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ZOOLOGY

(Major)

Paper : 5.4

(Biological Techniques and Biostatistics)

Full Marks : 60

Time : 3 hours

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

1. Answer the following questions very briefly :

$1 \times 7 = 7$

(a) What is numerical aperture (NA) of a microscope?

(b) Define isoelectric point.

(c) What is sample unit?

(d) Define autoradiography.

(e) Chi-square test is called goodness of fit. Why?

(f) Write the meaning of RPM and RCF of centrifuge.

(g) Define arithmetic mean.

(2)

2. Answer any *four* of the following questions :

$2 \times 4 = 8$

(a) Write the differences between colorimeter and spectrophotometer.

(b) Define concept of data and data processing.

(c) What is microtomy? State the principle of ultramicrotome.

(d) Write the differences between correlation and regression.

(e) Write the principle of fluorescence microscope.

(f) Write the principle of ultracentrifuge.

3. Answer any *five* of the following questions :

$3 \times 5 = 15$

(a) Define chromatography. Mention the stationary and mobile phase in TLC.

(b) What is *F*-test? Write the significance of *F*-test.

(c) Explain Lambert-Beer law. State the relation between absorbance and transmittance.

(d) Define the concept of standard error of the mean.

(3)

(e) What is high-level language? What are the advantages and disadvantages of high-level language?

(f) Write the principle of pH meter. Mention the uses of pH meter in life science.

(g) Write the role of statistics in biology.

4. What is cryopreservation? Describe about the natural and synthetic cryoprotectant. Write the significance of cryopreservation of sperm and ova. $2+2+2+4=10$

Or

What is electrophoresis? Write about the theory of electrophoresis. Describe about the immunoelectrophoresis. Write the role of SDS in PAGE. $2+3+4+1=10$

5. Write the principle of light and phase contrast microscope. Mention the importance of phase contrast microscope in biology. Describe the differences between scanning electron microscope (SEM) and transmission electron microscope (TEM). $3+3+2+2=10$

Or

Define radioisotope. Write the uses of radio-isotopes in medicine and environmental science. $4+3+3=10$

6. (a) Describe the advantages and disadvantages of gas chromatography. 2½+2½=5

(b) What is Student's t-test? Mention the differences between paired t-test and unpaired t-test. Write the importance of t-test in biology. 1+2+2=5

Or

(a) What do you mean by ANOVA? Write the differences between one-way ANOVA and two-way ANOVA. 2+3=5

(b) The amount of different constituents in dry muscle tissue of a catfish is estimated as follows :

Constituent	Amount (in g)
Protein	15·4
Fat	9·1
Crude fibre	14·7
Ash	8·6
Others	52·2

Draw a pie chart from the above data. 5

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