

2016

ZOOLOGY

(Major)

Paper : 5.4

(**Biological Techniques
and Bio-statistics**)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Answer the following questions in brief : $1 \times 7 = 7$
 - (a) State the significance of pH value.
 - (b) Write the Lambert's law.
 - (c) What is limit of resolution?
 - (d) Express the relation between RCF and RPM in centrifugation.
 - (e) Define vitrification.
 - (f) What is more than ogive?
 - (g) What do you mean by goodness of fit?

2. Answer briefly the following : 2×4=8

(a) Distinguish between UV-Vis spectrophotometry and atomic absorption spectrophotometry.

(b) State the significance of chi-square test.

(c) Discuss the factors which affect the sectioning in microtomy.

(d) Distinguish between geometric mean and harmonic mean.

3. Answer any *three* from the following :

(a) Discuss the basic difference in working principles of scanning electron microscope and transmission electron microscope. 5

(b) What is autoradiography? State the principles and application of autoradiography. 1+2+2=5

(c) Discuss the importance of statistics in biology. 5

(d) The following are the seven groups of zooplankton collected from two sampling stations of river Brahmaputra :

Planktons	Sampling station-I	Sampling station-II
Daphnia sp.	28	32
Maina sp.	41	56
Bosmina sp.	34	43
Keratella sp.	76	85
Brachisnus sp.	86	101
Cyclops sp.	112	117
Nauplius sp.	69	74

Represent the data of each site using pie-diagram.

$$2\frac{1}{2} + 2\frac{1}{2} = 5$$

(e) Calculate mode from the following data : 5

<i>x</i>	0-10	10-20	20-30	30-40	40-50	50-60
<i>f</i>	15	17	32	13	12	10

4. What is regression equation? What is line of best fit? Describe regression equation *Y* on *X* with suitable example.

$$2+2+6=10$$

Or

What is correlation? State the different types of correlation. Describe the Karl Pearson's coefficient of correlation with suitable example.

$$2+2+6=10$$

5. Describe the process of fixation, block preparation, sectioning and staining in microtomy. $2+3+2+3=10$

Or

Describe the principle and application of paper chromatography and column chromatography. $5+5=10$

6. Write the principles and application of pH meter and ultracentrifuge. $5+5=10$

Or

Describe the working principle and application of fluorescence and phase contrast microscopy with suitable illustrations. $5+5=10$
