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B.E (FT) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2019

GEOINFORMATICS ENGINEERING BRANCH

Second Semester

(PH7256) PHYSICS FOR GEOINFORMATICS ENGINEERING

(Regulations 2015)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Suppose an object is heated to about 3000 K. Of what color would this source appear? How?
2. Define "Spectral luminous efficiency".
3. Write a short note on synthetic aperture radar.
4. What do you mean by atmospheric window?
5. Sketch the diagram and Write a short note on "Coma" aberration.
6. What do you mean by false color photographic film?
7. What do you mean by Fresnel theory of Diffraction? Give an example.
8. Write a short note on "Weather Satellites"
9. List any two advantages and disadvantages of Low Earth Orbit.
10. Sketch the structure of PIN photodiode and Avalanche Photodiode.



Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. (i) Derive the relation between the luminous and radiation quantities.
(ii) Explain the production of EMR from solid and liquids. (8+8)
 12. a) (i) Derive the operating principle of Radar.
(ii) Draw and explain contribution of different atmospheric gases in spectral irradiance at sea level. (9+7)
- OR
- b) Define 'spectral signature'. Describe the spectral signature and reflectance characteristics of earth cover type: vegetation, water and soil with neat diagram. (4+12)

13. a) What are the common aberrations in the images produced by a single lens? Explain in detail about spherical aberration and condition for minimizing it? (4+12)

OR

- b) (i) Derive the condition for minimizing chromatic aberration when two lenses are separated by a distance.
(ii) Explain the performance of photographic film in terms of speed, contrast and Resolution. (9+7)

14. a) (i) Discuss the variation of acceleration due to gravity (g) due to height and rotation of the earth.
(ii) Calculate the escape velocity on the surface of the moon, taking its radius as 1700 km, and mass 7.3×10^{22} kg. (12+4)

OR

- b) Why we need satellites? Give an elaborate discussion about "earth observation satellites" and its applications. (4+12)

15. a) (i) Explain in detail about silicon photodiode and its types, performance and applications.
(ii) The photocathode of a Photo multiplier tube is irradiated by photons with a wavelength of $\lambda = 850$ nm and a total power of $P = 0.10$ μ W. With an amplification factor of $G = 10 \times 10^6$, the measured output current is $I = 17$ mA. What is the efficiency e of this Photomultiplier tube at the given wavelength? (10+6)

OR

- b) (i) Explain the working principle of CCD camera with neat diagram.
(ii) The noise equivalent power of a detector with area 1 cm^2 is measured to be 2×10^{-8} watts/(Hz) $^{1/2}$ with a bandwidth of 1 Hz. What power is incident on the detector if the ratio of the noise voltage to the signal voltage is 10^{-6} ? (10+6)

