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# Evolution
# PROBLEM SOLVING

# BQ29Q463

Artificial selection to obtain cows yielding higher milk output represents :

(A) Stabilizing followed by disruptive as it stabilizes the population to produce higher yielding cows.

(B) Stabilizing selection as it stabilizes this character in the population.

(C) Directional as it pushes the mean of the character in one direction.

(D) Disruptive as it splits the population into two, one yielding higher output and the other lower output.

Stabilizing selection → avg. milk output

## BQ29S463

**Ans [C]**

A natural selection where an extreme phenotype is favored over other phenotypes, causing the allele frequency to shift over time in the direction of that phenotype is known as directional artificial selection. in order to achieve the cow yielding higher milk directional selection is used as it pushes mean of the frequency of the selected individual in one direction.

# BQ29Q464

Which one of the following sets of items in the option 1 – 4 are correctly categorized with one exception in it ?

| | ITEMS | CATEGORY | EXCEPTION |
|---|---|---|---|
| (A) | Kangaroo, Koala, wombat | Australian marsupials | Wombat |
| (B) | Plasmodium, Cuscuta, Trypanosoma | Protozoan parasites | Cuscuta |
| (C) | Typhoid, Pneumonia, Diphtheria | Bacterial diseases | Diphtheria |
| (D) | UAA, UAG, UGA | Stop codons | UAG |

# BQ29S464

## Ans [B]

| | | |
|---|---|---|
| Plasmodium, Cuscuta, Trypanosoma | Protozoan parasites | Cusc uta |

All are parasites  Plasmodium & Trypanosoma both are protozoans & Cuscuta – plant

# BQ29Q465

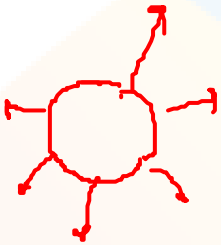
The wings of a bird and the wings of an insect are :

(A) Homologous structures and represent convergent evolution

(B) Homologous structures and represent divergent evolution

(C) Analogous structures and represent convergent evolution

(D) Phylogenetic structures and represent divergent evolution



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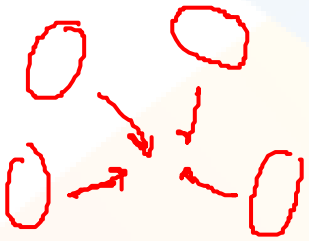


A . C

## BQ29S465

**Ans [C]**

Wings of birds and the wings of an insect are similar in function but differ in origin so they are analogous structure & analogy shows convergent evolution.

# BQ29Q466

Industrial melanism is an example of -

(A) Neo Lamarckism

(B) Neo Darwinism

(C) Natural selection

(D) Mutation

## BQ29S466

**Ans [C]**

Industrial melanism shows natural selection. It is the appearance of dark melanic forms of some organism like moths in the industrial region where soot emission from burning of coal has been heavy so as to color the background.

# BQ29Q467

Which of the following structures is homologus to the wing of the birds ?

(A) Wing of a Moth

(B) Hind limb of Rabbit

(C) Flippers of Whale

(D) Dorsal fin of a Shark

## BQ29S467

### Ans [C]

Flipper of Whale is homologus to the wing of a bird. Homologous organs - Thestructure which are similar in their morphology, anatomy, genetics and embryology, but dissimilar in their functions. Wings of a bird & flippers of a whale are modified forelimbs.

## BQ29Q468

Following are the two statements regarding the origin of life -

(a) The earliest organisms that appeared on the earth were non-green and presumably anaerobes

(b) The first autotrophic organisms were the chemoautotrophs that never released oxygen Of the above statements which one of the following options is correct ?

(A) (b) is correct but (a) is false

(B) Both (a) and (b) are correct

(C) Both (a) and (b) are false

(D) (a) is correct but (b) is false

## BQ29S468

**Ans [B]**

Both statements are correct because primitive atmosphere was reducing and chlorophyll appeared later on.

# BQ29Q469

When does the growth rate of a population following the logistic model equal zero? The logistic model is given as $dN/dt = rN(1-N/K)$:

(A) When N nears the carrying capacity of the habitat.

(B) When N/K equals zero.

(C) When death rate is greater than birth rate.

(D) When N/K is exactly one.

# BQ29S469

## Ans [D]

$$\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right)$$

when $\frac{N}{K} = 1$

then $\frac{dN}{dt} = rN\,(1 - 1)$

$$\Rightarrow \frac{dN}{dt} = rN \times 0 \Rightarrow \frac{dN}{dt} = 0$$

## BQ29Q470

Analogous structures are a result of :

(A) Convergent evolution

(B) Shared ancestry

(C) Stabilizing selection

(D) Divergent evolution

## BQ29S470

**Ans [A]**

Development of similar adaptive functional structure in organs of different origin is due to convergent evolution.

# BQ29Q471

Homologous organs are :

(A) Wings of cockroach and wings of bats

(B) Wings of insects and wings of birds

(C) Air bladder of fishes and lungs of frog

(D) Pectoral fins of fishes and forelimbs of horse

## BQ29S471

**Ans[D]**

Pectoral fins of fishes and forelimbs of horse

Homologus organs have the same origin and structure but differ in their functions. The rest are all analogus organs as they have different origin and structure but have same function. So the choice is pectoral fins of fishes and forelimbs of horse.

# BQ29Q472

Reptiles like mammals originated in :

(A) Jurassic

(B) Triassic

(C) Cretaceus

(D) Permian

## BQ29S472

**Ans[B]**

Triassic

The Triassic Period was the first period of the Mesozoic Era and occurred between 251 million and 199 million years ago. Reptiles originated in this age.

# BQ29Q473

Industrial melanism is example of :

(A) Natural selection

(B) Mutation

(C) Racial difference

(D) Predation

## BQ29S473

### Ans[A]

Natural selection

Nature selects the individual best suited for a particular environment. Prior to industrial revolution, tree barks were free from pollution and hence lichens grew. There the light coloured moths survived because of the camouflage provided by the background white lichens. Due to advent of industrial revolution, the melanised forms became more prominent as they could not be spotted easily in the dark background by their predators and lighter ones became the target for predators easily.

## BQ29Q474

Which one is obtained by S. Miller in his experiments on origin of life before 1953 :

(A) Simple sugars

(B) Amino acids (alanine, glycine, aspartic acid)

(C) Nucleotide

(D) Peptides

$CH_4$, $NH_3$, $H_2$ & water vapour

# BQ29S474

## Ans[B]

Amino acids

# BQ29Q475

Variation in gene frequencies within populations can occur by chance rather than by natural selection. This is referred to as :

(A) Genetic flow

(B) Genetic drift

(C) Random mating

(D) Genetic load

## BQ29S475

### Ans [B]

Genetic drift

# BQ29Q476

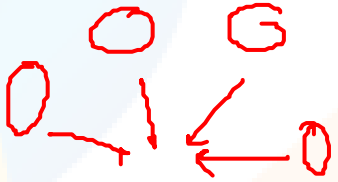
The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge is called :

(A) Natural selection

(B) Convergent evolution

(C) Non-random evolution

(D) Adaptive radiation



## BQ29S476

### Ans [B]

Convergent evolution

Due to common environmental changes different animals develop similar looking feature. This phenomenon is known as convergent evolution.

## BQ29Q477

The tendency of population to remain in genetic equilibrium may be disturbed by :

(A) Random mating

(B) Lack of migration

(C) Lack of mutations

(D) Lack of random mating

# BQ29S477

## Ans [D]

Lack of random mating

According to Hardy-Weirberg principle, allele frequencies in a population are stable and is constant from generation to generation allele frequencies in a population will remain constant over generations only if the following condition are met

i) There is no mutation no gene flow and all mating is random

ii) All genotypes reproduce equally well (i.e., no natural selection,)But their conditions rarely met in nature.

## BQ29Q478

According to Darwin, the organic evolution is due to -

(A) Intraspecific competition

(B) Interspecific competition (most potent force of organic evolution)

(C) Competition within closely related species

(D) Reduced feeding efficiency in one species due to the presence of interfering species.

# BQ29S478

## Ans [B]

Interspecific competition

According to Darwinism competition between two different species is the key factor for organic evolution Since it results in divergent evolution.

# BQ29Q479

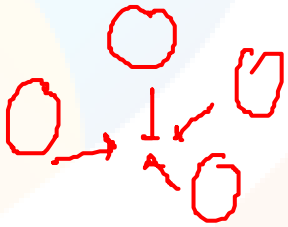
The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function, This is an example of :

(A) Homologous organs that have evolved due to convergent evolution

(B) Homologous organs that have evolved due to divergent evolution

(C) Analogous organs that have evolved due to convergent evolution

(D) Analogous organs that have evolved due to divergent evolution



A. C

# BQ29S479

## Ans [C]

Analogous organs are organs similar in shape and function but their origin, basic plan an development are dissimilar. Such similarities are because of convergent evolution for adaptation to a common condition. Example: Eye of octopus and eye of cat; wing of bird and wing of bat.

## BQ29Q480

Sweet potato is homologous to :

(A) Turnip

(B) Potato

(C) Colocasia

(D) Ginger

## BQ29S480

### Ans [A]

Turnip

Sweet potato and turnip are homologous plants as both are roots however sweet potato is an adventitious root while turnip a napiform tap root.

## BQ29Q481

Darwin's finches are a good example of –

(A) Industrial melanism

(B) Connecting link

(C) Adaptive radiation

(D) Convergent evolution

## BQ29S481

## Ans [C]

Adaptive radiation

Darwin's finches are known for their diverse beak shapes and structures. This arises due to different feeding habit and habitat and is an example of adaptive radiation. Adaptive radiation refers to the diversification of organisms from their ancestral species due to change in habitat, feeding habit etc.

## BQ29Q482

In the case of peppered moth (Biston betularia) the black-coloured from became dominant over the light-coloured form in England during industrial revolution. This is an example of -

(A) Inheritance of darker colour character acquired due to the darker environment

(B) Natural selection whereby the darker forms were selected.

(C) Appearance of the darker coloured individuals due to very poor sunlight

(D) Protective mimicry

## BQ29S482

**Ans [B]**

Natural selection whereby the darker forms were selected.

Industrial Melanism: Industrial melanism is an example of natural selection. There were collection of white moths in England. It was observed that before industrial revolution in England, white-winged moths were more in number than dark-winged moths. After industrialisation, dark-winged moths became more than white-winged moths. This is because during industrialisation, the tree trunks covered by white lichens became dark due to air pollution (dust and soot particles). Due to this, white-winged moths could be easily eaten by the predators as they failed in camouflaging (hide or disguise the presence of a person, animal or object by means of camouflage).

## BQ29Q483

Age of fossils in the past was generally determined by radio-carbon method and other methods involving radioactive elements found in the rocks. More precise methods, which were used recently and led to the revision of the evolutionary periods for different groups of organisms includes -

(A) Study of the conditions of fossilization

(B) Electron spin resonance (ESR) & fossil DNA

(C) Study of carbohydrates/proteins in rocks

(D) Study of carbohydrates/proteins in fossils

## BQ29S483

### Ans [B]

Electron spin resonance (ESR) & fossil DNA

Electron spin resonance (ESR) dating is a **trapped charge** dating method. The other trapped charge dating methods are thermoluminescence dating (TL) and optically stimulated luminescence (OSL). However, only ESR can be applied to teeth and is therefore used for the direct dating of human fossils

## BQ29Q484

What kind of evidence suggested that man is more closely related with chimpanzee than with other hominoid apes ?

(A) Comparison of chromosomes morphology only

(B) Evidence from fossil remains and the fossil mitochondrial DNA alone

(C) Evidence from DNA extracted from sex chromosomes, autosomes & mitochondria

(D) Evidence from DNA from sex chromosomes only

# BQ29S484

## Ans [C]

Evidence from DNA extracted from sex chromosomes, autosomes & mitochondria

Chimpanzee is more closely related to man than other hominoids. It is evidenced by chromosome banding pattern, DNA extracted from sex chromosomes, autosomes and mitochondria. Molecular clock based on mitochondrial DNA are used to date recent events because this DNA mutates 5-10 times faster than nuclear DNA. Some similarities between human and chimpanzee are - DNA matching shows human similarity with chimpanzee. There is little difference in banding pattern in chromosomes 3 and 6 in human and chimpanzee. Serum test indicate maximum homology between human and chimpanzee.

## BQ29Q485

According to oparin, which one of the following was not present in the primitive atmosphere of the earth :-

(A) Oxygen

(B) Hydrogen

(C) Water vapour

(D) Methane

## BQ29S485

## Ans [A]

Oxygen

According to Oparin, the primitive atmosphere of the earth consisted of numerous hydrogen atoms that combined with all oxygen atoms to form water and leaving no free oxygen. Thus, primitive atmosphere was reducing one, without any free oxygen available.

# BQ29Q486

What is true about the isolated small tribal populations?

(A) Wrestlers who develop strong body muscles in their life time pass their character on to their progeny

(B) There is no change in population size as they have a large gene pool

(C) There is a decline in population as boys marry girls only from their own tribe

(D) Hereditary disease like colour-blindness do not spread in the isolated population

# BQ29S486

## Ans [C]

There is a decline in population as boys marry girls only from their own tribe

Small tribal population result in a small gene pool and the hereditary diseases are spread in the population as a result of inbreeding and the decline in population is seen as a result of absence of gene migration or gene flow

## BQ29Q487

Thorn of Bougainvillea and tendril of Cucurbita are examples of:

(A) Vestigial organs

(B) Retrogressive evolution

(C) Analogous organs

(D) Homologous organs

## BQ29S487

### Ans [D]

Homologous organs

Thorns of bougainvillea and tendrils of cucurbita are homologous organs and they are modified branches that arise from axillary bud

# BQ29Q488

Darwin's Finches are an excellent examples of:

(A) Brood parasitism

(B) Connecting links

(C) Adaptive radiation

(D) Seasonal migration

## BQ29S488

## Ans [C]

Adaptive radiation

Dawin finches are an example of adaptive radiation, they are known for their diverse beak shapes and structure

## BQ29Q489

Which one of the following is incorrect about the characteristics of protobionts (coacervates and microspheres) as envisaged in the a biogenic origin of life?

(A) They were partially isolated from the surruounding

(B) They could maintain an internal environment

(C) They were able to reproduce

(D) They could separate combinations of molecules from the surroundings

**Ans [C]**

## BQ29Q490

Which one of the following pairs of items correctly belongs to the category of organs mentioned against it?

| | | |
|---|---|---|
| (A) | Nephridia of earthworm and malpighian tubules of cockroach | Excretory organs |
| (B) | Wings of honeybee and wings of crow | Homologous organs |
| (C) | Thorn of Bougainvillea and tendrils of Cucurbita | Analogous organs |
| (D) | Nictitating membrane and blind spot in human eye | Vestigial organs |

## BQ29S490

**Ans [A]**

Nephridia of earthwormand malpighian tubulesof cockroach Excretory organs

Excretory organ of cockroach is malphigian tubules which excretes nitrogenous wastes and other remains of metabolites and the excretory organs of earthworm is nephridia  helps in removing metabolic Wastes from animal body.

# BQ29Q491

Which one of the following scientist's name is correctly matched with the theory put fourth by him?

(A) Devries — Natural selection

(B) Mendel — Theory of pangenesis

(C) Weismann — Theory of continuity of germplasm

(D) Pasteur — Inheritance of acquired characters

## BQ29S491

### Ans [C]

Weismann — Theory of continuity of germplasm

Theory of continuity of germplasm was proposed by August Weismann in 1892 . According to the theory germplasm, is the essential element of germcell and heredity material.

## BQ29Q492

What is common to whale, seal and shark ?

(A) Homoeiothermy

(B) Seasonal migration

(C) Thick subcutaneous fat

(D) Convergent evolution

## BQ29S492

### Ans [D]

Convergent evolution

In evolutionary biology, convergent evolution is the process whereby organisms not closely related, independently evolve similar traits as a result of having to adapt to similar environments or ecological niches. Convergent evolution creates analogous structures that have similar form or function, but that were not present in the last common ancestor of those groups. Whale, seal and sharks shows convergent evolution, as they have analogous structures used for swimming.