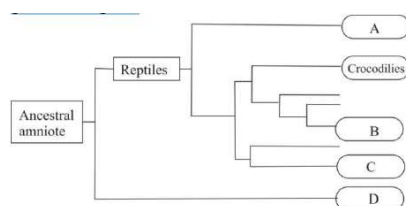
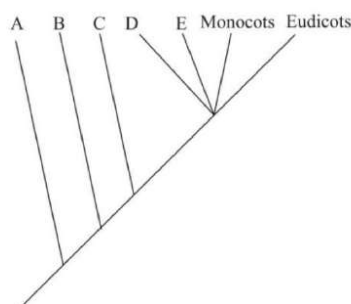


DEC-2015

- 1) The Phylogenetic tree of amniote vertebrates is given in diagram The groups labeled A, B, C, D are
a) A- Snakes, B- Turtles, C-Birds, D-Mammals



- b) A-Snakes, B- Turtles, C-Mammals, D-Birds
c) A-Turtles, B-Birds, C-Snakes, D-Mammals
d) A-Birds, B-Turtles, C-Snakes, D-Mammals
- 2) Following is a cladogram of the major taxonomic groups of the angiosperms: Groups A-E represent respectively:



- a) Astrobaleales, Nymphaeales, Amborellales, Chloranthaceae, Magnoliids
b) Amborellales, Astrobaleales, Nymphaeales, Magnoliids, Chloranthaceae
c) Amborellales, Nymphaeales, Astrobaleales, Chloranthaceae, Magnoliids
d) Amborellales, Nymphaeales, Chloranthaceae, Magnoliids, Astrobaleales
- 3) Important chemical reactions involved in nutrient cycling in ecosystems are given below: The organisms associated with these chemical reactions are

- a. $\text{NO}_2^- \rightarrow \text{NO}_3^-$
b. $\text{N}_2 \rightarrow \text{NH}_3$
c. $\text{NH}_4^+ \rightarrow \text{NO}_2^-$
d. $\text{NO}_3^- \rightarrow \text{N}_2$

- a) a - Nitrosomonas b-Pseudomonas c - Nostoc d - Nitrobacter
b) a - Pseudomonas b-Nitrobacter c - Nostoc d -Nitrosomonas
c) a-Nitrobacter b-Nostoc c-Nitrosomonas d - Pseudomonas
d) a-Nostoc b-Nitrosomonas, c - Nitrobacter d - Pseudomonas
- 4) A Population is growing logistically with a growth rate (r) of 0.15/week, in an environment with a carrying capacity of 400. What is the maximum growth rate (No) of individuals/week) that this population can achieve?
a) 15
b) 30

- c) 22.5
- d) 60

- 5) Following table shows the number of individuals of five tree species in a community; Based on the above, the Simpsons diversity (DS) index of the community will be

| Tree Species | No. of Individuals |
|--------------|--------------------|
| A | 50 |
| B | 20 |
| C | 20 |
| D | 05 |
| E | 05 |

- a) 0.552.
 - b) 0.335.
 - c) 0.435.
 - d) 0.345.
- 6) In several populations, each of size $N = 20$, if genetic drift results in a change in the relative frequencies of alleles, A. What is the rate of increase per generation in the proportion of populations in which the allele is lost or fixed? B. What is the rate of decrease per generation in each allele frequency class between 0 and 1? The correct answer for A and B is:
- a) A-0.25, B-0.125
 - b) A-0.025, B-0.0125
 - c) A-0.0125, B-0.025
 - d) A-0.125, B-0.25
- 7) The mutation in an oncogene falls under which of the following classes?
- a) Loss of function mutation
 - b) Frame shift mutation
 - c) Gain of function mutation
 - d) Dominant negative mutation
- 8) Which of the following statements about evolution is NOT true?
- a) Evolution is the product of natural selection.
 - b) Evolution is goal-oriented.
 - c) Prokaryotes evolve faster than eukaryotes.
 - d) Evolution need not always lead to a better phenotype.

JUN-2015

- 1) According to which evolutionary theory, there are long periods without significant -evolutionary changes interrupted by short episodes of rapid evolution?
- a) Punctuated equilibrium
 - b) Saltation
 - c) Mutation
 - d) Neutrality
- 2) Which of the following is/are NOT valid explanation(s) for the observed pattern of species richness?
- a) Older communities are more species rich.
 - b) Large areas support more species.
 - c) Natural enemies promote reduced species richness at local level.
 - d) Communities in climatically similar habitats may themselves be similar in species richness.

3) Greater productivity permits existence of more species.

- a) B, C and D
- b) Only C
- c) Only D
- d) A, B and E

4) The following table shows the number of individuals of each species found in two communities: (Hint: In values for 0.05, 0.10, 0.25 and 0.80 are 3.0, -2.3, -1.4 and -0.2, respectively) The calculated Shannon diversity index (H) values for communities C1 and C2, respectively are

| समुदाय | प्रजाति | | | |
|--------|---------|----|----|----|
| | A | B | C | D |
| C1 | 25 | 25 | 25 | 25 |
| C2 | 80 | 05 | 05 | 10 |

- a) 1.4 and 0.69
- b) 2 and 0.34
- c) 2.1 and 0.43
- d) 1.8 and 0.37

5) In a population at Hardy-Weinberg equilibrium, the genotype frequencies are: $f(A_1A_1) = 0.59$; $f(A_1A_2) = 0.16$; $f(A_2A_2) = 0.25$. What are the frequencies of the two alleles at this locus?

- a) $A_1=0.59$ $A_2=0.41$
- b) $A_1=0.75$ $A_2=0.25$
- c) $A_1=0.67$ $A_2=0.33$
- d) $A_1=0.55$ $A_2=0.45$

6) Following are the main types of defense employed by prey species against predators Types of defense: Chemical with aposematic coloration

(A); Cryptic coloration

(B); Batesian mimicry

(C); Intimidation display

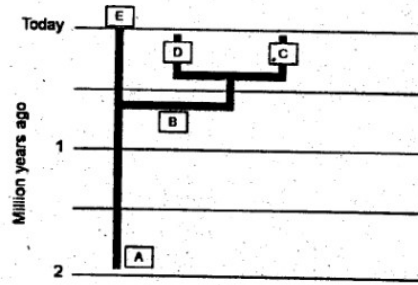
(D) Prey Species: Grasshoppers and seahorses

(i); Hoverflies and wasps (ii); Bombardier beetles, ladybird beetles, many butterflies (iii); Frilled lizard, Porcupine fish (iv)

Which one of the following combinations is correct?

- a) A-(i) B-(iii) C- (ii) D (iv)
- b) A-(iv) B-(ii) C-(i) D (iii)
- c) A-(iii) B-(i) C-(ii) D (iv)
- d) A-(ii) B-(iii) C- (i) D- (iv)

7) In the evolutionary tree given below terms A, B, C, D and E represent respectively.



- a) Homo erectus, Homo heidelbergensis, Neanderthal, Denisovan and Homo sapiens.
 - b) Homo heidelbergensis, Homo erectus, Denisovan, Neanderthal and Homo sapiens.
 - c) Homo erectus, Homo heidelbergensis, Denisovan, Neanderthal and Homo sapiens
 - d) Homo heidelbergensis, Homo sapiens, Denisovan, Neanderthal, and Homo erectus.
- 8) Following is the list of some important events in the history of life and the names of the epochs of Cenozoic era. Events
- a) Angiosperm dominance increases; continue radiation of most present day mammalian orders
 - b) Major radiation of mammals, birds and pollinating insects
 - c) Origins of many primate groups
 - d) Origin of genus Homo
 - e) Appearance of bipedal human ancestors
 - f) Continued radiation of mammals and angiosperms, earliest direct human ancestors Epochs I
- (1) Paleocene (ii) Pleistocene (iii) Oligocene (iv) Pliocene (v) Eocene (vi) Miocene
- 9) Which one of the following is the correct match of events with the epochs?
- a) A-(v) B-(ii) C-(i) D-(iii) E-(iv) F-(vi)
 - b) A-(vi) B-(i) C-(ii) D-(iv) E-(iii) F-(v)
 - c) A-(v) B-(i) C-(iii) D-(ii) E-(iv) F-(vi)
 - d) A-(iv) B-(i) C-(ii) D-(iii) E-(v) F-(vi)
- 10) Compared to K-selection, r-selection favours
- a) rapid development, smaller body size and early, semelparous reproduction.
 - b) rapid development, smaller body size and early, iteroparous reproduction.
 - c) slow development, larger body size and late, iteroparous reproduction.
 - d) slow development, smaller body size and late, iteroparous reproduction
- 11) For the aquaculture farming of Indian major carps several techniques are used. Which one of the following is NOT used for this purpose:
- a) Induced breeding
 - b) Selective breeding
 - c) Inbreeding
 - d) Composite fish farming