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**3 SEM TDC ZOO M 3 (N/O)**

**2018**

( November )

ZOOLOGY

( Major )

Course : 303

**( Bioinstrumentation and Biostatistics )**

Time : 2 hours

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

( New Course )

Full Marks : 48

Pass Marks : 14

**( Bioinstrumentation )**

1. Rewrite the following sentences by keeping the appropriate word(s) from the given options : 1×3=3
- (a) The resolution of scanning-electron microscope is about 10 nm / 20 nm / 25 nm / 30 nm.

(b) Near visible light / Visible light / Monochromatic light / Electromagnetic wave of invisible spectra is used in spectrophotometer.

(c) A beam of electrons is transmitted through an ultra-thin specimen in phase microscope / TEM / SEM / microtome.

2. Give an outline feature of ultracentrifugation and its application in bioscience.  $3+4=7$

3. Distinguish between any *two* of the following :  $3 \times 2 = 6$

(a) Ion-exchange and thin-layer chromatography

(b) Magnification and resolution power of microscope

(c) Beer's law and Lambert's law

4. Write on the working principle and applications of any *two* of the following instruments : 6×2=12

- (a) Rotary microtome
- (b) Kymograph
- (c) Scanning electron microscope (SEM)
- (d) Colorimeter
- (e) Spectrophotometer

( **Biostatistics** )

5. (a) Rewrite the following sentences by keeping the appropriate word(s) from the given options : 1×2=2

- (i) If there is zero or negative value exist in a series of data, arithmetic mean / geometric mean / mean deviation / variance cannot be calculated.
- (ii) Yates' correction is used in *t*-test / *Z*-test / *F*-test /  $\chi^2$ -test.

(b) Distinguish between the following statistical terms (any two) :  $3 \times 2 = 6$

(i) Discrete and Continuous data

(ii) Standard deviation and Standard error

(iii) Median and Mode

6. Elaborate why 'arithmetic mean' and 'standard deviation' are most widely used in analyzing biological data. 6

Or

Using probability theorem, calculate the probability of an event with a suitable example. 6

7. Write notes on any two of the following :  $3 \times 2 = 6$

(a) Utility of biostatistics

(b) Confidence limits

(c) Regression equation

(d) Sampling

( 5 )

( Old Course )

Full Marks : 48

Pass Marks : 19

( **Bioinstrumentation** )

( Marks : 24 )

1. (a) Fill in the blanks with suitable word(s) :

1×3=3

(i) Muscle twitching of animal can be recorded by a simple instrument called \_\_\_\_.

(ii) In centrifuge, \_\_\_\_ force pushes heavier materials to the outside of the vessel.

(iii) Separation of amino acid is usually done by \_\_\_\_.

(b) Write briefly on the basic principle and application of centrifugation.

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2. (a) Distinguish between the following pairs (any two) :

3×2=6

(i) Ordinary light microscope and Phase-contrast microscope

( 6 )

(ii) Thin-layer chromatography and Paper chromatography

(iii) Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM)

(b) Write in detail about the working principles and applications of spectrophotometer or colorimeter. 5

3. Write an account on the different components and working principle of a compound microscope or rotary microtome. 5

**( Biostatistics )**

( Marks : 24 )

4. (a) Fill in the blanks with suitable word(s) :  $1 \times 3 = 3$

(i) The \_\_\_\_ value of a series indicates median.

(ii) Square of the deviations taken from the mean is known as \_\_\_\_.

(iii) When two events cannot occur simultaneously, they are known as \_\_\_\_ events.

(b) Distinguish between (any two) :  $3\frac{1}{2} \times 2 = 7$

(i) Primary and secondary data

(ii) Arithmetic mean and geometric mean

(iii)  $t$ -test and  $\chi^2$ -test

5. What is 'sample' in statistical term? Why is sampling important in biostatistics? What are the steps taken for stratified random sampling?

$1+1+5=7$

Or

Why is arithmetic mean widely used in biostatistics? Mention the characteristic features of arithmetic mean and also mention its demerits.

$2+4+1=7$

6. Write short notes on (any two) :  $3\frac{1}{2} \times 2 = 7$

(a) Collection of data

(b) Histogram

(c) Standard deviation

(d) Coefficient of variation

(e) Correlation coefficient

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