Exam.Code:0932
Sub. Code: 6635

2054

B.E. (Electronics and Communication Engineering)

Eighth Semester

EC-803: Optical Networks

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

a) Write any four main features of WDM networks.

b) Define the responsivity of a photodiode and describe its dependence on the wavelength.

c) Sketch the signal waveforms of NRZ and RZ modulation formats assuming any 4 bit random data sequence.

d) What are the main applications of Passive optical networks?

e) In short, explain the function of header processing in photonic switching. (5x2)

UNIT - I

II. a) Describe 1G and 2G optical networks, in terms of applications supported, components used, data rates and main limitations of 1G and 2G optical networks.

b) Explain the working principle of an EDFA amplifier with the aid of a suitable diagram. (2x5)

III. a) Calculate the responsivity of a p-i-n photodiode at 1.3 um and 1.55 um if quantum efficiency is 90 %. Why is the photodiode more responsive at 1.55 um?

b) Explain the main differences between a single mode and a multimode fiber. Discuss their applications in different types of optical networks. (2x5)

IV. a) Discuss the working principle of a VCSEL and its application in WDM based optical networks.

b) Explain in detail the function of different building blocks of an optical receiver. (2x5)

P.T.O.

UNIT - II

V. a) Describe in detail the different constituent elements, function of each element and working principle along with the features of a WDM PON. What were the main issues with earlier version of simple PON or TPON and how WDM PON resolved these issues?

b) Describe in short the functions of ONU in an access networks. (8,2)

VI a) Is least congested path routing based on alternate routing the same as selecting a route using alternate routing and then applying the least used wavelength selection algorithm? Justify your answer with the help of an example.

b) State wavelength continuity constraint. (8,2)

VII. a) Explain the SONET frame structure in detail. Also write the functions of different overheads used in SONET/SDH frame structure.

b) Write the main advantages of photonic switching. (7,3)

x-x-x