

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

PAPER ID : 0393

Roll No.

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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.

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.

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.