বিদ্যাসাগর বিশ্ববিদ্যালয়
VIDYASAGAR UNIVERSITY

Question Paper

B.Sc. Honours Examinations 2021
(Under CBCS Pattern)
Semester - VI
Subject: ZOOLOGY
Paper : C 14-T & P
Evolutionary Biology

Full Marks : 60 (Theory-40 + Practical-20)
Time : 3 Hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

[Theory]

Answer ***any two*** of the following: 2×15=30

1. What are species? Briefly classify the isolating barriers on basis of speciation. Describe the different modes of speciation with proper example. Justify the significance of adaptive radiation. (2+5+5+3)

2. Comparison between background and mass extinction. Mention the different causes of extinction. What is Red Queen hypothesis? Briefly describe K-T extinction with example. (3+5+2+5)

3. Describe the origin and evolution of *Homo sapiens*. (15)

4. Make a note on"the geological time scale" and the mention the major events of each Era. How we can estimate the time of divergence in evolution?

[(4+6)+5]

Answer ***any one*** of the following: 1×10=10

5. Describe the significance of genetic drift mechanism on the basis of founder's effect and bottleneck phenomenon. (10)

6. a) Consider a single locus with two alleles which are as H-W equilibrium. If the frequency of one of the homozygous genotype is 0.64. What is the frequency of heterozygosity in the population?

   b) An autosomal recessive conditions allele 1 newborn in 10000in a random mating population without any disruptive acting forces. What is the approximate expected frequency that carries in this population? (5+5)

[Practical]

Answer ***any one*** of the following: 1×20=20

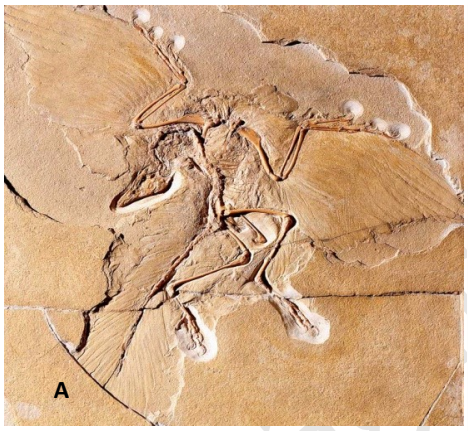
7. Most black bears (*Ursusamericanus*) are black or brown in color. However, occasional white bears of this species appear in some populations along the coast of British Columbia. Kermit Ritland and his colleagues determined that white coat color in these bears results from a recessive mutation (G)caused by a single nucleotide replacement in which guanine substitutes for adenine at the melanocortin-1 receptor locus (mcr1), the same locus responsible for red hair in humans. The wildtype allele at this locus (A) encodes black or brown color. Ritland and his colleagues collected samples from bears on three islands and determined their genotypes at the mcr1 locus: AA 42,AG 24 , GG 21.

a.) What are the frequencies of the A and G alleles in these bears?

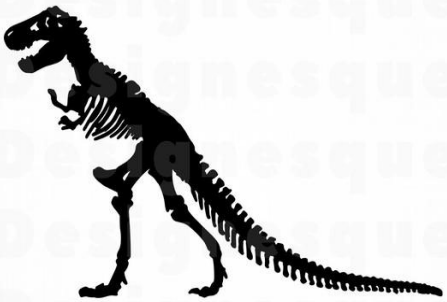
b.) Give the genotypic frequencies expected if the population is in Hardy–Weinberg equilibrium.

c.) Use a chi-square test to compare the number of observed genotypes with the number expected under Hardy– Weinberg equilibrium. Is this population in Hardy–Weinberg equilibrium? Explain your reasoning. (10+10)

8. Identify the provided specimen of fossils and write down the significance of the model specimen. (10x 2)



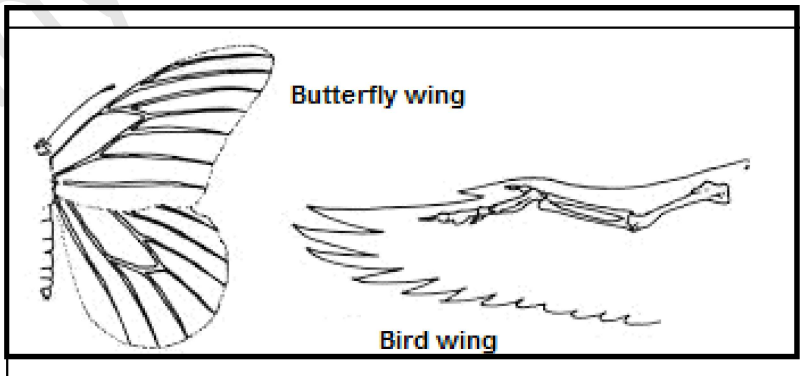
A



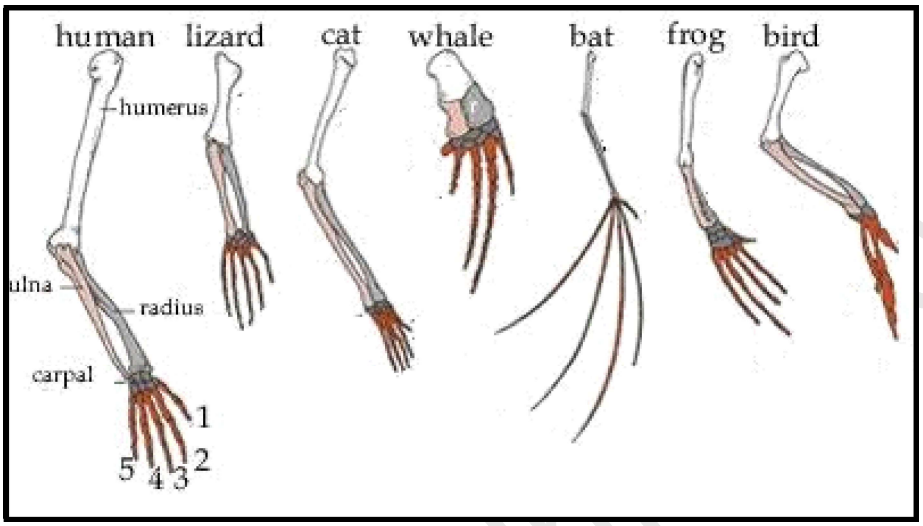
B

9. Study the homology and analogy from the organs provided below:

A.



B.



(10+10)