Total No. of Questions: 20

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

EC3CO21 Fiber Optic Communications

Programme	:	B.Tech.	**Branch/Specialisation**	:	EC
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. What is the material used for the manufacture of fiber optic cables? **1 1 1**

Rubric	Marks
Both (C) Plastic and (D) Glass are the answer.	1

- ○ Wood
- ○ Steel
- ◉ Plastic
- ○ Glass

Q2. What is used in the optical fiber for the total internal reflections? **1 1 1**

- ○ Core
- ○ Cladding
- ◉ Both (A) and (B)
- ○ None of these

Q3. Different modes of light travel at slightly different speeds in a multimode fiber is known as- **1 2 2**

- ◉ Intermodal dispersion
- ○ Intramodal dispersion
- ○ Implied dispersion
- ○ None of these

Q4. Signal degradation in optical fibers primarily caused due to- **1 2 2**

- ◉ Attenuation and dispersion
- ○ Banding losses
- ○ Can not say
- ○ None of these

Q5. The devices which convert electrical signals into optical signals for transmission through optical fibers are called- **1 3 2**

- ○ Line diodes
- ◉ Laser diodes
- ○ PN diodes
- ○ None of these

Q6. The range of frequencies at which modulated light can be detected are called- **1 3 2**

- ○ Bandwidth
- ◉ Optical modulation bandwidth
- ○ Modulation channel
- ○ None of these

Q7. The device which enhances light without need of electrical signal is called- **1 3 1**

- ◉ Optical amplifiers
- ○ Semiconductor amplifiers
- ○ Electrical amplifiers
- ○ None of these

Q8. GaAs photodiodes have a long wavelength cutoff around wavelength of- **1 1 1**

- ○ 830 nm
- ◉ 870 nm
- ○ 750 nm
- ○ None of these

Q9. The operation of conventional optical isolators depends on- **1 3 1**

- ○ Lenz's law
- ○ Beers law
- ◉ Faraday effect
- ○ None of these

Q10. Self - Phase Modulation refers to an example of- **1 4 2**

- ○ Linear optical effect
- ○ Rayleigh optical effect
- ◉ Nonlinear optical effect
- ○ None of these

Section 2 (Answer all question(s))

Marks CO BL

Q11. Describe the key elements of optical fiber systems. **4 1 1**

Rubric	Marks
Key elements name	1
key elements description specifically working or operation	3

Q12. (a) Define optical spectral bands. Describe the modes of step index fiber. **6 2 2**

Rubric	Marks
Define optical spectral bands (with names and their frequency or wavelength)	2
Describe the modes of step index fiber.	4

(OR)

(b) Discuss various types of fiber fabrication in optical fiber.

Rubric	Marks
Types	1
Description of any two types with diagrams	5

Section 3 (Answer all question(s))

Marks CO BL

Q13. Define: **4 2 2**
(i) Material dispersion
(ii) Waveguide dispersion

Rubric	Marks
Material dispersion (definition, fiber type, remedy) with formula	2
Waveguide dispersion (definition, fiber type, remedy) with formula	2

Q14. (a) What is the significance of fiber splicing? Describe the techniques of fiber splicing. **6 2 2**

Rubric	Marks
Significance	2
Techniques	4

(OR)

(b) Discuss various phenomenon of signal degradation in optical fibers .

Rubric	Marks
Name of phenomenon (attenuation and dispersion)	1
Description of phenomenon (4.5), diagram of dispersion (0.5)	5

Section 4 (Answer all question(s))

Marks CO BL

Q15. List types of optical sources. What is population inversion? **4 3 2**

Rubric	Marks
Types of optical sources	2
Population inversion definition (1 mark), diagram (1 mark)	2

Q16. (a) Compare spontaneous emission, stimulated emission and lasing in optical systems **6 3 1**

Rubric	Marks
Comparison points (any 4 key points)	6

(OR)

(b) Discuss various characteristics of LED. Also define optical output power.

Rubric	Marks
Characteristics of LED (any 4 key characteristics)	4
Definiition of optical output power	2

Section 5 (Answer all question(s))

Marks CO BL

Q17. State the optical detection principle. What is photo transistor? **4 4 2**

Rubric	Marks
Optical detection principle Definition - 1 mark ang diagram - 1 mark	2
Photo transistor	2

Q18. (a) Compare semiconductor amplifiers and fiber amplifiers along with examples. **6 4 2**

Rubric	Marks
Comparison points (any four key points)	6

(OR)

(b) Discuss semiconductor photodiode without internal gain and photodiodes with internal gain.

Rubric	Marks
semiconductor photodiode without internal gain (2 marks) with diagram (1 mark)	3
photodiodes with internal gain (2 marks) with diagram (1 mark)	3

Section 6 (Answer all question(s))

Marks CO BL

Q19. Define optical sensor and optical isolator. **4 3 1**

Rubric	Marks
Optical sensor (definition, working principle with some types)	2
Optical isolator (definition, working principle with its types)	2

Q20. (a) Describe various nonlinear optical effects. **6 4 2**

Rubric	Marks
Types of non linear effect (4 types which carries half mark each)	2
Description with proper definition (4 types- 1 mark each)	4

(OR)

(b) Describe wavelength division multiplexing with suitable diagram.

Rubric	Marks
Diagram of WDM	3
Description WDM (types of WDM also)	3

******