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End Semester Examination of Semester–III, 2015
Subject : ZOOLOGY (PG)
Paper : ZPGT–301 (Gr A + Gr B)
Full Marks : 40
Time : 2 Hrs

The figures in the margin indicate the marks corresponding to the question

Candidates are requested to give their answers in their own word as far as practicable.

Illustrate the answers wherever necessary.

Use separate Answer scripts for Group A and Group B

Group A (Full Marks : 20)

Answer **Question No. 1** and
any one out of **Question No. 2** and **Question No. 3**

1. Answer **any five** question: 2X5=10

   i) What do you mean by degrees of freedom?

   ii) Why ANOVA is considered more powerful than Student's t-test?

   iii) Write a note on standard scores.

   iv) Compare between any two measurement of dispersion.

   v) Graphically show the locations of mean, mode and median in positively skewed distribution.

vi) When do you apply Yates's correction?

vii) Write a brief note on Percentile.

viii) Compare parametric and non parametric statistical tests.

2. Test whether the bradycardia (slower heart beating rate) has any significant association with left ventricular ejection fraction (%) in ten individuals after 30 days therapy with a drug, verapamil, at a dose of 2 $mg.kg^{-1}$ body weight. Frame suitable null hypothesis and test significance of your result ($\alpha = 0.05$).

Individuals:	1	2	3	4	5	6	7	8	9	10
Heart rate ($beats.min^{-1}$):	80	84	96	87	79	99	105	85	92	96
Left ventricular ejection fraction (%):	50	54	44	50	59	45	45	50	45	48

Standard t-scores:

One-tailed: $t_{0.05(8)} = 1.860$ $t_{0.05(9)} = 1.833$

$t_{0.05(18)} = 1.734$ $t_{0.05(19)} = 1.729$

Two-tailed: $t_{0.05(8)} = 2.306$ $t_{0.05(9)} = 2.262$

$t_{0.05(18)} = 2.101$ $t_{0.05(19)} = 2.093$

6+2+2

3. Define binomial distribution and state the conditions under which the distributions holds. Calculate the probability of obtaining 5 male cockroach in sample of 10 individuals

drawn from a population with 60% male (α = 0.01). Comment on your result. (2+3)+(4+1)

Group B (Full Marks : 20)

Answer **Question No. 1** and **any one** out of **Question No. 2** and **Question No. 3**

1. Answer **any five** question: 2X5=10

   i) What are the utilities of patch-clamp technique?

   ii) Mention the usage of BLAST.

   iii) What is CAT?

   iv) What is it important to analyse secondary structure(s) of oligonucleotide primers used in PCR?

   v) What is FASTA format? Write reverse complement of the following in FASTA format indicating the identifier "QSeq 1" : 5'-ATGTGTGTATCCGATCG-3'

   vi) "The change in entropy along with suitable change in enthalpy decides the fate of reaction." – Justify whether this is true of false.

   vii) What do you mean by exergonic and endergonic reactions?

   viii) What is the difference between primary and secondary databases?

2. a) Name one each of software tool used to perform multiple alignment and that to generate restriction map of given DNA sequence.

   b) Which has greater entropy, liquid water at 0^0C or ice at 0^0C?

   c) What are the characteristics of high-energy biomolecules?

   d) Why are coupled processes important to living things?

   2+2+3+3

3. a) Write down the principle of UV-vis Spectrometry.

   b) Compare between NMR and ESR.

   c) Match the following:

a) MEGA	i) Protein Database
b) EMBL	ii) Nucleotide Database
c) MEDLINE and PubMED	iii) Multiple sequence alignment
d) PIR	iv) Literature Database
e) ClustalW	v) Phylogentic Tree contruction

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