

## **ISI Admission Test, 2012: JRF in Biological Anthropology**

The candidates in Junior Research Fellowship in Biological Anthropology will have to take two tests –RBA I (short Answer type) in the forenoon session and Test RBA II (Short Answer Type) in the afternoon session.

The syllabus and sample questions for both **RBA I** and **RBA II** tests are given below:

Standard: M.Sc. in Anthropology with specialization in Physical/Biological Anthropology

### **RBA I & RBA II SYLLABUS RBA I**

1. Introduction: Definition and scope; subdivision of anthropology; inter-relationship between anthropology and other disciplines.
2. Human evolution: Theories of evolution, taxonomic principles; man's place in the animal kingdom; comparative anatomy of anthropoid apes; structural and functional specialization; biocultural interactions.
3. Man as a social animal: choice of mate, monogamy; polygamy; exogamy; endogamy; inbreeding; family; clan ; kin group; social stratification and society; role of social factors in influencing genetic and environmental variations.
4. Human biological variation and adaptation to environment: Causes of variation, short- and long-term adaptation to different climatic, biotic and socio-cultural environments.
5. Anthropological dimensions of population/community health and health care: lifestyles and its relationship with health and disease; ecological variation and health and disease; biocultural dimensions of physical growth, aging and senescence.
6. Demographic studies in anthropology: Basic concepts of demography (population structure, age and sex composition, fecundity, fertility, sterility, morbidity, mortality, marriage, family, migration, population growth); anthropological demography.
7. Ethnic and biological diversity of the Indian populations.

### **RBA II**

1. Biological basis of inheritance: Cell, nucleus, chromosome, DNA (structure, replication, recombination, repair, rearrangement, etc.); genetic code; gene action; cell division; normal chromosome structure and number; functions of X and Y chromosomes; autosomal and sex chromosomal aberrations and application to evolution and disease.
2. Mendelian genetics: Laws of Mendel; basic terminology (gene, allele, genotype, phenotype, homozygote, heterozygote, linkage, crossing over, etc.); Mendelian inheritance (single factor and multifactorial inheritance, polygenic inheritance).
3. Non-Mendelian inheritance: Multiple allelism; co-dominance; sex-linked, sex-limited, sex-influenced traits; epistasis; variable penetrance and expressivity; cytoplasmic inheritance.

4. Population genetics and biostatistics: measures of central tendency, and dispersion; probability; correlation and regression; chi- square and t- test; Hardy- Weinberg equilibrium; mutation; random genetic drift; selection; inbreeding; admixture; assortative mating; isolation; linkage disequilibrium.
5. Genetic polymorphisms: Distributions; balanced and transient polymorphisms; variation in genes; simple genetic traits and DNA markers.
6. Role of heredity and environment in human biological traits: Different types of twins; twin diagnosis; heritability.

## **SAMPLE QUESTIONS**

### **RBAI (Short answer type)**

1. Define adaptation. The more generalized a species, the less adapted it is to a particular environment. Is the previous statement correct? Discuss the conditions for the evolutionary success of a specialized and generalized species.
2. Can population pyramids indicate the trends of population growth? Explain giving hypothetical examples of different population pyramids.
3. What is culture? Did culture play a role in human evolution? Discuss.
4. Outline important types of non-random mating (marriages) in the Indian cultural context. Briefly describe genetic consequences of those types of mating.
5. Is *Homo habilis* a link between the genus *Australopithecus* and *Homo*? Discuss.
6. Outline the existing theories on the origin of modern man.
7. Outline different methods in Forensic Anthropology. Explain/describe application of any one method to a hypothetical situation and try if you can justify use of traditional forensic anthropological methods in the age of DNA.
8. How would you define biological anthropology? Enumerate the recent trends in bioanthropological studies.
9. Discuss the synthetic theory of organic evolution.
10. Write short notes on the following:
  - (a) Paternity diagnosis
  - (b) Social stratification
  - (c) Hylobatidae
  - (d) Somatotyping
  - (e) Biotic environment
  - (f) Mongoloid

## **-SAMPLE QUESTION**

### **RBAII (Short answer type)**

1. Describe Hardy-Weinberg Equilibrium and its significance.
2. What is Genetic Code? Explain the process of protein synthesis.

3. Compare and contrast the Geneological and participant Observation Methods.

Or

Compare the merits and demerits of twin and Pedigree methods.

4. The following are the fasting blood glucose levels of 10 children:

72 68 65 66 71

65 62 67 69 65

Compute the mean, median and variance of the above data.

5. Mean and SD for fasting blood glucose level in a sample of 30 diabetic patients under medication "A" was found to be 125 and 20 respectively. Mean and SD values for another group of 40 diabetic patients under a new medication "B" was found to be 115 and 15. Does medicine B significantly reduce fasting glucose level compared to medicine A? Suggest a suitable statistical test for this problem and find the value of the test statistic on the basis of the observed data and draw your conclusion?