



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PLANT BIO. & BIOTECH., ADV. ZOO.

THIRD SEMESTER – NOVEMBER 2014

PH 3206 - PHYSICS FOR BIOLOGY

Date : 08/11/2014

Dept. No.

Max. : 100 Marks

Time : 09:00-12:00

PART A

Answer ALL the questions:

(10 × 2 = 20 marks)

1. Define viscosity of a liquid. Give its unit.
2. What are the factors affecting surface tension of a liquid?
3. Why stimulated emission is preferred over spontaneous emission in laser action?
4. Write any four uses of laser.
5. Define refraction of light.
6. What are the main differences between light microscopy and electron microscopy?
7. Define half-life in radioactivity.
8. A carbon specimen found in a cave contained $1/8$ as much C^{14} as an equal amount of carbon in living matter. Calculate the approximate age of the specimen. Half-life period of C^{14} is 5568 years.
9. What are the uses of electrode paste applied during bio-medical recording?
10. How does a piezoelectric transducer work as a pulse sensor?

PART B

Answer any FOUR questions:

(4 × 7.5 = 30 marks)

11. Describe an experiment to measure the surface tension of a liquid by capillary rise method.
12. Explain the terms absorption, spontaneous emission and stimulated emission.
13. Explain briefly, the principle of operation of He-Ne laser with neat schematic and energy level diagrams.
14. Describe the construction and optical principle of phase contrast microscope.
15. Give the theory of radioactive disintegration and derive the relation between decay constant and mean-life period.
16. Draw a block diagram of a bio-medical instrument system and briefly explain its components.

PART C

Answer any FOUR questions:

(4 × 12.5 = 50 marks)

17. Describe the capillary flow method of finding coefficient of viscosity of a liquid.
18. Explain the principle of operation of Ruby laser with help of neat schematic and energy level diagrams.
19. Describe the optical principle of
 - (i) Transmission Electron Microscope (TEM)
 - (ii) Scanning Electron Microscope (SEM).
20. Define radioactivity. Draw a neat diagram of a GM counter and explain its working.
21. (i) Explain how the interfacial surface tension of a given liquid is measured by method of drops?
 - (ii) Explain how archeological dating (Radiometric dating) is done by C^{14} method.
22. Give an account on how thermistors are used for the body temperature measurements.
