

AIPMT 2010 Mains — Biology Question Paper with Solutions

46 Biology questions as set in the paper · answers checked by RankUp

AIPMT 2010 Mains · Q1

1. Which one of the following pairs of structures is correctly matched with their correct description?

Structures - Description

- (A) Tibia and fibula – Both form parts of knee joint
- (B) Cartilage and cornea – No blood supply but do require oxygen for respiratory need
- (C) Shoulder joint and elbow joint – Ball and socket type of joint
- (D) Premolars and molars – 20 in all and 3-rooted

AIPMT 2010 Mains · Q3

2. Fastest distribution of some injectible material/medicine and with no risk of any kind can be achieved by injecting it into the

- (A) Muscles
- (B) Arteries
- (C) Veins
- (D) Lymph vessels

AIPMT 2010 Mains · Q4

3. Which one of the following statements about the particular entity is true?

- (A) Centromere is found in animal cells, which produces aster during cell division
- (B) The gene for producing insulin is present in every body cell
- (C) Nucleosome is formed of nucleotides
- (D) DNA consists of a core of eight histones

AIPMT 2010 Mains · Q6

4. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statements is not correct during this process of nitrogen fixation?

- (A) Leghaemoglobin scavenges oxygen and is pinkish in colour
- (B) Nodules act as sites for nitrogen fixation
- (C) The enzyme nitrogenase catalyses the conversion of atmospheric N_2 to NH_3
- (D) Nitrogenase is insensitive to oxygen

AIPMT 2010 Mains · Q7

5. Which one of the following is a xerophytic plant in which the stem is modified into the flat green and succulent structure?

- (A) Opuntia
- (B) Casuarina
- (C) Hydrilla
- (D) Acacia

AIPMT 2010 Mains · Q9

6. Which of the following are used in gene cloning?

- (A) Nucleoids
- (B) Lomasomes
- (C) Mesosomes
- (D) Plasmids

AIPMT 2010 Mains · Q10

7. When domestic sewage mixes with river water

- (A) Small animals like rats will die after drinking river water
- (B) The increased microbial activity releases micro-nutrients such as iron
- (C) The increased microbial activity uses up dissolved oxygen
- (D) The river water is still suitable for drinking as impurities are only about 0.1%

AIPMT 2010 Mains · Q13

8. In which one of the following organisms its excretory organs are correctly stated?

- (A) Humans – Kidneys, sebaceous glands and tear glands
- (B) Earthworm – Pharyngeal, integumentary and septal nephridia
- (C) Cockroach – Malpighian tubules and enteric caeca
- (D) Frog – Kidneys, skin and buccal epithelium

AIPMT 2010 Mains · Q15

9. The most apparent change during the evolutionary history of Homo sapiens is traced in

- (A) Loss of body hair
- (B) Walking upright
- (C) Shortening of the jaws
- (D) Remarkable increase in the brain size

AIPMT 2010 Mains · Q16

10. Which one of the following is now being commercially produced by biotechnological procedures?

- (A) Nicotine
- (B) Morphine
- (C) Quinine
- (D) Insulin

AIPMT 2010 Mains · Q18

11. If for some reason the parietal cells of the gut epithelium become partially non-functional, what is likely to happen?

- (A) The pancreatic enzymes and specially the trypsin and lipase will not work efficiently
- (B) The pH of stomach will fall abruptly
- (C) Steapsin will be more effective
- (D) Proteins will not be adequately hydrolysed by pepsin into proteoses and peptones

AIPMT 2010 Mains · Q19

12. Which one of the following is most appropriately defined?

- (A) Host is an organism which provides food to another organism
- (B) Amensalism is a relationship in which one species is benefited whereas the other is unaffected
- (C) Predator is an organism that catches and kills other organism for food
- (D) Parasite is an organism which always lives inside the body of other organism and may kill it

AIPMT 2010 Mains · Q20

13. Read the following four statements, A, B, C and D and select the right option having both correct statements.

STATEMENTS:

(A) Z scheme of light reaction takes place in presence of PSI only.

(B) Only PS I is functional in cyclic photophosphorylation.

(C) Cyclic photophosphorylation results into synthesis of ATP and NADPH₂

(D) Stroma lamellae lack PS II as well as NADP.

- (A) B and D
- (B) A and B
- (C) B and C
- (D) C and D

AIPMT 2010 Mains · Q21

14. Which one of the following techniques is safest for the detection of cancers?

- (A) Magnetic resonance imaging (MRI)
- (B) Radiography (X-ray)
- (C) Computed tomography (CT)
- (D) Histopathological studies

AIPMT 2010 Mains · Q22

15. Signals from fully developed foetus and placenta ultimately lead to parturition which requires the release of

- (A) Estrogen from placenta
- (B) Oxytocin from maternal pituitary
- (C) Oxytocin from foetal pituitary
- (D) Relaxin from placenta

AIPMT 2010 Mains · Q23

16. Select the correct matching of a hormone, its source and function.

Hormone - Source - Function

- (A) Vasopressin - Posterior pituitary - Increases loss of water through urine
- (B) Norepinephrine - Adrenal medulla - Increases heart beat, rate of respiration and alertness
- (C) Glucagon - Beta-cells of Islets of Langerhans - Stimulates glycogenolysis
- (D) Prolactin - Posterior pituitary - Regulates growth of mammary glands and milk formation in females

AIPMT 2010 Mains · Q24

17. In eukaryotic cell transcription, RNA splicing and RNA capping take place inside the

- (A) Ribosomes
- (B) Nucleus
- (C) Dictyosomes
- (D) ER

AIPMT 2010 Mains · Q25

18. Given below are four statements (a-d) regarding human blood circulatory system

(a) Arteries are thick-walled and have narrow lumen as compared to veins

(b) Angina is acute chest pain when the blood circulation to the brain is reduced

(c) Persons with blood group AB can donate blood to any person with any blood group under ABO system

(d) Calcium ions play a very important role in blood clotting

Which two of the above statements are correct?

- (A) (a) & (d)
- (B) (a) & (b)
- (C) (b) & (c)
- (D) (c) & (d)

AIPMT 2010 Mains · Q26

19. In human female the blastocyst

- (A) Forms placenta even before implantation
- (B) Gets implanted into uterus 3 days after ovulation
- (C) Gets nutrition from uterine endometrial secretion only after implantation
- (D) Gets implanted in endometrium by the trophoblast cells

AIPMT 2010 Mains · Q27

20. The haemoglobin content per 100 ml of blood of a normal healthy human adult is

- (A) 5 - 11 g
- (B) 25 - 30 g
- (C) 17 - 20 g
- (D) 12 - 16 g

AIPMT 2010 Mains · Q28

21. An example of endomycorrhiza is

- (A) Nostoc
- (B) Glomus
- (C) Agaricus
- (D) Rhizobium

AIPMT 2010 Mains · Q29

22. One of the commonly used plant growth hormone in tea plantations is

- (A) Ethylene
- (B) Abscissic acid
- (C) Zeatin
- (D) Indole - 3 - acetic acid

AIPMT 2010 Mains · Q31

23. Jaundice is a disorder of

- (A) Excretory system
- (B) Skin and eyes
- (C) Digestive system
- (D) Circulatory system

AIPMT 2010 Mains · Q32

24. Kranz anatomy is one of the characteristics of the leaves of

- (A) Potato
- (B) Wheat
- (C) Sugarcane
- (D) Mustard

AIPMT 2010 Mains · Q33

25. In *Antirrhinum* two plants with pink flowers were hybridized. The F_1 plants produced red, pink and white flowers in the proportion of 1 red, 2 pink and 1 white. What could be the genotype of the two plants used for hybridization? Red flower colour is determined by RR, and white by rr genes.

- (A) rrrr
- (B) RR
- (C) Rr
- (D) rr

AIPMT 2010 Mains · Q34

26. Transport of food material in higher plants takes place through

- (A) Companion cells
- (B) Transfusion tissue
- (C) Tracheids
- (D) Sieve elements

AIPMT 2010 Mains · Q35

27. Which one of the following is monoecious?

- (A) Marchantia
- (B) Cycas
- (C) Pinus
- (D) Date palm

AIPMT 2010 Mains · Q36

28. A cross in which an organism showing a dominant phenotype is crossed with the recessive parent in order to know its genotype is called :

- (A) Monohybrid cross
- (B) Back cross
- (C) Test cross
- (D) Dihybrid cross

AIPMT 2010 Mains · Q37

29. The Indian Rhinoceros is a natural inhabitant of which one of the Indian states?

- (A) Uttarakhand
- (B) Uttar Pradesh
- (C) Himachal Pradesh
- (D) Assam

AIPMT 2010 Mains · Q39

30. Black (stem) rust of wheat is caused by :

- (A) *Alternaria solani*
- (B) *Ustilago nuda*
- (C) *Puccinia graminis*
- (D) *Xanthomonas oryzae*

AIPMT 2010 Mains · Q40

31. Secretions from which one of the following are rich in fructose, calcium and some enzymes?

- (A) Male accessory glands
- (B) Liver
- (C) Pancreas
- (D) Salivary glands

AIPMT 2010 Mains · Q41

32. A person suffering from a disease caused by *Plasmodium*, experiences recurring chill and fever at the time when?

- (A) The sporozoites released from RBCs are being rapidly killed and broken down inside spleen
- (B) The trophozoites reach maximum growth and give out certain toxins
- (C) The parasite after its rapid multiplication inside RBCs ruptures them, releasing the stage to enter fresh RBCs
- (D) The microgametocytes and megagametocytes are being destroyed by the WBCs

AIPMT 2010 Mains · Q42

33. ABO blood grouping is controlled by gene I which has three alleles and show co-dominance. There are six genotypes. How many phenotypes in all are possible?

- (A) Six
- (B) Three
- (C) Four
- (D) Five

AIPMT 2010 Mains · Q43

34. Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?

- (A) Enzymes require optimum pH for maximal activity
- (B) Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures 80°-90°C
- (C) Enzymes are highly specific
- (D) Most enzymes are proteins but some are lipids

AIPMT 2010 Mains · Q44

35. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called :

- (A) Thylakoid
- (B) Endoplasmic Reticulum
- (C) Plasmalemma
- (D) Cytoskeleton

36. Consider the following four statements A, B, C and D and select the right option for two correct statements.

Statements

(A) In vexillary aestivation, the large posterior petal is called standard, two lateral ones are wings and two small anterior petals are termed keel

(B) The floral formula for Liliaceae is $\oplus \text{ } \overline{\text{Q}} \text{ } \text{P}_{3+3} \text{ } \text{A}_{3+3} + \underline{\text{G}}_3$

(C) In pea flower the stamens are monadelphous

(D) The floral formula for Solanaceae is $\oplus \text{ } \overline{\text{Q}} \text{ } \text{K}_{(3)} \text{ } \text{C}_{(3)} \text{ } \text{A}_{(4)} + \underline{\text{G}}_{(2)}$

The correct statements are

- (A) (A) and (C)
- (B) (A) and (B)
- (C) (B) and (C)
- (D) (C) and (D)

37. In genetic engineering, a DNA segment (gene) of interest, is transferred to the host cell through a vector. Consider the following four agents (A-D) in this regard and select the correct option about which one or more of these can be used as a vector/vectors

Statements

(A) A bacterium

(B) Plasmid

(C) Plasmodium

(D) Bacteriophage

- (A) (A), (B) and (D) only
- (B) (A) only
- (C) (A) and (C) only
- (D) (B) and (D) only

38. Which one of the following can not be used for preparation of vaccines against plague?

- (A) Formalin-inactivated suspensions of virulent bacteria
- (B) Avirulent live bacteria
- (C) Synthetic capsular polysaccharide material
- (D) Heat-killed suspensions of virulent bacteria

39. The fruit fly *Drosophila melanogaster* was found to be very suitable for experimental verification of chromosomal theory of inheritance by Morgan and his colleagues because :

- (A) It reproduces parthenogenetically
- (B) A single mating produces two young flies
- (C) Smaller female is easily recognisable from larger male
- (D) It completes life cycle in about two weeks

40. The lac operon consists of

- (A) Four regulatory genes only
- (B) One regulatory gene and three structural genes
- (C) Two regulatory genes and two structural genes
- (D) Three regulatory genes and three structural genes

41. Crocodile and penguin are similar to Whale and Dogfish in which one of the following features?

- (A) Possess a solid single stranded central nervous system
- (B) Lay eggs and guard them till they hatch
- (C) Possess bony skeleton.
- (D) Have gill slits at some stage

42. Select the answer with correct matching of the structure, its location and function

Structure - Location - Function

- (A) Eustachian tube - Anterior part of internal ear - Equalizes air pressure on either sides of tympanic membrane
- (B) Cerebellum - Mid brain - Controls respiration and gastric secretions
- (C) Hypothalamus - Fore brain - Controls body temperature, urge for eating and drinking
- (D) Blind spot - Near the place where optic nerve leaves the eye - Rods and cones are present but inactive here

43. Select the correct combination of the statements (a-d) regarding the characteristics of certain organisms

- (a) Methanogens are Archaeobacteria which produce methane in marshy areas**
- (b) Nostoc is a filamentous blue-green alga which fixes atmospheric nitrogen**
- (c) Chemosynthetic autotrophic bacteria synthesize cellulose from glucose**
- (d) Mycoplasma lack a cell wall and can survive without oxygen**

The correct statement are

- (A) (b), (c)
- (B) (a), (b), (c)
- (C) (b), (c), (d)
- (D) (a), (b), (d)

44. Which one of the following is the correct description of a certain part of a normal human skeleton?

- (A) Parietal bone and the temporal bone of the skull are joined by fibrous joint
- (B) First vertebra is axis which articulates with the occipital condyles
- (C) The 9th and 10th pairs of ribs are called the floating ribs
- (D) Glenoid cavity is a depression to which the thigh bone articulates

45. Vegetative propagation in Pistia occurs by

- (A) Stolon
- (B) Offset
- (C) Runner
- (D) Sucker

46. The 3'-5' phosphodiester linkages inside a polynucleotide chain serve to join

- (A) One DNA strand with the other DNA strand
- (B) One nucleoside with another nucleoside
- (C) One nucleotide with another nucleotide
- (D) One nitrogenous base with pentose sugar

Answer key and explanations

1. Answer: (B) Cartilage and cornea - No blood supply but do require oxygen for respiratory need

Cartilage and the cornea are avascular tissues: they have no blood vessels, yet their living cells still respire and obtain oxygen by diffusion (from perichondrium, aqueous humour and air). The knee joint is formed by the femur, tibia and patella; the fibula does not take part. The elbow is a hinge joint, not ball and socket, and premolars plus molars ($8 + 12 = 20$) are not all three-rooted.

2. Answer: (C) Veins

An intravenous injection puts the drug straight into venous blood, which returns to the heart and is pumped all over the body within seconds. Arteries carry blood at high pressure, so puncturing them is risky, and intramuscular injection only releases the drug slowly from the muscle. Lymph flow is very slow.

3. Answer: (B) The gene for producing insulin is present in every body cell

Every somatic cell carries the full genome, so the insulin gene is present in all body cells even though it is expressed only in pancreatic beta cells. Asters are formed by centrioles (centrosome), not by the centromere. A nucleosome is DNA wrapped around a histone octamer, so it is the nucleosome (not DNA) that has a core of eight histones.

4. Answer: (D) Nitrogenase is insensitive to oxygen

Nitrogenase is highly sensitive to oxygen, which inactivates it; that is exactly why root nodules contain the pink pigment leghaemoglobin, which binds and removes oxygen. The other statements are correct: nodules are the sites of fixation and nitrogenase reduces N_2 to NH_3 .

5. Answer: (A) Opuntia

Opuntia is a desert plant whose stem is flattened, green, fleshy and photosynthetic (a phylloclade), while its leaves are reduced to spines. Hydrilla is an aquatic plant, and Acacia and Casuarina do not have succulent flattened stems.

6. Answer: (D) Plasmids

Plasmids are small, autonomously replicating, extrachromosomal circular DNA molecules of bacteria and are the commonest cloning vectors (e.g. pBR322). Mesosomes and nucleoids are bacterial cell structures and lomasomes are fungal membrane bodies; none of them carry foreign DNA.

7. Answer: (C) The increased microbial activity uses up dissolved oxygen

Sewage adds a large amount of biodegradable organic matter, and the microbes decomposing it consume dissolved oxygen, raising the BOD and causing oxygen depletion that kills fish. Even though impurities are a small percentage, they include pathogens, so the water is not fit for drinking.

8. Answer: (B) Earthworm - Pharyngeal, integumentary and septal nephridia

Earthworm excretes through three types of nephridia: septal, integumentary and pharyngeal. Tear glands are not excretory in humans, enteric caeca in cockroach are digestive (its excretory organs are Malpighian tubules plus fat body and uricose glands), and buccal epithelium is not an excretory organ in frog.

9. Answer: (D) Remarkable increase in the brain size

Across the human lineage the most marked trend is the steady rise in cranial capacity, from about 650-800 cc in *Homo habilis*, to about 900 cc in *Homo erectus*, to about 1400 cc in *Homo sapiens*. Upright walking appeared early and changed little afterwards, so it is not the most apparent trend through the lineage.

10. Answer: (D) Insulin

Human insulin is now made by recombinant DNA technology: Eli Lilly produced the A and B chains separately in *E. coli* and then joined them. Nicotine, morphine and quinine are plant alkaloids still obtained mainly from plants.

11. Answer: (D) Proteins will not be adequately hydrolysed by pepsin into proteoses and peptones

Parietal (oxyntic) cells secrete HCl, which converts inactive pepsinogen into pepsin and gives the acidic pH pepsin needs. With less HCl, pepsin is poorly formed and proteins are not properly broken down into proteoses and peptones. The stomach pH would rise, not fall, and pancreatic enzymes work in the intestine, which is unaffected.

12. Answer: (C) Predator is an organism that catches and kills other organism for food

A predator catches and kills its prey for food, which is the standard definition. One species benefiting while the other is unaffected is commensalism, not amensalism (one harmed, other unaffected). Parasites may be external (lice, ticks) and generally do not kill the host, and 'host' refers to the organism a parasite lives on, not any food provider.

13. Answer: (A) B and D

Cyclic photophosphorylation uses only PS I, and the stroma lamellae lack PS II and NADP reductase, so cyclic flow there makes only ATP. The Z scheme (non-cyclic flow) needs both PS II and PS I, and cyclic photophosphorylation does not produce NADPH.

14. Answer: (A) Magnetic resonance imaging (MRI)

MRI uses strong magnetic fields and non-ionising radiation, so it does not damage DNA the way X-rays do. Radiography and CT both use ionising X-rays, which can themselves cause mutations. Histopathology is accurate but needs a biopsy, which is an invasive procedure.

15. Answer: (B) Oxytocin from maternal pituitary

Signals from the mature foetus and placenta set up the foetal ejection reflex, which triggers release of oxytocin from the mother's posterior pituitary; oxytocin causes strong uterine contractions that expel the baby. The oxytocin acts on the mother's uterus, so it is the maternal, not foetal, pituitary that releases it.

16. Answer: (B) Norepinephrine - Adrenal medulla - Increases heart beat, rate of respiration and alertness

Norepinephrine (with epinephrine) from the adrenal medulla is an emergency hormone that raises heart rate, breathing rate and alertness. Vasopressin (ADH) reduces water loss in urine, glucagon comes from alpha cells (beta cells make insulin), and prolactin is secreted by the anterior pituitary.

17. Answer: (B) Nucleus

In eukaryotes the DNA is in the nucleus, so the primary transcript (hnRNA) is made there and is also capped, tailed and spliced there before the mature mRNA leaves for the cytoplasm. Ribosomes are where translation happens, after these steps.

18. Answer: (A) (a) & (d)

Arteries have thick muscular walls and a narrow lumen compared with veins, and Ca^{2+} ions are needed at several steps of the clotting cascade. Angina is chest pain caused by too little oxygen reaching the heart muscle, not the brain, and AB individuals are universal recipients, while O is the universal donor.

19. Answer: (D) Gets implanted in endometrium by the trophoblast cells

The outer trophoblast layer of the blastocyst attaches to the endometrium and the uterine cells then cover it, which is implantation. The placenta forms only after implantation, implantation happens about 7 days after fertilisation (not 3), and the blastocyst is already nourished by uterine secretions before it implants.

20. Answer: (D) 12 - 16 g

NCERT states that a healthy adult has 12-16 g of haemoglobin in every 100 ml of blood. Values of 5-11 g would indicate anaemia, and 17-20 g or more are above the normal range.

21. Answer: (B) Glomus

Glomus is a fungus that forms vesicular-arbuscular mycorrhiza, growing inside root cortical cells (endomycorrhiza) and helping the plant absorb phosphorus. Nostoc is a cyanobacterium, Rhizobium is a nitrogen-fixing bacterium, and Agaricus is a mushroom, none of which form endomycorrhiza.

22. Answer: (D) Indole - 3 - acetic acid

Auxins such as IAA are used in tea plantations, where shoot tips are removed to break auxin-driven apical dominance and get bushy growth, and auxins are applied to make stem cuttings root for propagation. Ethylene and ABA are not used commercially there in this way.

23. Answer: (C) Digestive system

Jaundice is a disorder of the liver, a digestive gland: when the liver is damaged or the bile duct blocked, bile pigments build up in the blood. The yellowing of skin and eyes is only the symptom, not the organ system affected.

24. Answer: (C) Sugarcane

Kranz anatomy, with large chloroplast-rich bundle sheath cells ringing the vascular bundles, is typical of C4 plants such as sugarcane and maize. Wheat, potato and mustard are C3 plants and lack this arrangement.

25. Answer: (C) Rr

Flower colour in Antirrhinum (dog flower) shows incomplete dominance, so the heterozygote Rr is pink. Crossing Rr × Rr gives RR : Rr : rr in a 1 : 2 : 1 ratio, i.e. red : pink : white. RR or rr parents would breed true for red or white.

26. Answer: (D) Sieve elements

Food is carried in phloem, through the sieve tube elements (sieve cells in gymnosperms) joined end to end by sieve plates. Companion cells only support the sieve tubes, tracheids conduct water, and transfusion tissue is a gymnosperm leaf tissue.

27. Answer: (C) Pinus

In Pinus both male and female cones are borne on the same tree, so it is monoecious. Cycas has separate male and female plants, Marchantia has separate male and female thalli, and date palm is also dioecious.

28. Answer: (C) Test cross

Crossing a dominant-phenotype individual of unknown genotype with a homozygous recessive is a test cross: all dominant offspring means the individual was homozygous, and a 1 : 1 ratio means it was heterozygous. A back cross is any cross of F₁ with either parent, so only the cross with the recessive parent is the test cross.

29. Answer: (D) Assam

The one-horned Indian rhinoceros lives naturally in the floodplain grasslands of Assam, especially Kaziranga National Park, which holds most of the world's population. The other states are not its natural range.

30. Answer: (C) Puccinia graminis

Black stem rust of wheat is caused by the basidiomycete rust fungus Puccinia graminis (f. sp. tritici). Ustilago nuda causes loose smut of wheat, Alternaria solani causes early blight of potato, and Xanthomonas oryzae is the bacterium of rice blight.

31. Answer: (A) Male accessory glands

The male accessory glands (seminal vesicles, prostate and bulbourethral glands) produce seminal plasma, which NCERT describes as rich in fructose, calcium and certain enzymes. Fructose is the energy source for sperm; the liver, pancreas and salivary glands make digestive secretions instead.

32. Answer: (C) The parasite after its rapid multiplication inside RBCs ruptures them, releasing the stage to enter fresh RBCs

Plasmodium multiplies asexually inside RBCs and then bursts them, releasing new merozoites to infect fresh RBCs along with the toxin haemozoin. This bursting happens in cycles (every 48 hours in vivax), which is when the chill and high fever recur. Sporozoites enter through the mosquito bite and go to the liver, not RBCs.

33. Answer: (C) Four

The three alleles I^A, I^B and i give six genotypes, but I^A and I^B are dominant over i and co-dominant with each other, so only four phenotypes appear: A, B, AB and O. Six would be correct only if every genotype looked different.

34. Answer: (D) Most enzymes are proteins but some are lipids

Almost all enzymes are proteins, and the non-protein exceptions are RNA molecules (ribozymes), not lipids. Enzymes of thermophilic organisms in hot springs do stay active at 80-90°C, and enzymes do have an optimum pH and high specificity.

35. Answer: (D) Cytoskeleton

The cytoskeleton is a network of protein filaments (microtubules, microfilaments and intermediate filaments) in the cytoplasm that gives mechanical support, maintains cell shape and helps in motility. The ER is a membrane system, not a protein filament network.

36. Answer: (B) (A) and (B)

Statement A describes vexillary aestivation correctly, and B gives the Liliaceae formula (actinomorphic, bisexual, 3+3 tepals, 3+3 stamens, tricarpeal superior ovary). Pea stamens are diadelphous (9 + 1), not monadelphous, and Solanaceae has five fused sepals, five fused petals and five stamens, not 3, 3 and 4.

37. Answer: (D) (B) and (D) only

The standard cloning vectors are plasmids and bacteriophages, because both replicate inside bacteria and can carry inserted DNA. Plasmodium is a protozoan parasite and is never used as a vector.

38. Answer: (C) Synthetic capsular polysaccharide material

Plague vaccines have been made from killed *Yersinia pestis* (heat-killed or formalin-inactivated) and from live avirulent (attenuated) strains. Capsular polysaccharide vaccines are used against encapsulated bacteria such as pneumococcus, *Haemophilus* and meningococcus, not against plague.

39. Answer: (D) It completes life cycle in about two weeks

Drosophila is useful for genetics because it completes its life cycle in about two weeks, a single mating gives a large number of progeny, and the sexes are easy to tell apart. The female is larger than the male, not smaller, and flies reproduce sexually, not parthenogenetically.

40. Answer: (B) One regulatory gene and three structural genes

The lac operon has one regulatory gene (*i*, coding the repressor) and three structural genes: *z* (β -galactosidase), *y* (permease) and *a* (transacetylase), along with promoter and operator sites. The promoter and operator are DNA sites, not genes, so it does not have two or three regulatory genes.

41. Answer: (D) Have gill slits at some stage

All four are chordates, and every chordate has pharyngeal gill slits at some stage of its life, at least in the embryo. Chordates have a hollow dorsal nerve cord, not a solid one; the dogfish has a cartilaginous skeleton and the whale is viviparous, so the other features are not common to all.

42. Answer: (C) Hypothalamus - Fore brain - Controls body temperature, urge for eating and drinking

The hypothalamus lies at the base of the forebrain (diencephalon) and has centres for body temperature, hunger and thirst. The Eustachian tube connects the middle ear (not internal ear) with the pharynx, the cerebellum is part of the hindbrain and controls balance, and the blind spot has no rods or cones at all.

43. Answer: (D) (a), (b), (d)

Methanogens are archaeobacteria that produce methane in marshes, *Nostoc* is a filamentous cyanobacterium with heterocysts that fix nitrogen, and *Mycoplasma* has no cell wall and can survive without oxygen. Chemosynthetic bacteria oxidise inorganic substances such as nitrites or ammonia to get energy for making food; making cellulose from glucose is not what defines them.

44. Answer: (A) Parietal bone and the temporal bone of the skull are joined by fibrous joint

Skull bones such as the parietal and temporal are joined by sutures, which are fibrous, immovable joints. The first vertebra is the atlas (not the axis), the floating ribs are the 11th and 12th pairs, and the glenoid cavity takes the head of the humerus, whereas the femur fits into the acetabulum.

45. Answer: (B) Offset

In aquatic plants like *Pistia* and *Eichhornia*, a short lateral branch with one internode grows out and bears a rosette of leaves and a tuft of roots at its tip; this is an offset, and it separates to form a new plant. Runners and stolons are longer creeping branches of land plants such as grasses and strawberry.

46. Answer: (C) One nucleotide with another nucleotide

In a polynucleotide, the phosphate of one nucleotide links the 3'-carbon of one sugar to the 5'-carbon of the next, so a 3'-5' phosphodiester bond joins successive nucleotides. The two DNA strands are held together by hydrogen bonds, and a base is joined to its sugar by an N-glycosidic bond.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.