Printed Pages—3 TEC043

(Following Paper ID and Roll No. to be filled in your Answer Book)
PAPER ID : 0393 Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION 2010-11

OPTICAL NETWORKS

Time : 3 Hours *Total Marks : 100*

Note : (1) Attempt **all** questions.

(2) Each question carries equal marks.

1. Attempt any **four** parts of the following : **(5×4=20)**

(a) Write a short note on timing and synchronization in optical networks.

(b) Draw a block diagram and explain the key elements of optical communication system.

(c) Why non-linear effects arise in optical fibers ? Explain the various non-linear effects in optical fiber.

(d) Why there is a need of multiplexing in optical network ? Explain the function of optical ADD/DROP Multiplexers.

(e) What are Solitons ? Explain its types and working.

(f) Give a comparative account of the optical network layer and ISO-OSI model.

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2. Attempt any four parts of the following : (5×4=20)

(a) Give an account of the various architecture used for building large optical switches.

(b) Write short notes on :-

(i) Tunable VCSELs

(ii) Two and three section DBR lasers.

(c) State the principle of operation of Mach-Zehender interferometer.

(d) What are couplers ? Explain its working and principle of operation.

(e) Write short note on wavelength converter. Mention any one of the approaches used in realizing them.

(f) Derive the power transfer function of Fabry-Perot filter.

3. Attempt any two parts of the following : (10×2=20)

(a) Explain SONET/SDH frame structure in detail. Give a brief account of SONET/SDH layers with diagram.

(b) Discuss voice over IP method of implementation in optical communication system.

(c) Explain ATM, its advantages and function in detail and also explain how does an ATM establishes a connection between two end points for the purpose of transferring data with the help of an example.

4. Attempt any two parts of the following: (10×2=20)

(a) Differentiate between Light path topology design (LTD) problem and routing and wavelength assignment problem.

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For a point to point WDM (PWDM) ring design topology, calculate design parameters required in determining and minimizing network cost.

(b) Why SONET/SDH are called self-healing ? Explain the protection technique implemented in SONET/SDH rings.

(c) Briefly explain network architecture overview in reference to optical network. Compare UPSR, BLSR/2, BLSR/4.

5. Attempt any two parts of the following : (10×2=20)

(a) Explain the OTDM and Buffering functions performed by photonic packet switched (PPS) network.

(b) Explain optical switching on the basis of optical cross connect and optical burst switching.

(c) Explain internetworking between layers.a WDM network carrying SONET traffic, Classified broadcast OTDM and Switch based Network.