

BIOLOGY

1. The Lac-Operon model was elucidated by
(A) Jacob and Crick
(C) Francois Jacob and Jaques Monad
(B) Watson and Crick
(D) Hershey and Chase
2. Which of these is NOT an example for Adaptive radiation?
~~(A)~~ Long-necked Giraffe
(C) Australian marsupials
(B) Darwin's finches
(D) Placental mammals
3. 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) 0.36
(B) 0.4
(C) 0.48
~~(D)~~ 0.84
4. In male heterogametic type of sex determination
(A) Males do not produce gametes.
~~(B)~~ Male parent produces similar gametes.
(C) Female parent produces dissimilar gametes.
~~(D)~~ Male parent produces dissimilar gametes.
5. 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_2 generation and recessive parent trait appears only in F_1 generation.
(B) Dominant parent trait appears in F_1 generation and recessive parent trait appears in F_2 generation.
~~(C)~~ Dominant parent trait appears in both F_1 & F_2 generations, recessive parent trait appears in only F_2 generation.
(D) Dominant parent trait appears in F_1 generation and recessive parent trait appears in F_1 and F_2 generations.
6. Histone proteins are positively charged because they are rich in basic amino acid residues
(A) Arginine and Proline
~~(C)~~ Arginine and Lysine
(B) Arginine and Alanine
(D) Arginine and Phenylalanine
7. Eukaryotic genes are monocistronic but they are split genes because
(A) Introns are interrupted with Mutons.
(C) they contain Introns only.
(B) they contain Exons only.
(D) Exons are interrupted by Introns.



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8. Identify from the following a pair of better yielding semi dwarf varieties of rice developed in India.
 (A) Kalyan Sona and Sonalika (B) ~~Jaya~~ and Ratna
 (C) Sonalika and Ratna (D) ~~Jaya~~ and Kalyan Sona
9. In MoET technique fertilized eggs are transferred into surrogate mother in which of the following stage ?
 (A) 16-32 celled stage (B) 2-4 celled stage (C) ~~8-16~~ celled stage (D) 8-32 celled stage
10. Roquefort cheese is ripened by
 (A) Yeast (B) Bacterium (C) ~~Fungi~~ (D) Virus
11. 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) 0.16 mg/L (B) 0.6 mg/L (C) ~~0.06~~ mg/L (D) ~~6~~ mg/L
12. The toxic substance 'haemozoin' responsible for high fever and chill, is released in which of the following diseases ?
 (A) Typhoid (B) Dengue (C) Pneumonia (D) ~~Malaria~~
13. Identify the symptoms of pneumonia.
 (A) High fever, weakness, stomach pain, loss of appetite
 (B) Difficulty in breathing, fever, chills, cough, headache
 (C) Nasal congestion and discharge, cough, sore throat, headache
 (D) ~~Constipation, Abdominal pain, cramps, blood clots~~
14. The variety of Okra, Pusa Sawani is resistant to which of the following insect pests ?
 (A) Cereal leaf beetle (B) Aphids
 (C) ~~Jassids~~ (D) Shoot & Fruit borer
15. With respect to Inbreeding, which among the following is not true ?
 (A) It helps to evolve a pure line in an animal.
 (B) ~~Inbreeding decreases homozygosity.~~
 (C) It helps in accumulation of superior genes.
 (D) It helps in elimination of less desirable genes.



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

17. 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-s, 3-r, 4-q

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

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

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

18. PCR is used for

(A) DNA amplification

(B) DNA isolation

(C) DNA ligation

(D) DNA digestion

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

(A) Use of disarmed pathogen vectors

(B) Micro-injection

(C) Elution

(D) Biolistics

20. Select the correct statement from the following :

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

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

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

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

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

(A) eliminates dilute urine.

(B) found in North American desert.

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

(D) uses minimal water to remove excretory products.



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22. During transcription the DNA strand with $3' \rightarrow 5'$ polarity of the structural gene always acts as a template because
- (A) Nucleotides of DNA strand with $5' \rightarrow 3'$ are transferred to mRNA.
 - (B) Enzyme DNA dependent RNA polymerase always catalyse the polymerisation in $5' \rightarrow 3'$ direction.
 - (C) Enzyme DNA dependent RNA polymerase always catalyse the polymerisation in $3' \rightarrow 5'$ direction.
 - (D) Enzyme DNA dependent RNA polymerase always catalyse polymerisation in both the directions.
23. According to David Tilman's long term ecosystem experiments, the total biomass in plots with more species shows,
- (A) No variation from year-to-year.
 - (B) Less variation from year-to-year.
 - ☒ (C) High variation from year-to-year.
 - (D) Average variation from year-to-year.
24. The toxic heavy metals from various industries which cause water pollution, normally have a density
- (A) more than 12.5 g/cm^3
 - (B) more than 5 g/cm^3
 - (C) more than 15 g/cm^3
 - (D) more than 7.5 g/cm^3
25. Identify the correct option showing the relative contribution of different green house gases to the total global warming.
- (A) CFC-14%, CO_2 -60%, Methane-6%, N_2O -20%.
 - ☒ (B) CFC-14%, CO_2 -60%, Methane-20%, N_2O -6%.
 - (C) CFC-20%, CO_2 -60%, Methane-14%, N_2O -6%.
 - (D) CFC-6%, CO_2 -60%, Methane-20%, N_2O -14%.
26. A flower has 10 stamens each having bilobed dithecal anther. If each microsporangium has 5 pollen mother cells, how many pollen grains would be produced by the flower ?
- (A) 1600
 - ☒ (B) 200
 - (C) 400
 - (D) 800



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240
25
200
10-5

27. 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) II, III, IV, VI, VII, VIII

~~(B)~~ II, III, V, VII, VIII

(C) I, II, IV, VI, VIII

(D) I, III, IV, V, VII

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

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

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

~~(C)~~ Energy flow is unidirectional.

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

29. Find out the correct match.

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

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

Column-I				Column-II			
1.	<u>Haemophilus influenzae</u>			p.	Malignant malaria		
2.	<u>Entamoeba histolytica</u>			q.	Elephantiasis		
3.	<u>Plasmodium falciparum</u>			r.	Pneumonia		
4.	<u>Wuchereria bancrofti</u>			s.	Amoebiasis		

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

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31. When the vascular cambium is present between the xylem and phloem, then the vascular bundle is called,
 (A) Closed (B) Exarch (C) Open ~~(D) Endarch~~
32. The function of Typhlosole in earthworm is
 (A) Increasing the effective area of absorption in the intestine
 (B) Grinding of soil particles
 (C) Grinding of decaying leaves
 (D) Transportation
33. Select the correctly matched pair of organisms with their order.
 (A) Mangifera, indica : Primata
 (B) Triticum, aestivum : Sapindales
~~(C) Musa, domestica : Diptera~~
 (D) Homo, sapiens : Poales
34. 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) | q | s | p | r |
| (B) | s | r | q | p |
| (C) | r | p | s | q |
| (D) | q | p | s | r |
35. Flame cells present in the members of platyhelminthes are specialized to perform,
 (A) Respiration and Osmoregulation
 (B) Osmoregulation and Circulation
 (C) Osmoregulation and Excretion
 (D) Respiration and Excretion
36. Identify the floral formula of plant belonging to potato family.
 (A) $\frac{\sigma}{\text{♀}}, K_{(5)}, C_5, A_{(9)+1}, G_1$ (B) $\frac{\sigma}{\text{♀}}, K_{(5)}, \overbrace{C_{(5)} A_5}^{(5)}, \underline{G}_{(2)}$
 (C) $\frac{\sigma}{\text{♀}}, K_{10}, C_{10}, A_{10}, \overline{G}_2$ ~~(D) $\frac{\sigma}{\text{♀}}, P_{3+3}, A_{3+3}, G_{(3)}$~~



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37. Toxicity of which micronutrient induces deficiency of iron, magnesium and calcium ?
 (A) Boron (B) Zinc (C) Molybdenum (D) Manganese
38. Considering the stroke volume of an adult healthy human being is 70 mL, identify the cardiac output in one hour from the following :
 (A) 50.40 Lit/hour (B) 504.0 Lit/hour (C) 30.24 Lit/hour (D) 302.4 Lit/hour
39. Function of contractile vacuole in Amoeba is
 (A) Digestion and excretion (B) Excretion and osmoregulation
 (C) Digestion and respiration (D) Osmoregulation and movements
40. 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-p, 3-r, 4-p	
(B) 1-q, 2-r, 3-q, 4-s	
(C) 1-s, 2-q, 3-r, 4-p	
(D) 1-s, 2-r, 3-q, 4-p	

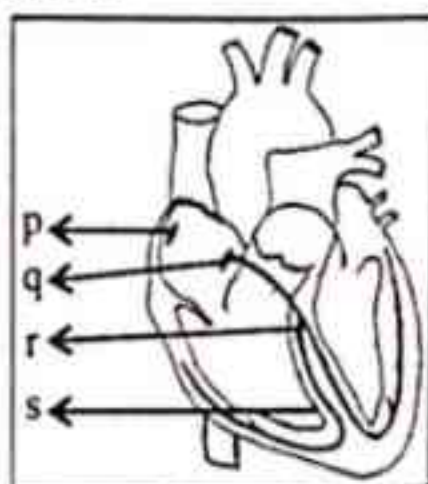
41. The complex formed by a pair of synapsed homologous chromosomes is called,
 (A) Univalent (B) Pentavalent (C) Triad (D) Bivalent
42. Match column-I with column-II. Select the option with correct combination.

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



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43. In Bryophyllum, the adventitious buds arise from
 (A) Leaf base (B) Leaf axil
~~(C) Notches in the leaf margin~~ (D) Shoot apex
44. Primary endosperm nucleus is formed by fusion of
 (A) Two polar nuclei and two male gametes
~~(B) Two polar nuclei and one male gamete~~
 (C) Ovum and male gamete
 (D) One polar nucleus and male gamete
45. 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- Interventricular septum, q-AVN, r-Bundle of His, s-SAN
~~(B) p-SAN, q-AVN, r-Bundle of His, s-Interventricular septum~~
 (C) p-AVN, q-SAN, r-Interventricular septum, s-Bundle of His
 (D) p-Bundle of His, q-SAN, r-Interventricular septum, s-AVN
46. Atrial Natriuretic Factor (ANF) acts as a
 (A) Hypertension inducer ✗
 (B) Check on Renin-Angiotensin mechanism
 (C) Promoter on Renin-Angiotensin mechanism
~~(D) Vasoconstrictor~~
47. The vibrations from the ear drum are transmitted through ear ossicles to
 (A) Auditory nerves ✗ ~~(B) Cochlea~~
 (C) Oval window (D) Tectorial membrane
48. Bamboo species flowers
 (A) Twice in 50-100 years (B) Every year
 (C) Once in 12 years ~~(D) Once in lifetime~~

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49. 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-r, 2-q, 3-s, 4-p
(B) 1-s, 2-p, 3-q, 4-r
(C) 1-s, 2-r, 3-p, 4-q
(D) 1-q, 2-s, 3-r, 4-p
50. Which pair of the following cells in the embryo sac are destined to change their ploidy after fertilization ?
(A) Egg cell and central cell
(B) Antipodals and synergids
(C) Synergids and egg cell
(D) Central cell and antipodals
51. 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) Vagina (B) Hymen (C) Mons pubis (D) Clitoris
52. 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 wrong.
(B) Statement 1 is correct and Statement 2 is wrong.
(C) Both the Statement 1 and Statement 2 are correct.
(D) Statement 1 is wrong and Statement 2 is correct.
53. The male sex accessory ducts include,
(A) Rete testis, vasa efferentia, epididymis and vas deferens
(B) Rete testis, vasa efferentia, epididymis and seminal vesicle
(C) Rete testis, urethra, epididymis and vas deferens
(D) Rete testis, vasa efferentia, seminal vesicle and vas deferens

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54. Which of the following statements is correct ?
 (A) Female carrier for haemophilia may transmit the disease to sons.
 (B) Thalassaemia is a qualitative problem.
 (C) Change in whole set of chromosomes is called aneuploidy.
 (D) Sickle cell anaemia is a quantitative problem.
55. 'Gene-mapping' technology was developed by
 (A) Mendel (B) Tschermak (C) Correns (D) Sturtevant
56. 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 the Statements are wrong. (B) Statement (1) is correct.
 (C) Statement (2) is correct. (D) Both Statements (1) and (2) are correct.
57. From the following table, select the option that correctly characterizes various phases of menstrual cycle :
- | Menstruation phase | Follicular phase | Luteal phase |
|---------------------------------|-----------------------------|-----------------------------|
| (A) Regeneration of endometrium | High level of progesterone | Developing corpus luteum |
| (B) Matured follicle | Regression of corpus luteum | Ovulation |
| (C) Menses | Developing corpus luteum | Follicle maturation |
| (D) Menses | L.H. Surge | Regeneration of endometrium |
58. Which of the following is abbreviated as ZIFT ?
 (A) Zygote Inter Fallopian Tube (B) Zygote Intra Fallopian Transfer
 (C) Zygote Inter Fallopian Transfer (D) Zygote Intra Fallopian Tube
59. An example for hormone releasing IUD is
 (A) Implant (B) LNG - 20 (C) Multiload 375 (D) Lippes loop
60. MTPs are considered relatively safe during
 (A) First trimester (B) Second trimester
 (C) 24 weeks of pregnancy (D) 180 days of pregnancy

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