MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SECOND SEMESTER M.TECH DEGREE END SEMESTER EXAMINATION
MAY/JUNE 2016
SUBJECT: OPTICAL FIBRE COMMUNICATION (ECE - 540)

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

Instructions to candidates
- Answer **FIVE FULL** questions.
- Missing data may be suitably assumed.

1A.   Explain different types of optical fibres. What do you mean by different modes in them?

1B.   Explain DWM, DDWM, SDH concept.

                                                                                          (5+5)

2A.   Derive an expression for the maximum acceptance angle and numerical aperture of a step index optical fibre. An optical fibre has the following parameters. Core refractive index = 1.55, cladding refractive index = 1.51 and core diameter = 50µm. If light is launched into this fibre from a medium of refractive index 1.32, find the numerical aperture and maximum acceptance angle. If the fibre is to be used at an operating wavelength of 800 nm, determine the *V* number and the number of modes supported.

2B.   Explain how SDH and WDM multiplexing is done in optical fibres.
2C.   Compare LASER and LED source.

                                                                                          (5+3+2)

3A.   Explain different types of losses in OFC .Plot the attenuation vs. losses in OFC.
3B.   Explain and compare PIN and APD photo detector. Mention the applications of them.

                                                                                          (5+5)

4A.   Explain with block diagram the block diagram of OTDR and the different methods of measuring dispersion and attenuation using OTDR.

4B.   Explain cutback method of measuring attenuation using OTDR.

4C.   What does V number signifies in a fibre explain.

                                                                                          (5+3+2)

5A.   Explain material dispersion and waveguide dispersion in optical fibres. Plot both dispersion vs. wavelength.

5B.   Explain how numerical aperture is measured in optical fibres with relevant equation.

                                                                                          (5+5)

6A.   What is splicing? Explain different types of splicing in OFC.

6B.   What are the requirements of the designer to choose the components and their associated characteristics in OFC in Link Power Budget?

                                                                                          (5+5)