

2017

ELECTRONICS

(Major)

Paper : 5.2

(Optoelectronics)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Choose the correct answer : $1 \times 7 = 7$

(a) One of the semiconductors used in
fabrication of LED is

(i) silicon

(ii) germanium

(iii) gallium arsenide

(b) The most sensitive photodetector is

(i) PIN-photodiode

(ii) avalanche photodiode

(iii) photomultiplier tube

- (c) LCD screens used in electronic gadgets are ____ display.
- (i) passive
 - (ii) active
 - (iii) hybrid
- (d) Quantum well lasers need ____ driving current as compared to bulk semiconductor lasers.
- (i) very high
 - (ii) very low
 - (iii) moderate
- (e) Solar cells are connected in series and parallel combinations to enhance
- (i) output current
 - (ii) output voltage
 - (iii) output power
- (f) The display device that consume highest electrical power is
- (i) LCD display
 - (ii) LED display
 - (iii) plasma display

- (g) One of the popular electrooptic crystals used in fabrication of optical modulator is
- (i) lithium niobate
 - (ii) quartz
 - (iii) silicon

2. Write short answer for the following : 2×4=8

- (a) Calculate the wavelength of light emitted from an LED when the semiconductor material has energy-band gap of 1.43 eV.
- (b) How does a solar cell convert sunlight into electricity?
- (c) Explain briefly about working principle of photomultiplier tube.
- (d) An LED is driven by 5 V DC voltage through a current limiting resistance of 470 Ω and yields 1 mW of output light power. If the current passing through the LED is 20 mA, calculate overall quantum efficiency of the LED.