

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**Question Paper Code : 31231**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Seventh Semester

Electronics and Communication Engineering

EC 1401 — OPTICAL COMMUNICATION AND NETWORKS

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why is lossless combining not possible in couplers?
2. Define insertion loss.
3. Show how an ATM over SONET network is realised.
4. What is known as light path?
5. Give any four examples for broadcast and select networks.
6. Which is known as "tell-and-go" protocol? Why?
7. Write the functions of WXC.
8. Define Circuit switching.
9. Define Bit interleaving.
10. What is a test bed?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the principle of operation of Fabry-perot filter. Describe its tunability. (8)
- (ii) Draw the diagram and explain the principle of operation of Mach-Zehnder interferometer. Describe its transfer function. (8)

Or

- (b) (i) With the help of energy band structures, explain the principle of operation of SOA. Explain crosstalk in it. (8)
- (ii) Explain Mechanical, Electro-optic and thermo-optic switches with their performance comparison. (8)
12. (a) (i) Describe integration of TDM signals and mapping of lower-speed PDH streams into VT in SONET. (8)
- (ii) Explain Ring architectures of SONET. (8)

Or

- (b) (i) Calculate the equivalent distance limitations of the different types of SONET systems such as OC-3, OC-12 and OC-48. Assume a loss of 0.25 dB/km, at 1550 nm and 0.5 dB/km at 1310 nm. (8)
- (ii) Write a detailed notes on network management of SONET network. (8)
13. (a) (i) Explain the topologies for broadcast networks. Draw the internal structure of a star coupler. (8)
- (ii) Draw the architecture and explain the Rainbow and STARNET test beds. (8)

Or

- (b) (i) Describe how synchronization is achieved for frame/slot in MAC protocol. (8)
- (ii) Explain the protocol that is specifically designed for multi wavelength optical networks among all MAC protocols. (8)
14. (a) (i) Draw and explain the realization of different types of WXC's. Compare between the optical and electronic WXC's. (8)
- (ii) Write short notes on optical layer cost tradeoffs. (8)

Or

- (b) Explain in detail about any four types of wavelength routing test beds. (16)

15. (a) (i) Describe the concept of OTDM. Explain bit interleaving and packet interleaving in it. (8)
- (ii) Draw and explain the operation principle of soliton-trapping AND gate. (8)

Or

- (b) (i) What are the functions of a routing node of broadcast of OTDM network? Explain them briefly. (8)
- (ii) What are feed-forward and feedback delay lines? Explain their applications in Broadcast OTDM networks. (8)