Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SECOND SEMESTER M.TECH DEGREE END SEMESTER EXAMINATION - APRIL / MAY 2017

SUBJECT: OPTICAL FIBER COMMUNICATION (ECE - 5250)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Define terms i)Acceptance angle ii)Numerical Aperture. Derive maximum acceptance angle and numerical aperture highlighting their relationship .

1B A step index mode fiber with NA of 0.2 supports approximately 1000 modes at 850nm wavelength . What is the diameter of its core .How many modes does the fiber support at 1320 nm and at 1550 nm.

1C. What are the advantages and disadvantages of OFC?

(4+3+3)

2A. What do you understand by Inter Symbol Interference (ISI)? A multi graded index fibre exhibits total pulse broadening of 0.1μs over a distance of 15km.

i) Estimate the maximum possible bandwidth without ISI
ii) Pulse dispersion per unit length

2B. What do you understand by optical detector? Discuss various types of optical detectors and parameters of optical detectors.

2C Describe techniques employed to provide dispersion shifted fibre

(4+3+3)

3A. What is splicing? Explain different types of splicing in OFC.

3B. List the requirement of a good connector also explain different types of misalignment in fibre.

3C Differentiate between intramodal and intermodal dispersion for step and graded index fibres.

(4+3+3)

4A. An optical fibre system at 1300 nm has -13 dBm power coupled into the fibre. The PIN Diode detector sensitivity is - 38 dBm. The fibre attenuation is 1.5 dB/km with connector loss of 1 dB/km connector at each end. If a safety margin of 6 dB is required, find the maximum attenuation limited transmission distance.

4B. Explain two different types of WDM system?

4C Explain the working principle of LED. How the quantum efficiency of a LED is defined? List out various parameters which are needed to be optimized for getting maximum output power from the LED.

(4+3+3)

5A. Explain the detection process in p-n photodiode. Compare this device with the p-i-n photodiode.

5B. What is the requirement for optical sources to feed into a fibre? Enlist the advantage &disadvantages of LASER & LED.

5C What are the factors to be considered in link power budget?

(4+3+3)