



08 JUN 2017

Note: Answer Only Four Questions

Q1-

A-Answer by True or False:-

- 1-Optical technologies use light refraction to activate the sensor to avoid interference from an outside light source?
- 2- The response time is the amount of time the sensor must be exposed to a leak event after it responds?
- 3-Increasing the temperature of a semiconductor shifts its absorption spectrum to a shorter wavelength?
- 4-In p-i-n photodiodes detector, increasing depletion layer width improve quantum coefficient?

B-Find the sensor response if  $\Delta I = 0.6 \text{ nA}$  perturbation = 0.002,  $R=1 \text{ k}\Omega$ ,  $q=0.2 \text{ A/w}$   
 $I_o = 3 \text{ nA}$  ?

[15 Marks]

Q2-

A-What is a Photomultiplier tube (PMTS)? What are the main advantages of this detector?

B- When two monochromatic waves of complex amplitudes  $U_1(r)$  and  $U_2(r)$  are superposed, the result is a monochromatic wave of the same frequency and complex amplitude, Explain ?

[15 Marks]

Q3-

A- Draw Film thickness Measurement by using Fabry-Perot Interferometer? What is the equation for thickness calculation?

B-What is the term 1/f noise? How the 1/f noise may be minimized?

[15 Marks]

Q4-

A-What are the main types of optical detector?

B-Draw the zero bias operation detector circuit? What are the main advantages of this circuit?

[15 Marks]

Q5- Explain briefly the Bragg grating based sensor system? What are the main applications of this sensor? [15 Marks]