



SE-7387

B. E. - IV (Sem - VII) (E&C) Examination

May / June - 2011

Fiber Optics Communication

Time : Hours]

[Total Marks :

Instructions :

(1)

नीचे दृशावेव निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - IV (Sem - VII) (E&C)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Fiber Optics Communication"/>	<input type="text"/>
Subject Code No. : <input type="text" value="7"/> <input type="text" value="3"/> <input type="text" value="8"/> <input type="text" value="7"/>	<input type="text"/>
Section No. (1, 2,.....): <input type="text" value="Nil"/>	<input type="text"/>
	Student's Signature

(2) Figure to the right indicate marks.

(3) Assume suitable data if found necessary.

1 (a) Attempt the following questions. 10

- Draw fiber optic transmission link along with its major elements.
- Draw the schematic of single fiber structure. Explain importance of each part of fiber.
- What is index difference and what should be its typical value for single mode fiber and multimode fiber?
- What requirements must be satisfied for selection of fiber material.
- What is the difference between attenuation and dispersion ?

(b) Attempt the following questions. 10

- Why silica is added with glass fiber ? Explain OVPO process for fiber fabrication.
- Explain the concept of double hetro structure to achieve optical and carrier confinement. Also explain the concept of ELED.

- 2** Attempt any **two**. **16**
- (i) Explain fiber end face preparation methods. Explain different types of lensing schemes for coupling improvement. What are the different types of mechanical misalignments ?
 - (ii) Explain different types of bending losses which results into the attenuation of signal.
 - (iii) What is NA ? Derive an equation of NA for step index multi mode fiber. Explain the concept of V number and its relation with modes confined into the core.
- 3** Attempt any **two** : **14**
- (i) Design an optical fiber communications link with a system capacity of 100 Mb/s and a length of 120 km. Given parameters are (1) splicing loss = 0.3 dB per splice (Assume every splice at 4 km) (2) connector loss = 2.0 dB (3) power margin = 12 dB (4) optical output power 0.5 dBm (5) optical fiber attenuation = 0.2 dB/km (6) optical receiver sensitivity = -50 dBm.
Comment whether system is functional or not. If system is not functional, change the design parameter in such a manner that system becomes functional.
 - (ii) What is the difference between fiber splicing and connector ? Explain different types of splicing techniques. What are the main requirements of fiber optic connectors.
 - (iii) Explain the concept of double hetro structure to achieve optical and carrier confinement. Also explain the concept of SLED.
- 4** Do as directed : (**four** mark each) **20**
- (a) Explain basic operation of general optical amplifier.
 - (b) Explain link power budget.
 - (c) Explain the chromatic dispersion measurement method.
 - (d) Explain working principle of fiber Bragg grating.
 - (e) What is an importance of eye pattern ?

- 5** Attempt any **two**. **14**
- (a) What is the principal role of star couplers ? Explain the star coupler in detail and derive equations for splitting and excess loss.
 - (b) Draw WDM network with all elements and discuss some features of this architecture.
 - (c) Explain frequency and time domain intermodal dispersion measurement method.
- 6** Attempt any **two**. **16**
- (a) EDFA architecture.
 - (b) Tunable filters.
 - (c) Mech-Zehnder Interferometer Multiplexer.
 - (d) SONET/SDH networks.
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