

Chapter 7

Evolution

(Assertion Reason Questions)

Directions: In the following questions, a statement of assertion is followed by a statement of reason.

Mark the correct choice as:

- (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) If Assertion is true but Reason is false.
- (d) If both Assertion and Reason are false.

Q.1. Assertion: According to big-bang hypothesis about 20 billion years ago universe was a big ball of only neutrons.

Reason: Movement of these particles is known to generate tremendous heat which caused explosion due to temperature and pressure changes.

Q.2. Assertion: Big-bang theory is based on studies of Sir James Jeans.

Reason: He gave the theory of steady state.

Q.3. Assertion: Milky way is the galaxy in the universe.

Reason: Our Earth is part of milky way.

Q.4. Assertion: The primitive atmosphere was reducing once i.e., without oxygen.

Reason: In the primitive atmosphere, oxygen was involved in forming ozone.

[AIIMS 2009]

Q.5. Assertion: Organic compounds first evolved in earth required for origin of life were protein and nucleic acid.

Reason: All life forms were in water environment only. [AIIMS 2016]

Q.6. Assertion: Theory of chemical evolution proposed that life comes from pre-existing nonliving organic molecules.

Reason: The primitive earth conditions led to production of organic molecules.

Q.7. Assertion: Louis Pasteur showed that in flask open to air, new living organisms appeared in the heat killed yeast culture.

Reason: Life arises from pre-existing life.

Q.8. Assertion: Primitive atmosphere was of reducing type.

Reason: First hydrogen atoms combined with all oxygen.

Q.9. Assertion: Stanley Miller could work on experimental evidence of origin of life because of Harold Urey.

Reason: H. Urey was geochemist, cosmochemist and teacher of S. miller.

Q.10. Assertion: Darwin's finches show a variety of beaks suited for eating large seeds, flying insects and cactus seeds.

Reason: Ancestral seed-eating stock of Darwin's finches radiated out from South America main land to different geographical areas of the Galapagos Islands, where they found competitor-free new habitats.

Q.11. Assertion: Coacervates are believed to be the precursors of life.

Reason: Coacervates were self-duplicating aggregates of proteins surrounded by lipid molecules. [AIIMS 2004]

Q.12. Assertion: The first cells used RNA as their hereditary molecule.

Reason: DNA evolved from RNA.

Q.13. Assertion: The first molecules formed for replicating cells were most probably RNA.

Reason: This was proved by origin of ribozyme T. Cech in Tetrahymena.

Q.14. Assertion: We have lost all the direct evidence of origin of life.

Reason: The persons responsible for protecting evidences were not skilled.

[AIIMS 1998]

Q.15. Assertion: The earliest organisms that appeared on the earth were non-green and presumably anaerobes.

Reason: The first autotrophic organisms were the chemoautotrophs that never released oxygen. [AIIMS 2006]

-X-X-X-

ANSWER KEY

Q.1 : (a) Big bang theory explains the origin of universe, according to this hypothesis about 20 billion years ago the universe was the big ball made up of neutrons. Its huge explosion due to its high temperature change in pressure, the universe was formed.

Q.2 : (b) Steady State Theory was a theory proposed in twentieth-century cosmology to explain evidence that the universe was expanding, but still retain the core idea that the universe always looks the same. It was first proposed by Sir James Jeans in the 1920s.

Q.3 : (d) After the evolution of universe the gases condensed under gravitation and formed the galaxies and Milky Way galaxy is a part of solar system from which the earth was supposed to be formed.

Q.4 : (c) The lightest atoms of nitrogen, carbon, etc. formed the primitive atmosphere. Hydrogen atoms were most numerous and most reactive in primitive atmosphere. Hydrogen atoms combined with all oxygen atoms to form water leaving no free oxygen. Thus, primitive atmosphere was reducing (without free oxygen) unlike the present oxidizing atmosphere (with free oxygen). Formation of ozone layer is the consequence of modern oxidizing atmosphere having plenty of free oxygen. As more oxygen accumulated in the atmosphere. Due to photosynthesis, ozone began to appear in the top layers.

Q.5 : (b) Organic compounds that first evolved in earth which required for origin of life were protein and nucleic acid. All life forms were in aquatic environment only.

Q.6 : (a) The primitive earth conditions were so that they led to the production of organic molecules like proteins, RNA, etc.

Q.7 : (b)

Q.8 : (a) The interstellar dust from which earth originated was especially rich in hydrogen. It readily combine with nitrogen forming ammonia, with carbon forming methane, and with oxygen forming water leaving no free oxygen. Thus, early atmosphere of primitive earth was strongly reducing, it contains hydrogen, methane, ammonia and water vapours.

Q.9 : (a) The Miller-Urey experiment, conducted by chemists Stanley Miller and Harold Urey in 1953, is the classic experiment on the origin of life. It established that the early Earth atmosphere, as they pictured it, was capable of producing amino acids, the building blocks of life, from inorganic substances.

Q.10 : (a)

Q.11 : (d) Coacervates are large colloidal aggregates formed due to intermolecular attraction from large organic molecules synthesized abiotically on primitive earth. It mainly consists of proteins, polysaccharides and water. They do not fulfill the requirement for probable precursors of life. A coacervate is a tiny spherical droplet of assorted organic molecules which is held together by hydrophobic forces from a surrounding liquid. Coacervates possess osmotic properties and form spontaneously from certain dilute organic solutions. They were even once suggested to have played a significant role in the evolution of cells and, therefore, of life itself. They are interesting not only in that they provide a locally segregated environment but also in that their boundaries allow the selective absorption of simple organic molecules from the surrounding medium. Coacervates do not have lipid outer membrane, hence they cannot reproduce.

Q.12 : (b) The RNA world is proposed as the first stage in the evolution of life in which RNA catalysed all molecules necessary for survival and replication. If the first cells used RNA as their hereditary molecule, DNA evolved from an RNA template. DNA probably did not evolve as a hereditary molecule until RNA based life became enclosed in a membrane. Once cells evolved, DNA probably replaced RNA as the genetic material for most organisms.

Q.13 : (a) The first molecules formed for replicating cells were RNA. It was proved by T.Cech in *Tetrahymena thermophyla*. He discovered that an unprocessed RNA molecule could splice itself.

Q.14 : (c) We have lost all the direct evidences of origin of life only due to destruction of fossils on account of climatic changes and not due to any person/(s).

Q.15 : (b)