B.TECH.
THEORY EXAMINATION (SEM–VIII) 2016-17
OPTICAL NETWORKS

Time : 3 Hours   *Max. Marks : 100*

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. **Explain the following:**   **10 x 2 = 20**
    - **(a)** What do you understand by all-optical and opaque optical network?
    - **(b)** Differentiate between circuit switching and packet switching.
    - **(c)** Discuss the principle of operation of reflections grating.
    - **(d)** What do you understand by multiplexer and filters in optical network?
    - **(e)** What are point to point links in optical network?
    - **(f)** What is SONET/SDH concatenation?
    - **(g)** What are wavelength converters? Mentions their types
    - **(h)** What are solitons? How they are capable of reducing the non-linear effects?
    - **(i)** Explain gigabit and VLAN Ethernet frames.
    - **(j)** How do we arrive at 51.84 Mbps basic transmission rate in SONET/SDH?

SECTION – B

2. **Attempt any five of the following questions:**   **5 x 10 = 50**
    - **(a)** Explain the reasons for growing demand of optical networks. What are the key networks elements that enable optical networking?
    - **(b)** Mention the advantages offered by optical amplifiers over regenerators. Explain principle of operation of EDFA.
    - **(c)** Explain the structure and properties of VCSELs laser. Also tells about the different tuning mechanisms
    - **(d)** Explain OTDM with a function of a bit interleaved optical multiplexer?
    - **(e)** What do you understand by spectral efficiency? Explain about optical Duobinary modulation with the help of mathematical expression.
    - **(f)** With a neat diagram, explain the OTN frame structure. Also explain OTN hierarchy in detail. Why is this hierarchy more elaborate than SONET/SDH?
    - **(g)** Why SONET/SDH are called self healing. Explain the protection technique implemented in SONET/SDH rings?
    - **(h)** Explain the functions performed by Routers in photonic packet switched (PPS) networks?

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3. Differentiate between Light Path Topology(LTD) problem and Routing and Wavelength assignment problem(RWA). For a point to point WDM ring design topology, calculate design parameters required in determining and minimizing network cost?

4. Explain the optical switching on the basis of optical Cross Connect & Optical Burst Switching.

5. What are the different ways deployed for increasing transmission capacity in optical networks? Explain architectural choices for deploying next generations transport networks.