

Sample paper 9

Question: 1

In which of the following amino acids is hydrogen (H) present as an R group?

- A. Valine
- B. Glycine
- C. Histidine
- D. Arginine
- E. Glutamic acid

Correct Answer: B. Glycine

Explanation:

The basic structure of an amino acid includes an alpha carbon atom to which a COOH, an H and an NH₂ are attached. The fourth position is only variable and is called as R group. Glycine is the smallest of amino acids. It has an R group which is made up of an H molecule.

Question: 2

In which of the following stages is a baby's sex decided?

- A. Zygote
- B. Embryo
- C. Gastrula
- D. Blastula
- E. Neurula

Correct Answer: A. Zygote

Explanation:

In human, after fertilization of the male and female gametes the zygote formed contains either XX chromosomes (which develop into female) or XY chromosomes (which develop into male). This is decided by the sperm (X or Y) that fuses with the ovum.

Question: 3

Organisms exhibiting high intrinsic growth rates have

- A. Short generation time
- B. Low carrying capacity
- C. No courtship behaviours
- D. Long generation time
- E. High carrying capacity

Correct Answer: A. Short generation time

Explanation:

Intrinsic growth rate is the maximum rate at which a particular population would grow under the absence of external growth suppressing agents or conditions. Organisms possessing high intrinsic growth rates have short generation time (time needed to produce the offspring).

Question: 4

Schizogony is a characteristic feature of

- A. Arthropods
- B. Algae
- C. Sporozoans
- D. Nematodes
- E. Both A and D

Correct Answer: C. Sporozoans

Explanation:

Schizogony is the asexual mode of reproduction in sporozoans. It is the process where the nucleus divides first followed by the segmentation of cytoplasm by multiple fission resulting in the formation of merozoites. For example in Plasmodium schizogony stage occurs in the hepatocytes of liver and RBC's of humans.

Question: 5

The arrangement of teeth on one side of adult human mouth is

- A. Premolars, molars, canine, incisors
- B. Molars, premolars, canine, incisors
- C. Incisors, canine, premolars and molars
- D. Canine, incisors, premolars and molars
- E. Canine, premolars, molars, incisors

Correct Answer: C. Incisors, canine, premolars and molars

Explanation:

Humans are of heterodont dentition; that means non similar teeth. Adult humans have 32 permanent teeth in which one half of the upper and lower jaws show 2 incisors, 1 canine, 2 premolars and 3 molars.

Question: 6

Supercoiling of DNA during replication is prevented by

- A. DnaB protein
- B. Topoisomerase
- C. SSBP
- D. PCNA
- E. DnaG protein

Correct Answer: B. Topoisomerase

Explanation:

Topoisomerase is involved in preventing positive supercoiling of DNA during replication. SSBP (single strand binding protein) is needed for maintaining the strands in the separated state during replication. DnaB protein and DnaG protein have helicase and primase activity respectively.

Question: 7

Which of the following hormones is responsible for reabsorption of water from kidney?

- A. Renin
- B. Oxytocin
- C. Antidiuretic hormone
- D. Insulin
- E. Glucocorticoids

Correct Answer: C. Antidiuretic hormone

Explanation:

Antidiuretic hormone is secreted by posterior pituitary. It is also called as arginine vasopressin. The body water level remains stable despite of variation of water taken. This is due to the action of antidiuretic hormone. It prevents the production of dilute urine.

Question: 8

Ferns do not possess

- A. Flowers
- B. Seeds
- C. Spores
- D. Both A and B
- E. Both B and C

Correct Answer: D. Both A and B

Explanation:

Pteridophytes are the group of plants which are termed as ferns. They are vascular plants with the conductive tissues xylem and phloem. Leaves and roots are present in ferns. They have no flowers and seeds for reproduction. Instead they are cryptogams (reproduce through spores).

Question: 9

Which of the following can lead to loss of pluripotency of stem cells?

- A. Increased expression of oct-4 gene
- B. Oct-4 siRNA transfection
- C. Use of LIF
- D. High expression of β - catenin
- E. None of these

Correct Answer: Oct-4 siRNA transfection

Explanation:

Oct-4 is considered as a very important protein for maintaining the pluripotency of stem cells. siRNA against oct-4 will decrease its amount in the cell and thus it will negatively affect the pluripotency of the cell.

Question: 10

Decidua refers to

- A. Endometrium of uterus
- B. Yolk sac of egg
- C. The outer layer of blastocyst
- D. Embryo after cleavage
- E. None of the above

Correct Answer: A. Endometrium of uterus

Explanation:

Decidua is the mucous membrane lining the uterus. It is modified during pregnancy and shed during menstruation and parturition. It forms the maternal part of placenta.

Question: 11

A solution containing a protein molecule shows _____ entropy when compared to a solution containing its free amino acids.

- A. Equal
- B. Higher
- C. Lower
- D. Either higher or lower
- E. Negligible

Correct Answer: C. Lower

Explanation:

Entropy is a measure of disorderliness in a system. A protein is a chain of amino acids linked together in an orderly manner. Hence a protein will have lower entropy than its amino acids that are in unbound state.

Question: 12

Gluconeogenesis takes place mainly in

- A. Liver
- B. Kidney
- C. Pancreas
- D. Muscles
- E. Both A and B

Correct Answer: E. Both A and B

Explanation:

Gluconeogenesis is the synthesis of glucose from a non- carbohydrate source. Liver and kidney are the main sites of gluconeogenesis.

Question: 13

The individuals who possess one of the alleles of sickle cell disease are more resistant to

- A. Cholera
- B. Typhoid
- C. Malaria
- D. Common cold
- E. None of the above

Correct Answer: C. Malaria

Explanation:

The individuals who possess one of the alleles of sickle cell disease are resistant to malaria. The malarial parasites replicate in the RBC. The sickled RBC has unusual shape when compared to the normal RBC and contains pores in its cell membrane. The malarial parasites cannot survive in the sickled RBC and therefore an individual with sickle cell disease is more resistant to malaria.

Question: 14

Parapodia are present in

- A. Platyhelminthes
- B. Arthropods
- C. Cnidarians
- D. Porifers
- E. Annelids

Correct Answer: E. Annelids

Explanation:

Parapodia are paired unjointed lateral outgrowths from the body of annelids. Parapodia functions in locomotion. It is mainly seen in polychaetes (belong to phylum annelida). They are also found in some animals like sea snail.

Question: 15

Rain occurs due to

- A. Precipitation of condensed water vapour
- B. Sublimation
- C. Evaporation
- D. Percolation
- E. Snowmelt

Correct Answer: A. Precipitation of condensed water vapour

Explanation:

Rain is a form of precipitation which occurs due to the condensation of water vapours. When a portion of atmosphere is saturated with water vapour, it condenses and precipitates as rain, drizzle snow etc.