B.TECH. SEM. – VII (ELECTRONICS ENGG.) (2007 COURSE) : WINTER 2018
SUBJECT : ELECTIVE – I : OPTO ELECTRONICS

Day : Wednesday
Date : 05-12-2018 W-2018-2926

Time : 2:30 PM TO 5:30 PM.
Max. Marks : 80

N.B.

1) **Q.No. 1** and **Q.No.5** are **COMPULSORY**. Out of remaining questions, attempt **ANY TWO** questions from each section.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Assume suitable data, if necessary.
4) Answers to both the sections should be written in **SEPARATE** answerbooks.

SECTION – I

Q.1 **a)** Describe various characteristics of injection laser. **(05)**
b) Describe operation of p-n photodiode. **(05)**
c) Write applications of opto-isolator. **(04)**

Q.2 **a)** Describe construction and working of : **(07)**
i) Planar LED
ii) Dome LED
b) Describe various characteristics of LED. **(06)**

Q.3 **a)** Describe construction and working of PIN photodiode. **(07)**
b) Describe the following in relation with photo-detectors: **(06)**
i) Quantum efficiency
ii) Responsivity

Q.4 **a)** Describe different isolation techniques. **(07)**
b) Describe Holographic technique with suitable diagram. **(06)**

SECTION – II

Q.5 **a)** Derive expression for numerical Aperture. **(05)**
b) Describe different types of optical couplers. **(05)**
c) With suitable diagram explain operation of optical amplifier. **(04)**

Q.6 **a)** A silica optical fiber has a core refractive index of 1.50 and a cladding refractive index of 1.47. **(07)**
Determine : a) Critical angle (ϕc)
b) Numerical aperture (NA)
c) Acceptance angle (θa)
b) Describe: **(06)**
i) Attenuation
ii) Dispersion

Q.7 **a)** Describe various types of optical splicing techniques. **(07)**
b) Derive expressions for optical power budget and rise time budget. **(06)**

Q.8 **a)** Draw block diagram of WDM and explain it. **(07)**
b) Write application of optical fiber communication in industry and military. **(06)**

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