BIOLOGY

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

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

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

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

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

2. 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) 400 (B) 800 (C) 1600 (D) 200

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

(A) Enzyme DNA dependent RNA polymerase always catalyse the polymerisation in 3' → 5' direction.

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

(C) Nucleotides of DNA strand with 5' → 3' are transferred to mRNA.

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

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

(A) High variation from year-to-year.

(B) Average variation from year-to-year.

(C) No variation from year-to-year.

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

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

(A) more than 15 g/cm^3 (B) more than 7.5 g/cm^3

(C) more than 12.5 g/cm^3 (D) more than 5 g/cm^3

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6. Find out the correct match.

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

7. 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

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

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

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

(A) Energy flow is unidirectional.
(B) Green plants capture about 10% of the solar energy that falls on leaves.
(C) Each trophic level loses some energy as heat to the environment.
(D) The amount of energy available at each trophic level is 10% of previous trophic level.

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10. Flame cells present in the members of platyhelminthes are specialized to perform,
(A) Osmoregulation and Excretion
(B) Respiration and Excretion
(C) Respiration and Osmoregulation
(D) Osmoregulation and Circulation

11. Identify the floral formula of plant belonging to potato family.
(A) $⚥, K_{10}, C_{10}, A_{10}, \bar{G}_2$
(B) $⚥, P_{3+3}, A_{3+3}, G_{(3)}$
(C) $⚥, K_{(5)}, C_5, A_{(9)+1}, G_1$
(D) $⚥, K_{(5)}, \overset{\frown}{C_{(5)} A_5}, \underline{G}_{(2)}$

12. When the vascular cambium is present between the xylem and phloem, then the vascular bundle is called,
(A) Open (B) Endarch (C) Closed (D) Exarch

13. The function of Typhlosole in earthworm is
(A) Grinding of decaying leaves
(B) Transportation
(C) Increasing the effective area of absorption in the intestine
(D) Grinding of soil particles

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

(A)	Musa, domestica	:	Diptera
(B)	Homo, sapiens	:	Poales
(C)	Mangifera, indica	:	Primata
(D)	Triticum, aestivum	:	Sapindales

15. 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

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

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16. The complex formed by a pair of synapsed homologous chromosomes is called,
(A) Triad (B) Bivalent (C) Univalent (D) Pentavalent

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

18. Toxicity of which micronutrient induces deficiency of iron, magnesium and calcium ?
(A) Molybdenum (B) Manganese (C) Boron (D) Zinc

19. Considering the stroke volume of an adult healthy human being is 70 mL, identify the cardiac output in one hour from the following :
(A) 30.24 Lit/hour (B) 302.4 Lit/hour (C) 50.40 Lit/hour (D) 504.0 Lit/hour

20. Function of contractile vacuole in Amoeba is
(A) Digestion and respiration (B) Osmoregulation and movements
(C) Digestion and excretion (D) Excretion and osmoregulation

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

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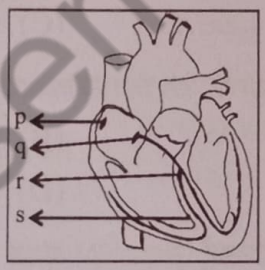
22. The vibrations from the ear drum are transmitted through ear ossicles to
(A) Oval window
(B) Tectorial membrane
(C) Auditory nerves
(D) Cochlea

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

24. In Bryophyllum, the adventitious buds arise from
(A) Notches in the leaf margin
(B) Shoot apex
(C) Leaf base
(D) Leaf axil

25. Primary endosperm nucleus is formed by fusion of
(A) Ovum and male gamete
(B) One polar nucleus and male gamete
(C) Two polar nuclei and two male gametes
(D) Two polar nuclei and one male gamete

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

27. Atrial Natriuretic Factor (ANF) acts as a
(A) Promoter on Renin-Angiotensin mechanism
(B) Vasoconstricter
(C) Hypertension inducer
(D) Check on Renin-Angiotensin mechanism

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28. 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) Both the Statement 1 and Statement 2 are correct.
(B) Statement 1 is wrong and Statement 2 is correct.
(C) Both the Statement 1 and Statement 2 are wrong.
(D) Statement 1 is correct and Statement 2 is wrong.

29. The male sex accessory ducts include,

(A) Rete testis, urethra, epididymis and vas deferens
(B) Rete testis, vasa efferentia, seminal vesicle and vas deferens
(C) Rete testis, vasa efferentia, epididymis and vas deferens
(D) Rete testis, vasa efferentia, epididymis and seminal vesicle

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

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

(A) Synergids and egg cell
(B) Central cell and antipodals
(C) Egg cell and central cell
(D) Antipodals and synergids

32. 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) Mons pubis (B) Clitoris (C) Vagina (D) Hymen

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33. An example for hormone releasing IUD is
(A) Multiload 375 (B) Lippes loop (C) Implant (D) LNG – 20

34. MTPs are considered relatively safe during
(A) 24 weeks of pregnancy (B) 180 days of pregnancy
(C) First trimester (D) Second trimester

35. Which of the following statements is correct ?
(A) Change in whole set of chromosomes is called aneuploidy.
(B) Sickle cell anaemia is a quantitative problem.
(C) Female carrier for haemophilia may transmit the disease to sons.
(D) Thalassemia is a qualitative problem.

36. 'Gene-mapping' technology was developed by
(A) Correns (B) Sturtvent (C) Mendel (D) Tschermak

37. 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) Statement (2) is correct. (B) Both Statements (1) and (2) are correct.
(C) Both the Statements are wrong. (D) Statement (1) is correct.

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

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

39. Which of the following is abbreviated as ZIFT ?
(A) Zygote Inter Fallopian Transfer (B) Zygote Intra Fallopian Tube
(C) Zygote Inter Fallopian Tube (D) Zygote Intra Fallopian Transfer

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40. Histone proteins are positively charged because they are rich in basic amino acid residues
(A) Arginine and Lysine
(B) Arginine and Phenylalanine
(C) Arginine and Proline
(D) Arginine and Alanine

41. Eukaryotic genes are monocistronic but they are split genes because
(A) they contain Introns only.
(B) Exons are interrupted by Introns.
(C) Introns are interrupted with Mutons.
(D) they contain Exons only.

42. The Lac-Operon model was elucidated by
(A) Francois Jacob and Jaques Monad
(B) Hershey and Chase
(C) Jacob and Crick
(D) Watson and Crick

43. Which of these is NOT an example for Adaptive radiation ?
(A) Australian marsupials
(B) Placental mammals
(C) Long-necked Giraffe
(D) Darwin's finches

44. 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) 0.48
(B) 0.84
(C) 0.36
(D) 0.4

45. In male heterogametic type of sex determination
(A) Female parent produces dissimilar gametes.
(B) Male parent produces dissimilar gametes.
(C) Males do not produce gametes.
(D) Male parent produces similar gametes.

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

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47. The variety of Okra, *Pusa Sawani* is resistant to which of the following insect pests ?
(A) Jassids
(B) Shoot & Fruit borer
(C) Cereal leaf beetle
(D) Aphids

48. With respect to Inbreeding, which among the following is not true ?
(A) It helps in accumulation of superior genes.
(B) It helps in elimination of less desirable genes.
(C) It helps to evolve a pure line in an animal.
(D) Inbreeding decreases homozygosity.

49. Identify from the following a pair of better yielding semi dwarf varieties of rice developed in India.
(A) Sonalika and Ratna
(B) Jaya and Kalyan Sona
(C) Kalyan Sona and Sonalika
(D) Jaya and Ratna

50. In MoET technique fertilized eggs are transferred into surrogate mother in which of the following stage ?
(A) 8-16 celled stage (B) 8-32 celled stage (C) 16-32 celled stage (D) 2-4 celled stage

51. Roquefort cheese is ripened by
(A) Fungi (B) Virus (C) Yeast (D) Bacterium

52. 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) 0.06 mg/L (B) 6 mg/L (C) 0.16 mg/L (D) 0.6 mg/L

53. The toxic substance 'haemozoin' responsible for high fever and chill, is released in which of the following diseases ?
(A) Pneumonia (B) Malaria (C) Typhoid (D) Dengue

54. Identify the symptoms of pneumonia.
(A) Nasal congestion and discharge, cough, sore throat, headache
(B) Constipation, Abdominal pain, cramps, blood clots
(C) High fever, weakness, stomach pain, loss of appetite
(D) Difficulty in breathing, fever, chills, cough, headache

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55. Select the correct statement from the following :
(A) There are no risk factors associated with r-DNA technology.
(B) The first step in PCR is heating which is used to separate both the strands of gene of interest.
(C) DNA from one organism will not band to DNA from other organism.
(D) Genetic engineering works only on animals and not yet successfully used on plants.

56. Choose the incorrect statement with reference to Kangaroo rat.
(A) meets its water requirements through internal fat oxidation.
(B) uses minimal water to remove excretory products.
(C) eliminates dilute urine.
(D) found in North American desert.

57. Generally, bears avoid winter by undergoing
(A) Hibernation (B) Aestivation (C) Migration (D) Diapause

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

59. PCR is used for
(A) DNA ligation (B) DNA digestion
(C) DNA amplification (D) DNA isolation

60. Which of these is NOT a method to make host cells 'competent' to take up DNA ?
(A) Elution (B) Biolistics
(C) Use of disarmed pathogen vectors (D) Micro-injection

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