



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – ADVANCED ZOOLOGY AND BIOTECHNOLOGY. & PLANT BIOLOGY & BIO.TECH.

THIRD SEMESTER – NOVEMBER 2016

PH 3206 – PHYSICS FOR BIOLOGY

Date: 10-11-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART - A

Answer ALL the questions:

(10 × 2 = 20)

1. Define interfacial surface tension.
2. Determine the radius of a drop of water falling through air, if the terminal velocity of the drop is $1.2 \times 10^{-2} \text{ ms}^{-1}$. Coefficient of viscosity for air = $18 \times 10^{-6} \text{ Nsm}^{-2}$ and density of air = 1.21 kgm^{-3} .
3. What are the characteristics of laser beam?
4. Mention any four uses of laser.
5. What is diffraction of light?
6. What are the uses of ultraviolet microscope?
7. Define half - life period of a radioactive element.
8. The disintegration constant λ of a radioactive element is 0.00231 per day. Calculate its half-life and mean- life periods.
9. What are the uses of chemical electrodes?
10. How does a piezoelectric transducer work as a pulse sensor?

PART - B

Answer any FOUR of the following questions:

(4 × 7.5 = 30)

11. Define Surface Tension. Explain the molecular theory of surface tension.
12. Explain stimulated absorption, spontaneous emission and stimulated emission of radiation. Obtain a relation between transition probabilities for the two emissions using Einstein's coefficients.
13. Explain the principle, construction and working of a CO₂ laser.
14. With a neat schematic diagram, explain the optical principle of Interference microscope and write its uses.
15. a) Explain how radioactive dating is used to find the age of the earth. (2)
b) Write a note on biological effects of Nuclear Radiation. (5.5)
16. Explain with a neat diagram, the working of capacitive pressure transducer.

PART - C

Answer any FOUR of the following questions:

(4 × 12.5 = 50)

17. a) Derive an expression for terminal velocity using Stokes' law. (6)
b) Explain the determination of viscosity of a liquid by Stoke's method. (6.5)
18. Describe the construction and working of He-Ne laser. Mention the advantages of a gas laser over a solid state laser.
19. a) How is a sample prepared for electron microscope? (2.5)
b) With necessary diagrams, explain the working of (10)
(i) Scanning Electron Microscope (SEM) and
(ii) Transmission Electron Microscope (TEM).
20. Using the Law of radioactive disintegration, derive expressions for half-life and mean-life of a radio element.
21. Draw the schematic diagram of a GM counter and explain its working.
22. What is a transducer? Describe the working of thermistor type transducer.
