2008

M.Sc. Part–II Examination

ANTHROPOLOGY (PHYSICAL)

PAPER—VIII

Full Marks : 100

Time : 4 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Write the answer to questions of each Half in separate books.

First Half (Marks : 50)

(Time : 2 Hours)

Group — A

Answer Q. No. *1* and any *two* from the rest.

1. Answer in brief any *six* of the following : 3×6

(a) What is cross-sectional growth study ?

(b) What is meant by adolescent growth spurt ?

(c) What is 'peak height velocity' ?

(d) Differentiate between growth and development.

(e) What is meant by ~~Menarche~~ menarche?

(f) What is meant by secular trend in growth?

(g) Differentiate between percentage and percentile.

(h) What is meant by distance growth curve?

(i) What is the formula for calculating intra-observer technical error of measurement?

2. Human growth is controlled by genetic factors. Substantiate this statement by citing appropriate evidences. 16

3. (a) Differentiate between leanness, thinness, stunting, wasting and underweight. 6

(b) The height and weight of a boy are 121.4 and 34.8 kgs., respectively. The median height and weight of boys of the same age in the reference population are 126.3 cm and 36.7 kgs., respectively. The corresponding standard deviations are 2.4 cm and 1.8 kg., respectively. Determine the nutritional status of the subject. Show *all* your workings clearly. 10

4. Describe in details Scammon's Growth Curves. 16

5. (a) What is meant by 'catchup growth'? 4

(b) Highlight ethnic and SES differences in human growth. 12

6. Hanspie et al had reported the following mean heights for Bengalee boys and girls :

Age (yr.)	*Girls*	*Boys*
1	69.84	73.30
2	78.61	81.46
3	86.21	88.24
4	93.00	94.65
5	99.15	100.63
6	104.74	106.29
7	110.55	111.66

All heights are in cm.

(a) Draw a suitable diagram which highlights age and sex variations in height. Comment on the important findings of this diagram.

(b) Mention the ages at which the sex difference in mean height is the highest and lowest.

(c) Mention the age at which the greatest increase in mean height occurs in the two sexes. 16

Second Half (Marks : 50)

(Time : 2 Hours)

Group — A

(*Population Genetics*)

Answer *Q. No. 1* and any *two* from the rest.

1. Answer any *six* of the following : 6×3

(a) Define heritability.

(b) What is Wahlund Effect ?

(c) What are gene and genotype frequencies ?

(d) What is autozygosity ?

(e) What do you mean by fixation of allele ?

(f) Define Mendelian population.

(g) Define quantitative genetics and evolutionary genetics.

(h) What is natural selection ?

(i) Can complete equilibrium in a gene pool exist in real situations ?

2. (a) State the Hardy-Weinberg Law. 3

(b) Derive and mathematically prove the Hardy-Weinberg Law. 10

(c) What are the major implications of Hardy-Weinberg Law ? 3

3. (a) What are the major factors responsible for the changes of allele frequencies and genotypic frequencies in a population? 6

(b) In an isolated mountain village, the gene frequencies of A, B, and O blood alleles are 0.95, 0.04 and 0.01, respectively. If the total population is 424, calculate the number of individuals with O, A, B and AB type blood. 5

(c) In a group of students, about 36% could roll their tongues, a trait determined by a dominant gene. The other 64% of the students were non-rollers. Calculate the frequencies of the gene R for tongue rolling and its recessive allele r for non-rolling. 2

(d) From 146 students tested for PTC tasting ability, 105 were tasters and 41 were non-tasters. Calculate the frequencies of tasters and non-tasters. 3

4. (a) Define selection co-efficient. Mathematically derive the equation explaining the balance between mutation and selection. 2+4

(b) If an allele A mutates to a with a frequency of 1 in 10,000 and back mutates with a frequency of 1 in 1,00,000 and if the 3 genotypes have equal fitness, What will be genotype frequencies at equilibrium in a random waiting population ?

What would be consequences of doubling the mutation rate in both direction ? 5

(c) The following is an application of a change in gene frequencies due to migration.

Consider the PTC testing characteristics in humans. Tasting or not tasting this chemical is a Mendelian trait governed by a single gene pair.

Assume that the frequencies of the homozygous recessive non-tasters (tt) is 0.30 in whites ; 0.04 in African Blacks and 0.09 in African Americans.

What proportion of the genes in the African American Population is actually derived from the surroundings white population ? 5

5. (a) How population size can be a causative factor for the random change in gene frequencies ? 4

(b) What are the major consequences of dispersive process ? 3

(c) What is inbreeding co-efficient ? Calculate inbreeding co-efficient for 1st cousin, 2nd cousin and uncle-niece marriages ? 3+6

6. (a) How the principles of population genetics can be applied for human welfare ? 5

(b) How the social-cultural factors control the genetic structure of Indian population. 6

(c) Give a brief note on bio-anthropology of Indian population. 5
