

2007

ZOOLOGY

PAPER-III (Group-B)

Full Marks : 50

Time : 2 hours

Answer any **four questions taking**
two from each Unit

The figures in the right-hand margin indicate marks

*Candidates are required to give their answers in their
own words as far as practicable*

**Write the answers Questions of each Unit
.in separate books**

UNIT-I

(Immunology)

1. (a) What are the kinetics of Primary and Secondary humoral immune responses ?
- (b) Discuss briefly about the molecular mechanism of B-cell and T-cell interactions.

4 1+ 8

(Turn Over)

2. (a) **Define Antibody. State in brief the structure and biological function of Immunoglobulin (Ig) molecule.**

(b) **Distinguish between sequential epitope and conformational epitope.**

(1+5+4)+2 $\frac{1}{2}$

3. (a) **What is NK cell? Mention its function.**

(b) **Define Adjuvants with example. State its mode of action.**

(c) **Enumerate the mechanism of antigen processing by endocytic pathway.**

2+1+3 $\frac{1}{2}$ +6

4. **Write short notes on any five of the following :** 121

2

(i) **Antibody diversity**

(ii) **Lymphokines**

(iii) **Cytokines**

(iv) **Vaccination**

(v) **TCR-CD complex.**

(vi) Immunoelectrophoresis

(vii) Fab and Fc .

UNTT-H

(*Biostatistics*)

5. (a) Write brief notes on any *two* of the following :

(i) Yates' correction

(ii) Null Hypothesis

(iii) Skewness

(iv) Sampling errors and their measures.

(b) Using the Chi square test find whether or not the following frequency distribution of phenotypes in a sample of fruit fly, has a significant goodness of fit with the Mendelian 9:3:3:1 distribution:

<u>Phenotypes</u>	<u>Frequencies</u>
Red-eye straight-wing (AB)	60
Purple-eye straight-wing (aB)	13
Red-eye curved-wing (Ab)	17
Purple-eye curved-wing (ab)	5

4 .)

(Given Chi square table values for 0.05 level : (i) for df 1: 3.84; (ii) for df 2: 5.99 & (iii) for df 3: 7.82).

(4+4)+4 $\frac{1}{2}$

6. (a) What are the different properties followed by simple linear correlation co-efficient?

(b) Calculate product-moment r between temperature and pulse of 5 following patients :

Patient No.	1	2	3	4	5
Temperature (°F)	102	99	100	98	101
Pulse (beats/min)	100	70	80	60	90

(c) From the following two regression lines find out the mean of x and y :

Regression lines : $x+2y=3$, $2x-y=5$.

4+5+3 $\frac{1}{2}$

7. (a) Discuss various properties of Normal distribution.

5)

- (b) Find the co-efficient of variation from the scores of blood sugar (mg. per 100 ml) of a sample of 100 pigs:

Range of Blood sugar scores	Number of pigs
50-55	7
55-60	15
60-65	30
65-70	25
70-75	14
75-80	9

- (c) Write down the p.d.f and p.m.f. of the normal and Poisson distribution with their respective ranges.

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

- (a) Explain the term 'Analysis of Variance'.
- (b) Discuss different models of ANOVA.
- (c) Work out a one-way model I anova to find whether or not there is any significant difference between the tracheal ventilation scores (ml. per minute) of the following sample of cockroaches,

respectively before and after their exposure to a chosen dose of the pesticide rotenone ($\alpha=0.05$)

Animal :	1	2	3	4	5	6	7	8	
Tracheal									
ventilation									
(i) before (X₁) :	70	75	80	72	60	80	72	75	70 76
(u') after (X₂) :	65	70	70	55	60	70	60	50	60 70

Critical **F scores:** $F_{0.05}(1, 19) = 4.38;$

$F_{0.05}(1, 18) = 4.41;$ $F_{0.05}(2, 19) = 3.52;$

$F_{0.05}(2, 18) = 3.55.$

$$3 + 5 + 4 \frac{1}{2}$$