Explain the working principle of optical directional couplers with diagram.	M4.02	U

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