DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 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 '*one*' mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	Define refractive index.	M1.01	R
2.	List the types of fiber based on transmission mode.	M1.03	R
3.	Define the term population inversion.	M2.01	R
4.	Expand the term LED.	M2.01	R
5.	List any two characteristics of laser	M2.01	R
6.	Define signal attenuation within optical fiber.	M3.02	R
7.	State the functional difference between optical amplifier and electronic amplifier.	M3.01	R
8.	Expand the term SONET.	M4.04	R
9.	State the function of beam splitter.	M4.02	R

PART-B

II. Answer any '*eight*' questions from the following. Each question carries '*three*' marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	A beam of flashlight traveling in air is incident on a surface of a thin glass at an angle of **30°** with the normal. The index of refraction of the glass is **1.52.** Calculate the angle of refraction.	M1.01	A
2.	List any three differences between PIN and avalanche photodiodes.	M2.04	R
3.	Explain bend losses in optical fiber.	M3.02	U
4.	Explain the working of semiconductor optical amplifier with diagram.	M3.01	U
5.	Explain scattering loss in optical fiber.	M3.02	U
6.	Draw the block diagram of optical transmitter.	M3.03	R
7.	Describe the function of optical modulator.	M4.02	U
8.	Explain the function of optical isolator.	M4.02	U
9.	State the basic difference between 'broadcast-and-select network' and 'wavelength- routed- network'	M4.04	R
10.	State the function of fiber connector and splicer.	M4.01	R

PART-C
Answer 'all' questions from the following. Each question carries 'seven' marks.

(6 x 7 = 42 Marks)

Module Outcome   Cognitive level

		Module Outcome	Cognitive level
III.	Explain any seven advantages of optical fiber communication.	M1.03	U
	OR		
IV.	Calculate the acceptance angle, numerical aperture and critical angle of a fiber having a core refractive index of 1.5 and a cladding refractive index of 1.45.	M1.02	U
V.	A step index fiber has a numerical aperture of 0.26 and a core refractive index of 1.5. Calculate refractive index of the cladding and angle of acceptance.	M1.02	U
	OR		
VI.	Explain total internal reflection in optical fiber with diagram.	M1.01	U
VII.	Describe the structure of edge emitting LED with figure.	M2.01	U
	OR		
VIII.	Describe the structure of laser diode with diagram.	M2.01	U
IX.	Explain the working principle of avalanche photodiode with diagram.	M2.03	U
	OR		
X.	Explain the working principle of PIN photodiode with diagram.	M2.03	U
XI.	Draw and explain the block diagram of optical fiber communication system.	M3.03	U
	OR		
XII.	Explain wavelength division multiplexing with diagram.	M3.04	U
XIII.	Explain working principle of directional coupler with figure.	M4.02	U
	OR		
XIV.	Explain the function of optical circulator with diagram.	M4.02	U

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