LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **ADV.ZOOLOGY & PLANT BIOLOGY**

THIRDSEMESTER – APRIL 2017

PH 3206- PHYSICS FOR BIOLOGY

Date: 04-05-2017 Dept. No. Max. : 100 Marks
09:00-12:00

PART - A

I. Answer all the questions: **(10 × 2 = 20)**

1. Define coefficient of viscosity. Write it's unit.
2. What are the factors affecting surface tension of a liquid?
3. What is population inversion in laser?
4. Mention any four uses of laser.
5. What is refraction? Write the expression for refractive index of a medium.
6. Write the differences between optical and electron microscope.
7. Define the unit curie.
8. The half-life of radon is 3.8 days. After how many days will only 1/16 of a radon sample be left over?
9. What is meant by linearity and sensitivity of a biomedical instrument?
10. What are electrodes?

PART - B

II. Answer any four of the following questions: **(4 × 7.5 = 30)**

11.a) Explain the drop-weight method experiment to determine the surface tension of a liquid.(5)

b) In a drop-weight method experiment, a glass tube of external diameter 2 mm is used and 100 drops of water are collected. The total mass of these drops is 2.8 grams. Find the surface tension of water. (2.5)

12. Explain spontaneous emission and induced emission. Using Einstein's A and B coefficients, obtain a relation between transition probabilities for the two emissions.
13. Describe the construction and working of Ruby laser with necessary diagrams.
14. With a neat diagram, explain the working principle of phase contrast microscope. Write the uses of this microscope.
15. Draw the schematic diagram of a proportional counter and explain its working.
16. Write a note about various forms of surface electrodes.

PART - C

III. Answer any four of the following questions: **(4 × 12.5 = 50)**

17. a) Derive an expression for terminal velocity using Stoke's law. (6)

b) Explain the determination of viscosity of a liquid by Stoke's method. (6.5)

18. Explain how a semiconductor junction diode can be used as a laser. What are its merits over other lasers?

19. Describe the construction and working of a compound microscope with necessary diagrams.

20. Using the law of radioactive disintegration, derive expressions for half-life and mean-life of a radioelement.

21. a) Briefly explain about radiometric dating to find the ages of biological specimens. (9)

b) A piece of wood from the ruins of an ancient dwelling was found to have a ^{14}C activity of 13 disintegrations per minute per gram of its carbon content. The ^{14}C activity of living wood is 16 disintegrations per minute per gram. How long ago did the tree die from which the wood sample came? (3.5)

22. What is a transducer? Describe the working of thermistor type temperature transducer.

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