B.E. / B.Tech. Instrumentation Engineering (Model Curriculum) Semester-IV

IN401 / IN104M - Fundamentals of Optical Communication

P. Pages : 2 **GUG/S/25/14014**

Time : Three Hours * 2 3 5 4 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain Amplitude modulation in detail. **8**

b) i) Define modulation and types of modulation. Explain why modulation is needed? **4**

ii) What are the advantages and disadvantages of modulation? **4**

OR

2. a) Compare Frequency modulation and Amplitude modulation. **8**

b) Define modulation index. Derive expression for it. **8**

3. a) What is Pulse code modulation? **8**

b) What is Radio receiver? Discuss its characteristics. **8**

OR

4. a) Explain basic Time Division Multiplexing system. **8**

b) Describe the process of obtaining a PCM signal. **8**

5. a) What are the basic steps to form a Laser beam? **8**

b) Compare LED and LASER diode. **8**

OR

6. a) Write short note on P-N junction diode. **8**

b) Explain CO_2 laser. **8**

7. a) Explain optical power budget with suitable diagram. **8**

b) What is Bidirectional wavelength division multiplexing? **8**

OR

8. a) Explain Double crucible method of fiber drawing process. **8**

b) Derive $NA = \left(n_1^2 - n_2^2\right)^{1/2}$. **8**

9. a) Explain speed measurement using optocoupler with suitable diagram. **8**

b) What are the different military applications of laser? **8**

OR

10. a) What is optocoupler? Discuss working principle of optocoupler with neat diagram. **8**

b) Write short note on: **8**

i) Material Dispersion

ii) Waveguide Dispersion

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