

BIOLOGY

1. **Assertion A :** In Bt cotton *B. thuringiensis* produces a toxic insecticidal crystalline protein which destroys bollworms.

Reason R : *B. thuringiensis* produces this toxic protein in an inactive form, but when an insect ingests this inactive protein, it is converted into active form of toxin due to the alkaline pH of gut which solubilises the crystals, which is responsible for the death of bollworm.

- (A) A is correct and R is wrong
(B) A is wrong and R is correct
(C) A and R both are correct but R is not the explanation of A
(D) A and R both are correct and R is the correct explanation of A

Answer (B)

Sol. Specific Bt toxin gene are isolated from *B. thuringiensis* and incorporated in plants.

2. How many number of barr body will be present in female suffering from Turner's syndrome?
(A) Zero
(B) One
(C) Two
(D) Three

Answer (A)

Sol. • Turner's syndrome = 44 A + XO.

• Number of barr bodies

= number of X chromosomes(nx) – 1.

= 1 – 1

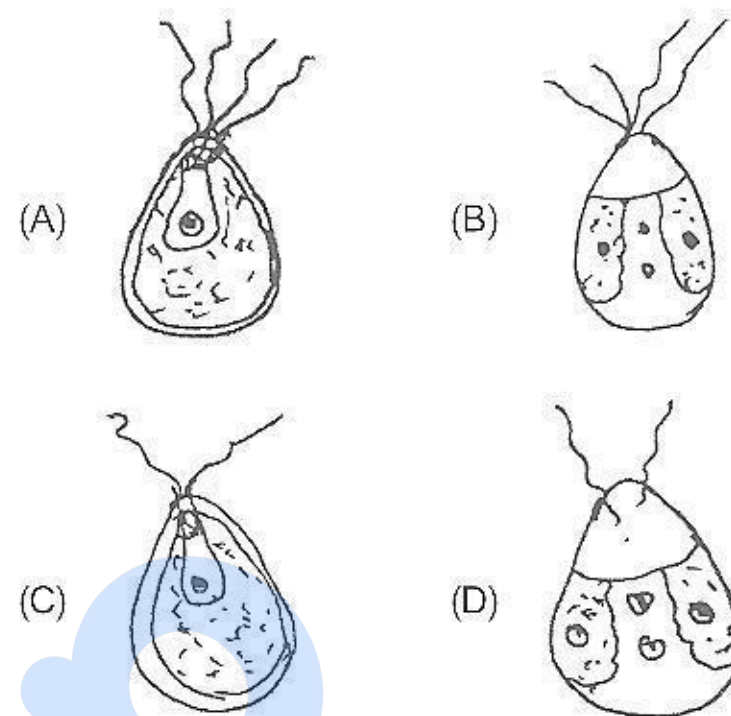
= 0 (Zero)

3. What does 'R' indicate in EcoRI?
(A) Enzyme isolated from species of bacteria
(B) Genus of bacteria
(C) Sequence of enzyme
(D) Species of bacteria

Answer (*)

Sol. Indicate strain-R-13 of *E.coli* bacteria.

4. Which is the motile zoospore of *Chlamydomonas* in the given figure?



Answer (C)

Sol. Zoospores of *Chlamydomonas* are biflagellated, haploid and asexual spores.

5. Which is the correct order for the development of embryo sac?
(A) Megaspore → Megaspore mother cell → Embryo sac
(B) Megaspore → Embryo sac → Megasporangium
(C) Megaspore mother cell → Embryo sac → Megaspores
(D) Megaspore mother cell → Megaspore → Embryo sac

Answer (D)

Sol. $\text{MMC}_{(2n)} \xrightarrow{\text{Meiosis}} \text{Megaspore}_{(n)} \longrightarrow \text{Embryo sac / female gametophyte}_{(n)}$

6. Which of the following statement is correct for pituitary gland?
(i) Melenocyte stimulating hormone secretes from intermediate lobe of pituitary gland
(ii) The pituitary gland is located below the hypothalamus
(iii) Oxytocin produces from posterior lobe of pituitary gland
(iv) Somatotropic hormone secretes from intermediate lobe of pituitary gland.
(A) (i), (ii), (iii) (B) (i), (iv), (iii)
(C) (i), (ii), (iv) (D) (i), (ii), (iii), (iv)

Answer (A)

Sol. Posterior pituitary secretes oxytocin and vasopressin melanocyte stimulating from intermediate pituitary somatotrophic hormone from anterior lobe of pituitary.

7. Which is not the symptom of Cushing's syndrome, out of the following?

- (A) Increased blood sugar level
- (B) Decrease in weight
- (C) Rise in blood pressure
- (D) Rise in blood volume

Answer (B)

Sol. It occurs due to hypersecretion of adrenal hormone.

8. Which of the following sentence is correct for cranial nerve?

- (A) It is only connected with parasympathetic path
- (B) It is associated with sympathetic pathway
- (C) Originates from spinal cord
- (D) It transports both motor and sensory impulses

Answer (A)

Sol. Parasympathetic path is craniosacral in origin.

9. The person is suffering from which disease having the symptoms like aging and tremor?

- (A) Sciatica
- (B) Diabetes
- (C) Parkinson's
- (D) Multiple sclerosis

Answer (C)

Sol. Parkinson is due to deficiency of dopamine. Sciatica is due to compression of spinal nerve root and pain radiates from back, hip to outer side of legs.

10. Match the column-I and II, choose the correct option.

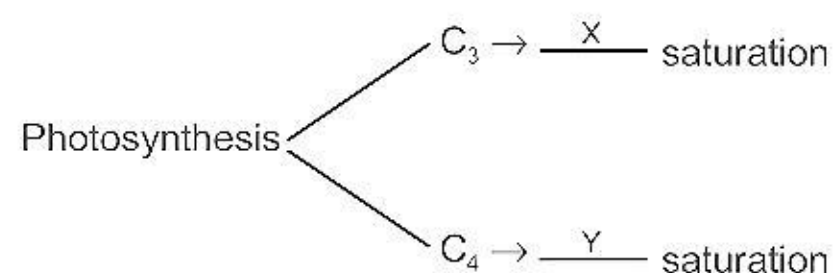
Column I	Column II
P. Silicon	(i) In structure of coenzymes
Q. Nickel	(ii) Required for nitrogen fixation in leguminous plants
R. Sulphur	(iii) As a component of cell walls
S. Cobalt	(iv) Required for iron absorption

- (A) P(iii), Q(iv), R(ii) S(i)
- (B) P(ii), Q(iv), R(ii) S(i)
- (C) P(iii), Q(iv), R(i) S(ii)
- (D) P(ii), Q(iii), R(i) S(iv)

Answer (C)

Sol. Factual

11. CO_2 concentration factor affecting photosynthesis process, which statement is **correct** for C_3 and C_4 plant?



- (A) $\text{X} = 450 \text{ ML}^{-1}$ (B) $\text{X} = 360 \text{ ML}^{-1}$
- $\text{Y} = 350 \text{ ML}^{-1}$ $\text{Y} = 350 \text{ ML}^{-1}$
- (C) $\text{X} = 450 \text{ ML}^{-1}$ (D) $\text{X} = 350 \text{ ML}^{-1}$
- $\text{Y} = 360 \text{ ML}^{-1}$ $\text{Y} = 450 \text{ ML}^{-1}$

Answer (C)

Sol. Factual

12. If 4 molecules of glucose are synthesized during photosynthesis, how many ATP molecules are released and how many molecules of ATP are utilized respectively?

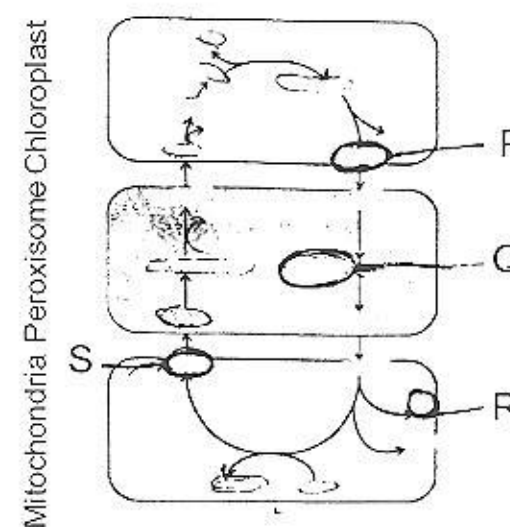
- (A) 8 ATP, 72 ATP
- (B) 2 ATP, 18 ATP
- (C) 8 ATP, 36 ATP
- (D) 4 ATP, 36 ATP

Answer (A)

Sol. Number of ATP molecules released = $2 \times 4 = 8$

Number of ATP molecules utilised = $18 \times 4 = 72$

13. In the given figure, what are the substances labelled as P, Q, R and S?



- (A) P-PGA, Q-Glyoxylate, R- NH_3 , S-Serine
- (B) P-Glycolate, Q-Glyoxylate, R- NH_3 , S-Serine
- (C) P-Glycolate, Q-Glycerate, R- CO_2 , S-Serine
- (D) P-RuBP, Q-Glycerate, R- CO_2 , S-Serine

Answer (B)

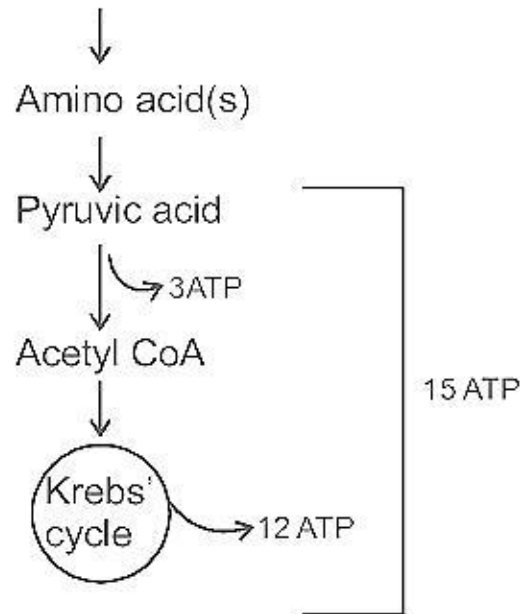
Sol. C_2 Cycle / Photorespiration

14. How many ATP molecules are synthesized in complete aerobic respiration of dipeptide molecule during Amphibolic pathway?

(A) 30 ATP
(B) 60 ATP
(C) 15 ATP
(D) 36 ATP

Answer (A)

Sol. Protein



Oxidation of 1 amino acid leads to synthesis of 15 ATP molecules, so oxidation of dipeptide protein leads to synthesis of 30 ATP molecules.

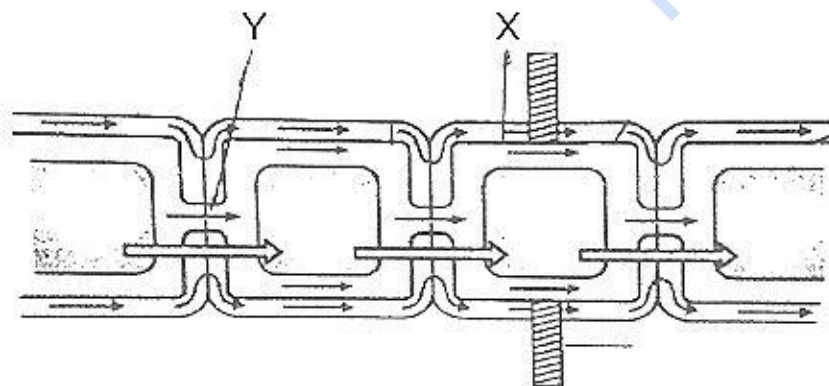
15. What is the end product of Glycolysis process?

(A) $\text{CH}_3\text{CH}_2\text{OH}$
(B) $\text{CH}_3\text{CO}\cdot\text{COOH}$
(C) $\text{CH}_3\text{HCOH}\cdot\text{COOH}$
(D) $\text{CH}_3\text{CH}_2\text{COOH}$

Answer (B)

Sol. End product of glycolysis is pyruvate / pyruvic acid ($\text{CH}_3\text{COCO}\cdot\text{COOH}$).

16. What indicate X, Y in the given diagram?



(A) X-Cell surface membrane Y-Plasmodesma
(B) X-Plasmodesma Y-Tonoplast
(C) X-Cell surface membrane Y-Cytoplasm
(D) X-Plasmodesma Y-Cell surface membrane

Answer (A)

Sol. Symplastic water movement.

17. In a garden, the gardner cut the apical bud of *Lawsonia* (Mehandi) because _____

(A) The length should be limited in *Lawsonia*
(B) Due to the cutting of apical bud the effect of Auxins decreases and lateral bud grows and forms dense appearance that is why it can give a definite shape
(C) Other apical bud grows quickly due to cut of apical bud
(D) Due to the cutting of apical bud effect of Ethylene decreases and plant grows rapidly

Answer (B)

Sol. Lateral dominance.

18. When spermatogonia accumulates large amount of nutrient and chromatin material and increase in size, now it is known as _____.

(A) Spermatids
(B) Spermatogonium
(C) Sperm
(D) Primary spermatocytes

Answer (D)

Sol. Primary spermatocyte form spermatogonia by increasing theri size due to synthesising new protoplasm.

19. Alkaptonuria (aa) is which type of error?

(A) Lethal mutation
(B) Metabolism error
(C) Error in number of chromosome
(D) Induced error

Answer (B)

Sol. Alkaptonuria is an autosomal recessive genetic disorder as well as a metabolic error.

20. Due to _____ therapy changes would be heritable.

(A) Magnetic therapy
(B) Somatic cell gene therapy
(C) Germ line gene therapy
(D) Chemotherapy

Answer (C)

Sol. Only change in genetic composition or gene structure is heritable.

21. Human insulin contains how many amino acids on B chain?
- (A) 51 (B) 21
(C) 30 (D) 31

Answer (C)

Sol. Human insulin consist of two polypeptide chain which are linked together by disulphide bonds. Total 51 amino acid present in two polypeptide, out of which chain (polypeptide) A contains 21 amino acid and B contains 30 amino acid.

22. Statement-A : A plant *Pentadiplandra brazzeana* produces a protein called brazzein.

Statement-B : This protein is a low caloric sweetner, i.e. it is used in the treatment of diabetes.

- (A) A and B both are correct but B is not the explanation of A
(B) A and B both are correct B is the correct explanation of A
(C) A is correct and B is wrong
(D) A is wrong and B is correct

Answer (A)

Sol. Factual

23. Out of the following which is reabsorbed in selective reabsorption?
- (A) Urea (B) Creatine
(C) Uric acid (D) Amino acid

Answer (D)

Sol. During selective reabsorption, high threshold substance like amino acid, glucose etc. are 100% reabsorbed from PCT.

24. Frog excretes _____ whereas tadpole excretes _____.
- (A) Ammonia, Urea (B) Urea, Ammonia
(C) Urea, Uric acid (D) Uric acid, Ammonia

Answer (B)

Sol. Frog is uricotelic so it excretes uric acid but tadpole is ammonotelic so it excretes ammonia. During metamorphosis of tadpole this type of change occurs. Also tadpole is aquatic but frog is terrestrial in habit.

25. The functional unit of myofibril is made up of
- (A) Complete A-band
(B) Complete I-band
(C) Complete I-band and two half A-band
(D) Complete A-band and two half I-band

Answer (D)

Sol. Functional unit of myofibril or muscle contraction is called sarcomere. One sarcomere consist of one complete A-band and two half I-band.

26. Which of the following paired bone is present in the skull?
- (A) Frontal bones (B) Parietal bones
(C) Occipital bone (D) Sphenoid bone

Answer (B)

Sol. Skull consists of 8 cranial 14 facial, 1-hyoid and 6 ear ossicle. In 8 cranial bone → Frontal – 1, Parietal – 2, Temporal – 2, Occipital – 1, Sphenoid – 1 and Ethmoid – 1

27. In hydrosere succession, which stage comes just before sedge meadow stage?
- (A) Rooted submerged stage
(B) Phytoplankton stage
(C) Reed swamp stage
(D) Climax stage

Answer (C)

Sol. Reed swamp stage.

28. The energy which is present in the biomass of plant is known as _____.
- (A) Gross primary productivity
(B) Net productivity
(C) Secondary productivity
(D) Net primary productivity

Answer (D)

Sol. Factual

$NPP = GPP - \text{Respiratory loss.}$

29. Match the column-I and II choose the correct option

Column - I	Column - II
(a) Kaziranga National Park	(i) Uttar Pradesh (Uttarakhand)
(b) Tadoba National Park	(ii) Gujarat
(c) Corbett National Park	(iii) Maharashtra
(d) Gir National Park	(iv) Assam

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

Answer (A)**Sol.** Factual

30. What is searched from the patient's blood in ELISA method for the detection of AIDS?
- (A) Antigen (B) Antibody
(C) No. of WBC (D) No. of RBC

Answer (B)

Sol. ELISA is based on antigen-antibody reaction. The indirect ELISA is a test for the presence of antibody. In this known antigen is adsorbed to the inside of the well in a microtiter plate then the sample suspected of containing the antibody is added. Development of colour due to antigen antibody reaction indicates the presence of the antibody.

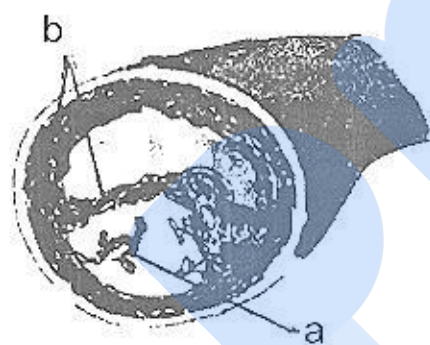
31. What is intrinsic factor-X-activator complex?

- (A) XII + FSF + Glycolipid + Ca^{2+}
(B) IX + AHF + Glycolipid + Ca^{2+}
(C) XII + FSF + Phospholipid + Ca^{2+}
(D) IX + AHG + Phospholipid + Ca^{2+}

Answer (D)

Sol. The activation of blood coagulation factor X by factor IX and non enzymatic cofactor. Phospholipid and Ca^{2+}

32. Mention the names of a and b in the given figure.



- (A) Cholesterol crystals, smooth muscle cells
(B) Fat, smooth muscle cells
(C) Lumen of vessel, ulcer
(D) Endothelium, fat

Answer (A)**Sol.** Factual

33. CO_2 , pH and O_2 levels in the blood is detected by which receptors?
- (A) Baro receptors
(B) Chemo receptors
(C) Sensory receptors
(D) Baro receptors & Chemo receptors

Answer (B)

Sol. Chemoreceptors present in carotid body, aortic sinus and responsible for receiving change in chemical composition of blood.

34. Which structure gives us ability to speech?

- (A) Epiglottis (B) Vocal cord
(C) Larynx (D) Trachea

Answer (B)

Sol. Vocal cord generate sound during expiration.

35. The largest salivary gland present in human _____.

- (A) Submandibular gland (B) Sublingual gland
(C) Parotid gland (D) Gastric gland

Answer (C)

Sol. Parotid gland is a largest salivary gland in human.

36. Match the Column-I and II choose the correct option.

Column - I	Column - II
(a) Secretin	(i) Stimulates gastric gland to release gastric juice
(b) Cholecystokinin	(ii) Stimulates gall bladder to release bile juice
(c) Gastrin	(iii) With coeffect of pancreozymmin stimulates secretion of pancreatic juice and intestinal juice
(d) Enterogastrone	(iv) Inhibits gastric juice secretion and stops stomach churning

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

Answer (C)

Sol. Secretin stimulate pancrease for secretion of more pancreatic juice.

Cholecystokinine - Acts on gall bladder and increase contraction in it.

Gastrin - Secreted from stomach and increase secretion of gastric juice.

Enterogastrone - Inhibit gastric juice secretion.

37. Blood stained clothing of Abraham Lincoln has been analysed for evidence of which genetic disorder?

- (A) Marfan's syndrome
(B) Diabetes
(C) Alzheimer's disease
(D) Cardiovascular disease

Answer (A)

Sol. Marfan's syndrome is a genetic disorder of the connective tissue.

38. Which is the correct sequence of ancestors in the path of primates evolution?

- (A) Crossopterygian → Cotylosaur → Therapsid → Labyrinthodont → Insectivores → Primates
- (B) Labyrinthodont → Cotylosaur → Therapsid → Crossopterygian → Insectivores → Primates
- (C) Crossopterygian → Labyrinthodont → Cotylosaur → Therapsid → Insectivores → Primates
- (D) Crossopterygian → Therapsid → Cotylosaur → Labyrinthodont → Insectivores → Primates

Answer (C)

Sol. Factual

39. The human genome contains __a__ billion nucleotide bases. The average gene consists of __b__ bases. Which option is correct for a & b?

(A) a = 3, b = 3000

(B) a = 5, b = 3000

(C) a = 3, b = 2000

(D) a = 4, b = 3000

Answer (A)

Sol. Factual

40. In some viruses the flow of genetic information is in reverse direction. It was brought to light by _____

(A) F.H.C. Crick

(B) H.M. Temin and D. Baltimore

(C) Avery, McCarty and Macleod

(D) Erwin Chargaff

Answer (B)

Sol. 