# KCET - 2024

## ZOOLOGY

**Q1** The typical 'lub-dub' sounds heard during heartbeat are produced due to [KCET 2024]
(A) Closure of semilunar valves
(B) Closure of bicuspid and tricuspid valves
(C) Closure of bicuspid and tricuspid valves followed by semilunar valves
(D) Opening of bicuspid and tricuspid valves followed by semilunar valves

**Q2** The functional unit of contraction is a [KCET 2024]
(A) Portion of myofibril between two successive Z-lines
(B) Portion of myofibril between two successive M-lines
(C) Centre of the H-zone
(D) Centre of the I-band

**Q3** Match the parts of the brain given in List I with their functions given in List II. [KCET 2024]

| List I (Parts of the brain) | | List II (Functions) | |
|---|---|---|---|
| 1. | Medulla oblongata | p. | Body temperature |
| 2. | Hypothalamus | q. | Olfaction |
| 3. | Cerebral cortex | r. | Respiration |
| 4. | Limbic system | s. | Motor function |

Choose the correct option from the following :
(A) 1-p, 2-r, 3-s, 4-q
(B) 1-q, 2-s, 3-r, 4-p
(C) 1-s, 2-p, 3-q, 4-r
(D) 1-r, 2-p, 3-s, 4-q

**Q4** Hydra reproduces asexually by producing [KCET 2024]
(A) Zoospores (B) Conidia
(C) Buds (D) Gemmule

**Q5** When male and female gametes are morphologically distinct, the condition is known as [KCET 2024]
(A) Homogametes
(B) Heterogametes
(C) Hermaphrodites
(D) Sexual dimorphism

**Q6** Which of the following hormones is not secreted by human placenta? [KCET 2024]
(A) Progestogen (B) hCG
(C) Estrogen (D) LH

**Q7** In human females, the endometrium of uterus consists of [KCET 2024]
(A) Smooth muscle
(B) Glandular layer
(C) Adipose layer
(D) Cartilaginous layer

**Q8** If two primary spermatocytes and two primary oocytes undergo meiosis simultaneously, what will be the ratio of spermatozoa and ova produced at the end of the gametogenesis ? [KCET 2024]
(A) 2: 1 (B) 4: 1
(C) 6: 2 (D) 1: 2

**Q9** The Government of India legalised MTP with some strict regulations in the year [KCET 2024]
(A) 1951 (B) 1961
(C) 1971 (D) 2001

**Q10** The process in which a small part of the vas deferences is removed or tied up through a small incision, is called
(A) MTP (B) Vasectomy
(C) Tubectomy (D) GIFT

**Q11** Read the following statements:
Statement I : All vertebrates develop a row of vestigial gill slits during embryonic stage.
Statement II : Embryos always pass through the adult stages of other animals
Which of the following options is correct with reference to these statements? [KCET 2024]
(A) Statement I is correct, Statement II is incorrect
(B) Statement I is incorrect, Statement II is correct
(C) Both Statements I and II are correct
(D) Both Statements I and II are incorrect

**Q12** Stanley Miller simulated the conditions of pre-biotic earth using spark-discharge apparatus. Which organic compounds were observed by him on analysing the end product of his experiment? [KCET 2024]
(A) Pigments (B) Fats
(C) Nitrogen bases (D) Amino acids

**Q13** Most ape-like ancestral primate was [KCET 2024]
(A) Dryopithecus
(B) Ramapithecus
(C) Australopithecus
(D) Neanderthal man

**Q14** The principle of vaccination is based on which property of immune system? [KCET 2024]
(A) Memory (B) Specificity
(C) Diversity (D) Plasticity

**Q15** Genome of HIV replicates in the macrophages with the help of an enzyme called [KCET 2024]
(A) DNA Polymerase
(B) RNA Polymerase
(C) Reverse Transcriptase
(D) DNA Ligase

**Q16** Read the following statements:
Statement I: Morphine is obtained by acetylation of Heroin.
Statement II : Cannabinoids are known for their effect on cardiovascular system. Which of the following options is correct with reference to these statements? [KCET 2024]
(A) Both Statement I and II are correct
(B) Statement I is correct and Statement II is incorrect
(C) Statement I is incorrect and Statement II is correct
(D) Both Statements I and II are incorrect

**Q17** Mule is the result of [KCET 2024]
(A) Out-crossing
(B) Cross-breeding
(C) Interspecific hybridization
(D) Out-breeding

**Q18** Which of these enzymes is required to cleave a plasmid? [KCET 2024]
(A) Ligase (B) Endonuclease.
(C) Exonuclease (D) Polymerase

**Q19** DNA polymerase of Thermus aquaticus is [KCET 2024]
(A) Thermolabile (B) Thermophobic
(C) Exonuclease (D) Thermostable

**Q20** If a recombinant DNA bearing gene for resistance to Ampicillin is transferred into E. coli cells, host cells become transformed into Ampicillin resistant cells. What happens when these E. coli are grown on medium containing Ampicillin? [KCET 2024]

(A) Non-transformants will grow and transformants will die

(B) Non-transformants will die and transformants will grow

(C) Both non-transformants and transformants will die

(D) Both non-transformants and transformants will grow

**Q21** Which of the following is based upon the principle of antigen-antibody interaction? [KCET 2024]

(A) PCR

(B) ELISA

(C) rDNA technology

(D) Gel Electrophoresis

**Q22** Which among the following is used to treat Emphysema? [KCET 2024]

(A) Human Hormone-a Antitrypsin

(B) Human - Interferon

(C) Human protein - $\alpha_1$Antitrypsin

(D) Humana Lactalbumin

**Q23** Homeostasis is a condition where the organisms [KCET 2024]

(A) Maintain a constant internal environment in an everchanging external environment

(B) Do not maintain a constant internal environment

(C) Change their internal environment according to their external environment

(D) Change their internal environment when the external environment is constant

**Q24** Identify the phylum which shows the following characteristics: [KCET 2024]

(1) Animals are exclusively marine, radially symmetrical and diploblastic

(2) Body bears eight external rows of ciliated comb plates which help in locomotion.

(3) Digestion is both extracellular and intracellular.

(4) Reproduction only by sexual modes.

(A) Coelenterata (B) Mollusca

(C) Arthropoda (D) Ctenophora

**Q25** Ciliated epithelial cells are present in [KCET 2024]

(A) Kidneys (B) Intestines

(C) Blood Vessels (D) Bronchioles

**Q26** Exoskeleton of Arthropods is made up of unique complex polysaccharide known as [KCET 2024]

(A) Hyaluronic Acid

(B) Chitin

(C) Waxes

(D) Cellulose

**Q27** The term Uremia refers to [KCET 2024]

(A) Accumulation of Urea in blood.

(B) Presence of Glucose in the urine.

(C) Accumulation of Uric acid in blood.

(D) Accumulation of Uric acid in kidneys.

**Q28** Find the incorrect statement among the following: [KCET 2024]

(A) In sex linked recessive traits the gene is transmitted from unaffected carrier female to some of male progeny

(B) Accumulation of phenylpyruvic acid in brain results in mental retardation

(C) Individuals affected by Down's Syndrome will have congenital heart defect and are more intelligent

(D) Turner's Syndrome is caused due to the absence of one X-chromosome

**Q29** In Structural gene, the template DNA strand has nucleotide sequences - ATGCATGCATGCATGC-5'. Find the correct and complimentary nucleotide sequence on coding strand. [KCET 2024]

(A) 5'-ATGCATGCATGCATGC-3'

(B) 3'-GCATGCATGCATGCAT-5'

(C) 5'-TACGTACGTACGTACG-3'

(D) 3 '-TACGTACGTACGTACG-5'

**Q30** The chemical substances which are produced by some microbes which can kill or retard the growth of other microbes are known as [KCET 2024]

(A) Statins (B) Streptokinases

(C) Cyclosporins (D) Antibiotics

# Answer Key

| | |
|---|---|
| Q1 | C |
| Q2 | A |
| Q3 | D |
| Q4 | C |
| Q5 | B |
| Q6 | D |
| Q7 | B |
| Q8 | B |
| Q9 | C |
| Q10 | B |
| Q11 | A |
| Q12 | D |
| Q13 | A |
| Q14 | A |
| Q15 | C |
| Q16 | C |
| Q17 | C |
| Q18 | B |
| Q19 | D |
| Q20 | B |
| Q21 | B |
| Q22 | C |
| Q23 | A |
| Q24 | D |
| Q25 | D |
| Q26 | B |
| Q27 | A |
| Q28 | C |
| Q29 | C |
| Q30 | D |

# Hints & Solutions

Note: scan the QR code to watch video solution

**Q1 Text Solution:**

**Answer: (C) Closure of bicuspid and tricuspid valves followed by semilunar valves.**

**Explanation:** The first heart sound ("lub") is produced by the closure of the bicuspid (mitral) and tricuspid valves at the beginning of ventricular systole. The second heart sound ("dub") is produced by the closure of the semilunar valves at the beginning of ventricular diastole.

**Q2 Text Solution:**

**Answer: (A) Portion of myofibril between two successive Z-lines.**

**Explanation:** The functional unit of skeletal muscle is the **sarcomere**, which extends from one Z-line to the next. Muscle contraction occurs due to the sliding of actin filaments over myosin filaments within the sarcomere.

**Q3 Text Solution:**

**Answer: (D) 1-r, 2-p, 3-s, 4-q**

**Explanation:**

- Medulla oblongata controls respiration.
- Hypothalamus regulates body temperature.
- Cerebral cortex controls voluntary motor functions.
- Limbic system is associated with olfaction and emotions.

**Q4 Text Solution:**

**Answer: (C) Buds**

**Explanation:** Hydra reproduces asexually by **budding**, in which a small outgrowth develops on the parent's body, grows, and eventually detaches to form a new individual.

**Q5 Text Solution:**

**Answer: (B) Heterogametes**

**Explanation:** When male and female gametes differ in size and shape, the condition is called **heterogamy (anisogamy)**, and the gametes are termed **heterogametes**.

**Q6 Text Solution:**

**Answer: (D) LH**

**Explanation:** The placenta secretes hCG, hPL, estrogens, progesterone, and relaxin. **Luteinizing hormone (LH)** is secreted by the anterior pituitary gland, not by the placenta.

**Q7 Text Solution:**

**Answer: (B) Glandular layer**

**Explanation:** The endometrium is the inner glandular lining of the uterus. It undergoes cyclic changes during the menstrual cycle and is the site of embryo implantation.

**Q8 Text Solution:**

**Answer: (B) 4 : 1**

**Explanation:** Each primary spermatocyte produces **4 spermatozoa**, while each primary oocyte produces **1 ovum**.

Therefore, two primary spermatocytes produce 8 sperm and two primary oocytes produce 2 ova, giving a ratio of **8 : 2 = 4 : 1**.

**Q9 Text Solution:**

**Answer: (C) 1971**

**Explanation:** The **Medical Termination of Pregnancy (MTP) Act** was enacted in **1971** to permit abortion under specific legal conditions.

**Q10 Text Solution:**

**Answer: (B) Vasectomy**

**Explanation:** Vasectomy is a permanent method of male contraception in which the vas deferens is cut and tied to prevent sperm from entering the semen.

**Q11 Text Solution:**

**Answer: (A) Statement I is correct, Statement II is incorrect.**

**Explanation:** All vertebrate embryos possess pharyngeal (gill) slits during early development, although these do not function as gills in terrestrial vertebrates. However, embryos do **not** pass through the adult stages of other animals. Modern embryology disproves Haeckel's biogenetic law in its original form.

**Q12 Text Solution:**

**Answer: (D) Amino acids**

**Explanation:** Miller passed electric sparks through a mixture of methane, ammonia, hydrogen and water vapour, simulating early Earth conditions. After about a week, amino acids such as glycine and alanine were formed, supporting the chemical evolution theory.

**Q13 Text Solution:**

**Answer: (A) Dryopithecus**

**Explanation:** Dryopithecus lived about 15 million years ago and was more ape-like. Ramapithecus showed more human-like features, while Australopithecus and Neanderthals evolved much later.

**Q14 Text Solution:**

**Answer: (A) Memory**

**Explanation:** Vaccination introduces weakened or killed pathogens (or their antigens), stimulating the formation of memory B and T cells. Upon future exposure to the same pathogen, the body mounts a rapid and stronger secondary immune response.

**Q15 Text Solution:**

**Answer: (C) Reverse Transcriptase**

**Explanation:** HIV is a retrovirus with RNA as its genetic material. Reverse transcriptase converts viral RNA into DNA, which integrates into the host genome and directs the production of new viruses.

**Q16 Text Solution:**

**Answer: (C) Statement I is incorrect and Statement II is correct.**

**Explanation:** Heroin is produced by **acetylation of morphine**, not the reverse, making Statement I incorrect. Cannabinoids obtained from *Cannabis sativa* affect the cardiovascular system and alter mood and perception, making Statement II correct.

**Q17 Text Solution:**

**Answer: (C) Interspecific hybridization**

**Explanation:** A mule is produced by crossing a male donkey (jack) with a female horse (mare). Since the parents belong to different species, it is an example of interspecific hybridization. Mules are generally sterile due to an odd chromosome number.

**Q18 Text Solution:**

**Answer: (B) Endonuclease**

**Explanation:** Restriction endonucleases recognize specific DNA sequences and cut both plasmid DNA and foreign DNA at those sites, producing compatible ends for recombinant DNA formation.

**Q19 Text Solution:**

**Answer: (D) Thermostable**

**Explanation:** Taq DNA polymerase remains active even after repeated heating to around 95°C during PCR. This heat stability makes it ideal for DNA amplification.

**Q20 Text Solution:**

**Answer: (B) Non-transformants will die and transformants will grow.**

**Explanation:** Only bacteria that successfully receive the recombinant plasmid possess the ampicillin-resistance gene and survive on the antibiotic-containing medium. Cells without the plasmid are unable to grow and die. This is called **selection using a selectable marker**.

**Q21 Text Solution:**

**Answer: (B) ELISA**

**Explanation:** ELISA (**Enzyme-Linked Immunosorbent Assay**) is a diagnostic technique based on the **specific interaction between an antigen and its corresponding antibody**. It is commonly used to detect infections such as HIV by identifying either antigens or antibodies in a patient's blood.

**Q22 Text Solution:**

**Answer: (C) Human protein $\alpha_1$-Antitrypsin**

**Explanation:** Emphysema is often caused by a deficiency of **$\alpha_1$-antitrypsin**, a protein that protects lung tissues from damage by proteolytic enzymes. Patients with this deficiency can be treated with **genetically engineered human $\alpha_1$-antitrypsin protein**

**Q23 Text Solution:**

**Answer: (A) Maintain a constant internal environment in an ever-changing external environment.**

**Explanation:** Homeostasis is the ability of an organism to **maintain a stable internal environment** (such as body temperature, pH, osmotic pressure, and glucose concentration) despite changes in the external environment. This is essential for the proper functioning of cells and enzymes.

**Q24 Text Solution:**

**Answer: (D) Ctenophora**

**Explanation:** Members of **Phylum Ctenophora** (comb jellies) are exclusively marine animals. They possess **eight rows of ciliated comb plates** used for locomotion, show **radial symmetry**, and reproduce only sexually.

**Q25 Text Solution:**

**Answer: (D) Bronchioles**

**Explanation:** Ciliated epithelial cells line the **respiratory tract**, including the bronchioles. Their coordinated beating moves mucus, dust particles, and microorganisms toward the pharynx, helping to keep the air passages clean

**Q26 Text Solution:**

**Answer: (B) Chitin**

**Explanation:** The exoskeleton of arthropods is composed mainly of **chitin**, a nitrogen-containing polysaccharide that provides strength, protection, and support.

**Q27 Text Solution:**

**Answer: (A) Accumulation of urea in blood**

**Explanation:** Uremia is a condition in which **urea and other nitrogenous waste products accumulate in the blood** due to impaired kidney function. It is a common feature of kidney failure.

**Q28 Text Solution:**

**Answer: (C) Individuals affected by Down's Syndrome will have congenital heart defect and are more intelligent.**

**Explanation:** Individuals with **Down syndrome (Trisomy 21)** often have congenital heart defects and intellectual disability. Therefore, the statement saying they are **"more intelligent"** is incorrect.

**Q29** **Text Solution:**

**Answer: (C) 5′-TACGTACGTACGTACG-3′**

**Explanation:** The coding strand is **complementary** to the template strand and runs in the **5′ 3′ direction**. Using base-pairing rules (A–T and G–C), the complementary sequence is:

Template: **3′-ATGCATGCATGCATGC-5′**

Coding: **5′-TACGTACGTACGTACG-3′**

**Q30** **Text Solution:**

**Answer: (D) Antibiotics**

**Explanation:** **Antibiotics** are antimicrobial substances naturally produced by microorganisms such as bacteria and fungi. They either kill other microorganisms or inhibit their growth and are widely used in the treatment of bacterial infections.