

**M.TECH PRINTING ENGINEERING AND GRAPHIC COMMUNICATION FIRST YEAR FIRST SEMESTER 2018**

**RADIOMETRY**

Time: Three hours

Maximum Marks: 100

Answer Any **Four** questions

1. Explain the following quantities with mathematical expressions 25
  - a) Radiant flux and luminous flux
  - b) Radiant intensity and luminous intensity
  - c) Solid angle
  - d) Irradiance and illuminance
  - e) Radiance and luminance
  - f) Radiant exitance and luminous exitance.
  - g) Radiance temperature and color temperature.
2.
  - a) Explain spontaneous emission, stimulated emission and stimulated absorption. 5
  - b) What are classes of laser? 5
  - c) Write on the three parts of laser construction. 15
3. Write on the characteristics of optical detectors 25
4. Write short notes on
  - a) Incandescent light sources. 7
  - b) Fluorescent light sources 6
  - c) High-Intensity Discharge lamps. 6
  - d) Light emitting diode. 6

5. a) What are the types of noises in optical detectors? Explain 20
- b) Explain integrating sphere 5
6. a) The overall luminous efficiency of a 100 W electric lamp is 25 lumen/ W. 10  
Assume that light is emitted by the lamp only in the forward half, and is uniformly distributed in all directions in this half. Calculate the luminous flux falling on a plane object of area  $1 \text{ cm}^2$  placed at a distance of 50 cm from the lamp and perpendicular to the line joining the lamp and the object.
- b) A point source emitting uniformly in all directions is placed above a 10  
table-top at a distance of 0.50 m from it. The luminous flux of the source is 1570 lumen. Find the illuminance at a small surface area of the table-top (a) directly below the source and (b) at a distance of 0.80 m from the source.
- c) Classify UV radiation. 5
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