Biology [CET Exam – 2023]

Max. Marks:60 **Duration: 1 Hour 50 min**

1. **This paper consists of 60 questions.**

   - ***Multiple Choice Questions with one correct answer. A correct answer carries 1 Mark. No Negative marks.***

2. **The OMR sheet for 200 questions is to be used**

3. **Use of calculators and log tables is prohibited**

4. **Darken the appropriate bubble using a pen in the OMR sheet provided to you. Once entered, the answer cannot be changed. Any corrections or modifications will automatically draw a penalty of 1 mark**

5. **No clarification will be entertained during the examination. Doubts in the paper can be reported to the coordinator after the exam**

6. **If the details in the OMR Sheet are not filled, If the OMR sheet is mutilated, torn, white Ink used, the circles filled and scratched, then the OMR sheet will not be graded**

   All the best!!

Useful Data

At. Wt.:

$N = 14;\ O = 16;\ H = 1;\ S = 32;\ Cl = 35.5;\ Mn = 55;\ Na = 23;\ C = 12;\ Ag = 108;\ K = 39;\ Fe = 56;\ Pb = 207$

Physical Constants:

$h = 6.626 \times 10^{-34}\,\text{Js},\ \text{N}_\text{a} = 6.022 \times 10^{23}\,\text{mol}^{-1},\ \text{c} = 2.998 \times 10^{8}\,\text{m s}^{-1},\ \text{m}_\text{e} = 9.1 \times 10^{-31}\,\text{kg},\ R = 8.314\ \text{J mol}^{-1}\ \text{K}^{-1}$

1. The male sex accessory ducts include,

   (A) Rete testis, vasa efferentia, seminal vesicle and vas deferens

   (B) Rete testis, vasa efferentia, epididymis and vas deferens

   (C) Rete testis, vasa efferentia, epididymis and seminal vesicle

   (D) Rete testis, urethra, epididymis and vas deferens

   Sol: Rete testis, vasa efferentia, epididymis and vas deferens

   Ans: (B)

2. With reference to human sperm, match the List-I with List-II

List I		**List II**	
(1)	Head	(p)	Filled with enzyme
(2)	Acrosome	(q)	Contains mitochondria
(3)	Middle piece	(r)	Sperm motility
(4)	Tail	(s)	Contains haploid nucleus

   Choose the correct option from the following:

   (A) 1-q, 2-s, 3-r, 4-p (B) 1-r, 2-q, 3-s, 4-p (C) 1-s, 2-p, 3-q, 4-r (D) 1-s, 2-r, 3-p, 4-q

   Sol: 1-s, 2-p, 3-q, 4-r

   Ans: (C)

3. Which pair of the following cells in the embryo sac are destined to change their ploidy after fertilization?

   (A) Central cell and antipodals (B) Egg cell and central cell

   (C) Antipodals and synergids (D) Synergids and egg cell

   Sol: Egg cell and central cell

   Ans: (B)

4. In the female reproductive system, a tiny finger like structure which lies at the upper junction of the two labia minora above the urethral opening is called

   (A) Clitoris (B) Vagina (C) Hymen (D) Mons pubis

   Sol: Clitoris

   Ans: (A)

5. Consider the following statements with reference to female reproduction system :

   Statement 1: The presence or absence of hymen is not a reliable indicator of virginity or sexual experience.

   Statement 2: The sex of the foetus is determined by the father and not by the mother.

   Choose the correct option from the following :

   (A) Statement 1 is wrong and Statement 2 is correct.

   (B) Both the Statement 1 and Statement 2 are wrong.

   (C) Statement 1 is correct and Statement 2 is wrong.

   (D) Both the Statement 1 and Statement 2 are correct.

   Sol: Both the Statement 1 and Statement 2 are correct

   Ans: (D)

6. MTPs are considered relatively safe during

(A) 180 days of pregnancy (B) First trimester

(C) Second trimester (D) 24 weeks of pregnancy

Sol: First trimester

Ans: (B)

7. Which of the following statements is correct ?

(A) Sickel cell anaemia is a quantitative problem

(B) Female carrier for haemophilia may transmit the disease to sons

(C) Thalassemia is a qualitative problem

(D) Change in whole set of chromosomes is called aneuploidy

Sol: Female carrier for haemophilia may transmit the disease to sons

Ans: (B)

8. 'Gene-mapping' technology was developed by

(A) Sturtvent (B) Mendel (C) Tschermak (D) Correns

Sol: Sturtvent

Ans: (A)

9. Find the correct statement.

(1) Generally a gene regulates a trait, but sometimes one gene has effect on multiple traits.

(2) The trait AB-blood group of man is regulated by one dominant allele and another recessive allele. Hence it is co-dominant

(A) Both Statements (1) and (2) are correct.

(B) Both the Statements are wrong.

(C) Statement (1) is correct

(D) Statement (2) is correct.

Sol: Statement (1) is correct

Ans: (C)

10. From the following table, select the option that correctly characterizes various phases of menstrual cycle:

	Menstruation phase	**Follicular phase**	**Luteal phase**
(A)	Menses	L.H. Surge	Regeneration of endometrium
(B)	Regeneration of endometrium	High level of progesterone	Developing corpus luteum
(C)	Matured follicle	Regression of corpus luteum	Ovulation
(D)	Menses	Developing corpus luteum	Follicle maturation

Sol:

Menstruation phase	**Follicular phase**	**Luteal phase**
Menses	L.H. Surge	Regeneration of endometrium

Ans: (A)

11. Which of the following is abbreviated as ZIFT ?

(A) Zygote Intra Fallopian Tube (B) Zygote Inter Fallopian Tube

(C) Zygote Intra Fallopian Transfer (D) Zygote Inter Fallopian Transfer

Sol: Zygote Intra Fallopian Transfer

Ans: (C)

12. An example for hormone releasing IUD is

(A) Lippes loop (B) Implant (C) LNG-20 (D) Multiload 375

Sol: LNG-20

Ans: (C)

13. Eukaryotic genes are monocistronic but they are split genes because

(A) Exons are interrupted by Introns. (B) Introns are interrupted with Mutons.

(C) they contain Exons only. (D) they contain Introns only.

Sol: Exons are interrupted by Introns

Ans: (A)

14. The Lac-Operon model was elucidated by

(A) Hershey and Chase (B) Jacob and Crick

(C) Watson and Crick (D) Francois Jacob and Jaques Monad

Sol: Francois Jacob and Jaques Monad

Ans: (D)

15. Which of these is NOT an example for Adaptive radiation?

(A) Placental mammals (B) Long-necked Giraffe

(C) Darwin's finches (D) Australian marsupials

Sol: Long-necked Giraffe

Ans: (B)

16. In a population of 800 rabbits showing Hardy-Weinberg equilibrium, the frequency of recessive individuals was 0.16 . What is the frequency of heterozygous individuals ?

(A) 0.84 (B) 0.36 (C) 0.4 (D) 0.48

Sol: 0.48

Ans: (D)

17. In male heterogametic type of sex determination

(A) Male parent produces dissimilar gametes. (B) Males do not produce gametes.

(C) Male parent produces similar gametes. (D) Female parent produces dissimilar gametes.

Sol: Male parent produces dissimilar gametes

Ans: (A)

18. In one of the hybridisation experiments, a homozygous dominant parent and a homozygous recessive parent are crossed for a trait. (Plant shows Mendelian inheritance pattern)

(A) Dominant parent trait appears in F_1 generation and recessive parent trait appears in F_1 and F_2 generations.

(B) Dominant parent trait appears in F_2 generation and recessive parent trait appears only in F_1 generation.

(C) Dominant parent trait appears in F_1 generation and recessive parent trait appears in F_2 generation.

(D) Dominant parent trait appears in both F_1 & F_2 generations, recessive parent trait appears in only F_2 generation.

Sol: Dominant parent trait appears in both F_1 & F_2 generations, recessive parent trait appears in only F_2 generation.

Ans: (D)

19. Histone proteins are positively charged because they are rich in basic amino acid residues

(A) Arginine and Phenylalanine (B) Arginine and Proline

(C) Arginine and Alanine (D) Arginine and Lysine

Sol: Arginine and Lysine

Ans: (D)

20. With respect to Inbreeding, which among the following is not true ?

(A) It helps in elimination of less desirable genes.

(B) It helps to evolve a pure line in an animal.

(C) Inbreeding decreases homozygosity.

(D) It helps in accumulation of superior genes.

Sol: Inbreeding decreases homozygosity

Ans: (C)

21. Identify from the following a pair of better yielding semi dwarf varieties of rice developed in India.

(A) Jaya and Kalyan Sona (B) Kalyan Sona and Sonalika

(C) Jaya and Ratna (D) Sonalika and Ratna

Sol: Jaya and Ratna

Ans: (C)

22. In MOET technique fertilized eggs are transferred into surrogate mother in which of the following stage?

(A) $8-32$ celled stage (B) 16-32 celled stage

(C) 2-4 celled stage (D) 8-16 celled stage

Sol: $8-32$ celled stage

Ans: (A)

23. Roquefort cheese is ripened by

(A) Virus (B) Yeast (C) Bacterium (D) Fungi

Sol: Fungi

Ans: (D)

24. Four students were assigned a science project to find out the pollution levels of lakes in their surrounding. After analysing the quality of water samples, the BOD values were found as follows : Which among the following water samples is highly polluted ?

(A) 6mg / L (B) 0.16mg / L (C) 0.6mg / L (D) 0.06mg / L

Sol: 6mg / L

Ans: (A)

25. The toxic substance 'haemozoin' responsible for high fever and chill, is released in which of the following diseases ?

(A) Malaria (B) Typhoid (C) Dengue (D) Pneumonia

Sol: Malaria

Ans: (A)

26. Identify the symptoms of pneumonia.

(A) Constipation, Abdominal pain, cramps, blood clots

(B) High fever, weakness, stomach pain, loss of appetite

(C) Difficulty in breathing, fever, chills, cough, headache

(D) Nasal congestion and discharge, cough, sore throat, headache

Sol: Difficulty in breathing, fever, chills, cough, headache

Ans: (C)

27. The variety of Okra, *Pusa Sawani* is resistant to which of the following insect pests?

(A) Shoot & Fruit borer (B) Cereal leaf beetle (C) Aphids (D) Jassids

Sol: Shoot & Fruit borer

Ans: (A)

28. Choose the incorrect statement with reference to Kangaroo rat.

(A) uses minimal water to remove excretory products.

(B) eliminates dilute urine.

(C) found in North American desert.

(D) meets its water requirements through internal fat oxidation.

Sol: eliminates dilute urine

Ans: (B)

29. Generally, bears avoid winter by undergoing

(A) Aestivation (B) Migration (C) Diapause (D) Hibernation

Sol: Hibernation

Ans: (D)

30. Match Column-I with Column-II. Select the option with correct combination.

Column I		Column II	
(1)	Standing state	(p)	Mass of living material at a given time
(2)	Pioneer species	(q)	Amount of nutrients in the soil at a given time
(3)	Detritivores	(r)	Species that invade a bare area
(4)	Standing crop	(s)	Breakdown detritus into smaller particles

(A) 1-q, 2-r, 3-s, 4-p (B) 1-p, 2-s, 3-r, 4-q (C) 1-q, 2-r, 3-p, 4-s (D) 1-p, 2-r, 3-s, 4-q

Sol: 1-q, 2-r, 3-s, 4-p

Ans: (A)

31. *PCR* is used for

(A) DNA digestion (B) DNA amplification (C) DNA isolation (D) DNA ligation

Sol: DNA amplification

Ans: (B)

32. Which of these is NOT a method to make host cells 'competent' to take up DNA ?

(A) Biolistics (B) Use of disarmed pathogen vectors

(C) Micro-injection (D) Elution

Sol: Elution

Ans: (D)

33. Select the correct statement from the following :

(A) The first step in PCR is heating which is used to separate both the strands of gene of interest.

(B) DNA from one organism will not band to DNA from other organism.

(C) Genetic engineering works only on animals and not yet successfully used on plants.

(D) There are no risk factors associated with r-DNA technology.

Sol: The first step in PCR is heating which is used to separate both the strands of gene of interest

Ans: (A)

34. A flower has 10 stamens each having bilobed dithecous anther. If each microsporangium has 5 pollen mother cells, how many pollen grains would be produced by the flower ?

(A) 800 (B) 1600 (C) 200 (D) 400

Sol: 800

Ans: (A)

35. During transcription the DNA strand with $3' \rightarrow 5'$ polarity of the structural gene always acts as a template because

(A) Enzyme DNA dependent RNA polymerase always catalyse polymerisation in both the directions.

(B) Nucleotides of DNA strand with $5' \rightarrow 3'$ are transferred to mRNA.

(C) Enzyme DNA dependent RNA polymerase always catalyse the polymerisation in $5' \rightarrow 3'$ direction.

(D) Enzyme DNA dependent RNA polymerase always catalyse the polymerisation in $3' \rightarrow 5'$ direction.

Sol: Enzyme DNA dependent RNA polymerase always catalyse the polymerisation in $5' \rightarrow 3'$ direction.

Ans: (C)

36. According to David Tilman's long term ecosystem experiments, the total biomass in plots with more species shows,

(A) Average variation from year-to-year. (B) No variation from year-to-year.

(C) Less variation from year-to-year. (D) High variation from year-to-year.

Sol: Less variation from year-to-year

Ans: (C)

37. The toxic heavy metals from various industries which cause water pollution, normally have a density

(A) more than $7.5g/cm^3$ (B) more than $12.5g/cm^3$

(C) more than $5g/cm^3$ (D) more than $15g/cm^3$

Sol: more than $5g/cm^3$

Ans: (C)

38. Identify the correct option showing the relative contribution of different green house gases to the total global warming.

(A) $CFC-6\%, CO_2-60\%$, Methane-20%, $N_2O-14\%$.

(B) $CFC-14\%, CO_2-60\%$, Methane- $6\%, N_2O-20\%$.

(C) $CFC-14\%, CO_2-60\%$, Methane- $20\%, N_2O-6\%$.

(D) $CFC-20\%, CO_2-60\%$, Methane- $14\%, N_2O-6\%$.

Sol: $CFC-14\%, CO_2-60\%$, Methane- $20\%, N_2O-6\%$

Ans: (C)

39. Match the following columns and choose the correct option:

Column I		Column II	
(1)	*Haemophilus influenzae*	(p)	Malignant malaria
(2)	*Entamoeba histolytica*	(q)	Elephantiasis
(3)	*Plasmodium falciparum*	(r)	Pneumonia
(4)	*Wuchereria bancrofti*	(s)	Amoebiasis

(A) 1-s, 2-p, 3-q, 4-r (B) 1-r, 2-p, 3-q, 4-s (C) 1-q, 2-r, 3-s, 4-p (D) 1-r, 2-s, 3-p, 4-q

Sol: 1-r, 2-s, 3-p, 4-q

Ans: (D)

40. From the following tools/techniques of genetic engineering, identify those which are required for cloning a bacterial gene in animal cells and choose the correct option

I. Endonuclease	II. Ligase	III. A. tumefaciens	IV. Microinjection
V. Gene gun	VI. Lysozyme	VII. Cellulase	VIII. Electrophoresis

(A) I, III, IV, V, VII (B) II, III, IV, VI, VII, VIII

(C) II, III, V, VII, VIII (D) I, II, IV, VI, VIII

Sol: I, II, IV, VI, VIII

Ans: (D)

41. Identify the incorrect statement regarding the flow of energy between various components of the food chain.

(A) Green plants capture about 10% of the solar energy that falls on leaves.

(B) Each trophic level loses some energy as heat to the environment.

(C) The amount of energy available at each trophic level is 10% of previous trophic level.

(D) Energy flow is unidirectional.

Sol: Green plants capture about 10% of the solar energy that falls on leaves.

Ans: (A)

42. Find out the correct match

	Disease	**Pathogen**	**Main Organ affected**
(A)	Filariasis	Common round worm	Small intestine
(B)	Dysentery	Protozoa	Liver
(C)	Ringworm	Fungus	Skin
(D)	Typhoid	Bacteria	Lungs

Sol:

Disease	**Pathogen**	**Main Organ affected**
Ringworm	Fungus	Skin

Ans: (C)

43. Identify the floral formula of plant belonging to potato family.

(A) ♂, $P_{3+3}, A_{3+3}, G_{(3)}$ (B) ♂, $K_{(5)}, C_5, A_{(9)+1}, G_1$

(C) ♂, $K_{(5)}, \overset{\frown}{C_{(5)}, A_5}, \underline{G}_{(2)}$ (D) ♂, $K_{10}, C_{10}, A_{10}, \overline{G}_2$

Sol:

♂, $K_{(5)}, \overset{\frown}{C_{(5)}, A_5}, \underline{G}_{(2)}$

Ans: (C)

44. When the vascular cambium is present between the *xylem* and phloem, then the vascular bundle is called,

(A) Endarch (B) Closed (C) Exarch (D) Open

Sol: Open

Ans: (D)

45. The function of Typhlosole in earthworm is

(A) Transportation

(B) Increasing the effective area of absorption in the intestine

(C) Grinding of soil particles

(D) Grinding of decaying leaves

Sol: Increasing the effective area of absorption in the intestine

Ans: (B)

46. Select the correctly matched pair of organisms with their order.

(A) Homo, sapiens : Poales (B) Mangifera, indica : Primata

(C) Triticum, aestivum : Sapindales (D) Musa, domestica : Diptera

Sol: Musa, domestica : Diptera

Ans: (D)

47. Match the column-I with column-II and choose the correct option from the following:

Column I (Plant groups)		**Column II (Examples)**	
(1)	Bryophyta	(p)	Pinus
(2)	Gymnosperm	(q)	Adiantum
(3)	Algae	(r)	Sphagnum
(4)	Pteridophyta	(s)	Ectocarpus

(A) 1-q, 2-p, 3-s, 4-r (B) 1-q, 2-s, 3-p, 4-r (C) 1-s, 2-r, 3-q, 4-p (D) 1-r, 2-p, 3-s, 4-q

Sol: 1-r, 2-p, 3-s, 4-q

Ans: (D)

48. Flame cells present in the members of platyhelminthes are specialized to perform,

(A) Respiration and Excretion (B) Respiration and Osmoregulation

(C) Osmoregulation and Circulation (D) Osmoregulation and Excretion

Sol: Osmoregulation and Excretion

Ans: (D)

49. Match column-I with column-II. Select the option with correct combination.

Column I		Column II	
(1)	Hypertonic	(p)	Two molecules move in the same direction across the membrane
(2)	Capillarity	(q)	External solution is more concentrated than cell sap
(3)	Symport	(r)	Water loss in the form of droplets
(4)	Guttation	(s)	Ability of water to rise in thin tubes

(A) 1-q, 2-p, 3-s, 4-r (B) 1-q, 2-s, 3-p, 4-r (C) 1-q, 2-s, 3-r, 4-p (D) 1-q, 2-r, 3-p, 4-s

Sol: 1-q, 2-s, 3-p, 4-r

Ans: (B)

50. Toxicity of which micronutrient induces deficiency of iron, magnesium and calcium ?

(A) Manganese (B) Boron (C) Zinc (D) Molybdenum

Sol: Manganese

Ans: (A)

51. Considering the stroke volume of an adult healthy human being is 70mL , identify the cardiac output in one hour from the following :

(A) 302.4Lit/hour (B) 50.40Lit/hour (C) 504.0Lit/hour (D) 30.24 Lit/hour

Sol: 302.4Lit/hour

Ans: (A)

52. Function of contractile vacuole in Amoeba is

(A) Osmoregulation and movements (B) Digestion and excretion

(C) Excretion and osmoregulation (D) Digestion and respiration

Sol: Excretion and osmoregulation

Ans: (C)

53. Match List-I and List-II with respect to proteins and their functions and select the correct option.

List I		List II	
(1)	Collagen	(p)	Fights infectious agents
(2)	Trypsin	(q)	Hormone
(3)	Insulin	(r)	Enzyme
(4)	Antibody	(s)	Intercellular ground substance

(A) 1-s, 2-r, 3-q, 4-p (B) 1-s, 2-p, 3-r, 4-p (C) 1-q, 2-r, 3-p, 4-s (D) 1-s, 2-q, 3-r, 4-p

Sol: 1-s, 2-r, 3-q, 4-p

Ans: (A)

54. The complex formed by a pair of synapsed homologous chromosomes is called,

(A) Bivalent (B) Univalent (C) Pentavalent (D) Triad

Sol: Bivalent

Ans: (A)

55. Bamboo species flowers

(A) Once in lifetime .
(B) Twice in 50-100 years
(C) Every year
(D) Once in 12 years

Sol: Once in lifetime

Ans: (A)

56. In Bryophyllum, the adventitious buds arise from

(A) Shoot apex
(B) Leaf base
(C) Leaf axil
(D) Notches in the leaf margin

Sol: Notches in the leaf margin

Ans: (D)

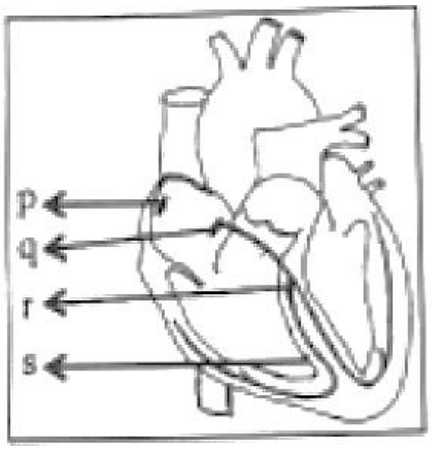
57. Primary endosperm nucleus is formed by fusion of

(A) One polar nucleus and male gamete
(B) Two polar nuclei and two male gametes
(C) Two polar nuclei and one male gamete .
(D) Ovum and male gamete

Sol: Two polar nuclei and one male gamete

Ans: (C)

58. Identify the option showing the correct labelling for p, q, r and s with reference to the conducting system of the human heart.



(A) p-Bundle of His, q-SAN, r-Interventricular septum, s-AVN
(B) p-Interventricular septum, q-AVN, r-Bundle of His, s-SAN
(C) p-SAN, q-AVN, r-Bundle of His, s-Interventricular septum
(D) p-AVN, q-SAN, r-Interventricular septum, s-Bundle of His

Sol: p-SAN, q-AVN, r-Bundle of His, s-Interventricular septum

Ans: (C)

59. Atrial Natriuretic Factor (ANF) acts as a

(A) Vasoconstricter
(B) Hypertension inducer
(C) Check on Renin-Angiotensin mechanism .
(D) Promoter on Renin-Angiotensin mechanism

Sol: Check on Renin-Angiotensin mechanism

Ans: (C)

60. The vibrations from the ear drum are transmitted through ear ossicles to

(A) Tectorial membrane (B) Auditory nerves (C) Cochlea (D) Oval window

Sol: Oval window

Ans: (D)