Paper / Subject Code: 52953 / Optical Networks (DLOC)

B.E. SEM VIII | CBCGS | ET

NOV-DEC 2012

Duration: 3hrs **[Max Marks:80]**

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt any **FOUR**

a Mention difference between circuit switching and packet switching. **[20]**

b Calculate STS 1 (synchronous transport signal level 1) when the SONET frame has 125 μs duration.

c Explain principle of operation of MachZender interferometer.

d Write short note on wavelength division assignment.

e Write short note on network survivability with protection of client layer. Discuss operation of internetwork between layers.

2 a Explain different multiplexing techniques in optical network. **[10]**

b Explain principle of operation of operation of WDM in optical communication with its advantages and disadvantages. **[10]**

3 a Illustrate the role of optical add and drop multiplexer (OADM) in providing cost effective means of handling traffic in optical network. Compare deployment of OADM with point-to-point WDM systems. **[10]**

b Explain in detail network management and protection architecture of SDH. **[10]**

4 a Explain working of multiprotocol lambda switching (MPLS) in optical network. Summarize how MPLS differs from multiprotocol label switching. **[10]**

b Explain the advantages of switching in optical networks and how IP forwarding differs from label switching in optical networks? **[10]**

5 a Explain SDH frame structure and show that the basic bit rate is 51.84 Mbps. **[10]**

b Explain the basic SONET transmission format with aid of a diagram. **[10]**

6 a Explain network management and discuss management framework. **[10]**

b Write short note on **(any 2)** **[10]**

i) Couplers

ii) Solitons

iii) Wavelength converters.

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1 Attempt any **FOUR**

a Explain polarization **[20]**

b Explain the various frequency bands used in satellite communication. List out advantages and disadvantages of 6/4 GHz band used in satellite communication **[5]**

c Compare DS- CDMA & FH-CDMA **[5]**

d Explain the parameters that control the design of earth station **[5]**

e Write a short note on bath tub curve. **[5]**

2 a Draw and explain simplified block diagram of satellite transponders:
a. Single conversion C band. b. Double conversion Ku band **[10]**

b Define the following with respect to TWTA amplifier
a. 1 dB compression point
b. Input and Output back-off
c. 3rd order Inter-modulation Noise
d. Am/PM conversion coefficient **[10]**

3 a A multiple carrier satellite circuit operates in the 6/4-GHz band with the following characteristics. Uplink: Saturation flux density 67.5 dBW/m2 ; input BO 11 dB; satellite G/T 11.6 dBK 1 . Downlink: Satellite saturation EIRP 26.6 dBW; output BO 6 dB; free-space loss 196.7 dB; earth station G/T 40.7 dBK 1 . For this example, the other losses may be ignored. Calculate the carrier-to-noise density ratios for both links and the combined value **[10]**

b Explain
(1) Lobe switching
(2) Mono pulse tracking

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(3) step tracking

(4) intelligent tracking

4 a Explain TDMA frame structure and Unique word detection in detail. **[10]**

b Draw a block diagram of TVRO or DBS system and explain each block in brief **[10]**

5 a Write a short note on

a. Sun-synchronous orbit. **[10]**

b. Polar orbit

c. Molynia orbit

d. Sun transit outage

e. Solar and Sidereal day

b Derive general link equation. Find expression for C/N and G/T ratio. Explain importance of these ratios in satellite link design. **[10]**

6 a Differentiate MCPC and SCPC FDMA systems and explain SPADE system in detail, **[10]**

b What are the different types of lasers used for satellite communication? Explain acquisition link model for optical communication **[10]**

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Time: 3 Hour **Marks: 80**

N.B.: (1) Question No. 1 is compulsory.

(2) Solve any three questions from the remaining five

(3) Figures to the right indicate full marks

(4) Assume suitable data if necessary and mention the same in the answer sheet.

Q1. Attempt any 4 questions

A) What are the perspectives of Network Managers? **[20]**

B) Show the encoding for the INTEGER 1456.

B) Explain in brief OSI Management System Architecture.

C) Explain the basic objectives and need for a TMN.

D) Analyze five-step process involved in Fault management.

E) Explain in detail the Broadband Service Networks.

Q2. A) How Network provisioning play role in Configuration Management. **[5]**

B) Show the encoding for the OCTET STRING "Hello World." **[5]**

C) Explain Performance Metrices to defining network performance on a global level. **[5]**

D) Justify the role of SNMP and ILMI in ATM Management. **[5]**

Q3 A) Elaborate the encoding methods used in SMI **[5]**

B) What is ATM LAN emulation **[5]**

C) Explain different types of reports used in Report Management. **[5]**

D) Draw and explain TMN Functional Architecture. **[5]**

Q4 A) Explain ATM Network Reference Model **10**

B) Draw and explain SNMPv3 **10**

Q5 A) Classify and explain the OSI network management organizational model. **10**

B) Explain M1, M2, M3, M4, M5 interface in Network Management. **10**

Q6 A) What do you mean by event corelation technique. Propose and explain any two event corelation techniques. **10**

B) Classify the services provided by Common Management Information Service Elements (CMISEs) and also explain the communication protocol used for intersystem communication (CMIP). **10**