

LIFE SCIENCE

PAPER - II

Note : This paper contains **hundred (100)** objective type questions, each question carrying **two (02)** marks. **All** the questions are compulsory.

1. DNA fingerprinting uses a specific type of DNA sequence, known as :
- (A) Palindromic sequence
 - (B) Microsatellite DNA
 - (C) Chimeric DNA
 - (D) CDNA.
2. Which of the following statements regarding enzyme inhibition is correct ?
- (A) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate
 - (B) Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme
 - (C) Non-competitive inhibitors often bind to the enzyme irreversibly
 - (D) Competitive inhibition is seen when a substrate competes with an enzyme for binding to as inhibitor protein
3. Which of the following is correct in DNA ?
- (A) A forms 2 hydrogen bonds with G; T forms 3 hydrogen bonds with C
 - (B) A forms 3 hydrogen bonds with T; G forms 2 hydrogen bonds with C
 - (C) A forms 2 covalent bonds with T; G forms 3 covalent bonds with C
 - (D) A forms 2 hydrogen bonds with T; G forms 3 hydrogen bonds with C
4. When cancer cells gain the ability to move independently and invade other tissues, they are said to have :
- (A) Evolved
 - (B) Metamorphosed
 - (C) Metastasized
 - (D) Mobilized

5. Which of the following species are occasionally referred to as 'opportunistic':
 (A) Allopatric species
 (B) Sympatric species
 (C) r-selected species
 (D) K-selected species
6. The hormones secreted by the hypothalamus in the region of median eminence are carried to adenohypophysis by which one of the following?
 (A) Hypophyseal stalk
 (B) Hypophyseal portal system
 (C) Pituitary stalk
 (D) Neurohypophysis
7. The major type of bond between antigen and antibody is
 (A) Hydrogen bond
 (B) Covalent bond
 (C) Hydrophobic interactions
 (D) van der Waals force.
8. The molecular weight of a protein molecule is 14.4 kDa, what would be the minimum number of nucleotides in the mRNA from where this protein is synthesised? Assume that the molecular weight of each amino acid of the protein is 80 Da
 (A) 60
 (B) 180
 (C) 240
 (D) 540
9. Which one of the following is considered the best for understanding general relationships of plants?
 (A) Cytotaxonomy
 (B) Experimental Taxonomy
 (C) Numerical Taxonomy
 (D) Chemotaxonomy
10. Discovery of new species has recently picked up due to initiatives under the projects:
 (a) Species 2000
 (b) Global diversity and information facility
 (c) Agenda 21
 (d) Climate change.
 (A) (a) and (b)
 (B) (b) and (c)
 (C) (a), (b), and (c)
 (D) All of the above
11. The chromosomal pattern of Klinefelter's syndrome is
 (A) XXX
 (B) XXY
 (C) XO
 (D) XYY
12. The major amino acids in histone are
 (A) Arginine, Lysine and Histidine
 (B) Glutamate and Aspartic acid
 (C) Lysine and Arginine
 (D) Histidine

13. In which type of cells of human mitochondria are absent?

- (A) Liver Cells
- (B) Brain Cells
- (C) Erythrocytes
- (D) Osteoblasts

14. Ecocline is

- (A) transient region between two adjacent communities
- (B) transient region between two adjacent species
- (C) transient region between two adjacent ecotypes
- (D) transient region between two adjacent forest

15. Okazaki fragments are:

- (A) Primed by RNA primer
- (B) Formed in the 5'-3' direction
- (C) United to form lagging strand
- (D) All of the above

16. You are given 17 meiotic cell divisions. With these divisions how many seeds are possible? How many pollen grains will be wasted?

- (A) 17 seeds and 3 pollen grains
- (B) 17 seeds and 17 pollen grains
- (C) 13 seeds and 3 pollen grains
- (D) None of these

17. Match the items of Column-I with those of Column-II and select the correct match using codes:

Column-I
(Gene)

(a) *wee 1*

(b) *suc 1*

(c) *nim 1*

(d) *cdc 25*

Column-II
(Function)

1. Dephosphorylation of Cdk 1

2. Phosphorylation of Cdk

3. Negative control of *wee 1*

4. Converts M form of Cdk-1 to S form

Codes :

	(a)	(b)	(c)	(d)
(A)	2	1	4	3
(B)	3	1	4	2
(C)	2	4	3	1
(D)	4	3	2	1

18. Match the items of Column-I with those of Column-II and select the correct match using codes:

Column-I

(a) HPM shunt

(b) Russell bodies

(c) Cytochromes

(d) Glucagon

Column-II

1. Inner mitochondrial membrane

2. Initiates respiratory burst in phagocytic neutrophils

3. Stimulates liver glucose-6-phosphatase

4. Plasma cells

Codes :

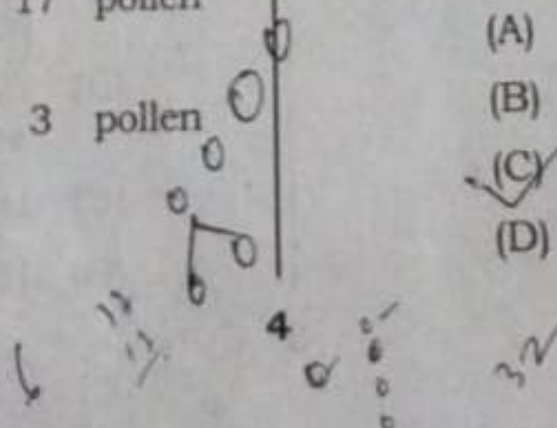
	(a)	(b)	(c)	(d)
(A)	2	1	3	4
(B)	3	4	2	1
(C)	2	4	1	3
(D)	4	2	3	1

19.

C

(a)

(b)



19. Match the items of Column-I with those of Column-II and select the correct match using codes :

Column-I	Column-II
(a) white blood cells	1. Thymus gland
(b) body cells in which viruses are reproducing are defended by	2. Macrophages
(c) anaphylaxis	3. Cytotoxic T cells
(d) maturation of T cells	4. Bee sting

Codes :

	(a)	(b)	(c)	(d)
(A)	1	2	4	3
(B)	3	4	1	2
(C)	4	1	3	2
(D) ✓	2	3	4	1

20. Match the items of Column-I with those of Column-II and select the correct match using codes :

Column-I	Column-II
(a) epigenetic	1. participates in active transcription of DNA to mRNA
(b) euchromatin	2. when molecule relieves helical stress by twisting around itself
(c) supercoiling	3. severe reduction in population size
(d) bottleneck	4. signal for formation of a regional centromere appears to be

Codes :

	(a)	(b)	(c)	(d)
(A)	2	1	4	3 X
(B) ✓	4	1	2	3
(C)	3	2	1	4 X
(D)	1	4	3	2 X

21. Match the items in Column-I with those of Column-II and select correct match by using the codes given below :

Column-I	Column-II
(a) Homopolymer of phenylalanine	1. Peptide bond formation
(b) Peptidyl transferase	2. Removal of tRNAs from their precursor molecules
(c) Aminoacyl tRNA synthetase	3. Polymerase II
(d) Ribonuclease-P	4. Amino acid activation

Codes :

	(a)	(b)	(c)	(d)
(A)	2	3	1	4 X
(B)	3	1	4	2 X
(C) ✓	3	2	4	1
(D)	3	4	2	1

22. Match the items of Column-I with those of Column-II and select the correct match using codes :

Column-I	Column-II
(a) Acid hydrolases	1. Ribosomes
(b) Protein factory	2. Lipid storage
(c) Elaioplasts	3. Lysosomes
(d) Photorespiration	4. Peroxisomes

Codes :

	(a)	(b)	(c)	(d)
(A)	3	2	1	4 X
(B)	4	1	3	2
(C) ✓	3	1	2	4
(D)	2	4	3	1

23. Match the items of Column-I with those of Column-II and select the correct match using codes :

Column-I	Column-II
(a) RNA polymerase	1. Protein chain elongation
(b) Peptidyl Transferase	2. Transcription
(c) β -galactosidase	3. Unwind DNA duplex
(d) Helicase	4. Hydrolysis of lactose

Codes :

	(a)	(b)	(c)	(d)
(A)	2	1	4	3
(B)	4	2	3	1
(C)	3	1	2	4
(D)	1	4	3	2

24. Match the items of Column-I with those of Column-II and select the correct match using codes :

Column-I	Column-II
(a) Pachytene	1. Pairing of homologous chromosomes
(b) Metaphase-I	2. Termination of chiasmata
(c) Diakinesis	3. Crossing over takes place
(d) Zygotene	4. Chromosomes align at equatorial plate

Codes :

	(a)	(b)	(c)	(d)
(A)	2	4	3	1 X
(B)	4	3	2	1 X
(C)	3	4	2	1
(D)	1	4	2	3

25. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : Reserve pool of nutrient cycle becomes emptied and filled repeatedly.

Reason (R) : Nutrient cycles are interdependent and interconnected on one another to a great extent.

Codes :

- (A) Both (Ass) and (R) are true and the (R) is the correct explanation of (Ass)
- (B) Both (Ass) and (R) are true but (R) is not the correct explanation of (Ass)
- (C) (Ass) is true but (R) is false
- (D) Both (Ass) and (R) are false

26. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : Bile is not a true digestive juice.

Reason (R) : Bile lacks digestive enzymes.

Codes :

- (A) Both (Ass) and (R) are true and (R) is the correct explanation of the (Ass)
- (B) Both (Ass) and (R) are true but (R) is not the correct explanation of (Ass)
- (C) (Ass) is true but (R) is false
- (D) Both (Ass) and (R) are false

27. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : Thymus is a lymphoid organ responsible for development of immunity.

Reason (R) : After their origin in bonemarrow some of the lymphocytes are processed in thymus to become T-lymphocytes.

Codes :

- (A) Both (Ass) and (R) are true and (R) is the correct explanation of (Ass)
(B) Both (Ass) and (R) are true but (R) is not the correct explanation of (Ass)
(C) (Ass) is true while (R) is false
(D) Both (Ass) and (R) are false
28. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : $Tt \times Tt$ is an example of Test cross.

Reason (R) : Test cross progeny are always in the ratio of 1:3:1.

Codes :

- (A) Both (Ass) and (R) are true and (R) is the correct explanation of (Ass)
(B) Both (Ass) and (R) are true and (R) is not the correct explanation of (Ass)
 (C) (Ass) is true but (R) is false
(D) Both (Ass) and (R) are false

29. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : In bacteria DNA Polymerase I is a template-directed enzyme.

Reason (R) : It recognizes the next nucleotide on the DNA template and then adds a complementary nucleotide to the 3'OH of the primer.

Codes :

- (A) Both (Ass) and (R) are true but (R) is not the correct evidence for (Ass)
(B) Both (Ass) and (R) are true but (R) is not the correct explanation
(C) (Ass) is true while (R) is false
(D) Both (Ass) and (R) are false
30. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : Glycolysis occurs inside the mitochondria due to requirement of ATP. ~~X~~

Reason (R) : The total ATP production in Electron transport chain is 32. ~~X~~

Codes :

- (A) Both (Ass) and (R) are true and (R) is the correct explanation of (Ass)
(B) Both (Ass) and (R) are true but (R) is not the correct explanation of (Ass)
 (C) (Ass) is false but (R) is true
(D) (Ass) is true but (R) is false

31. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : The endomembrane system includes endoplasmic reticulum, Golgi complex, lysosomes and vacuoles.

Reason (R) : Mitochondria, chloroplast and peroxisomes are not the part of endomembrane system because their functions are not coordinated with the same.

Codes :

- (A) Both (Ass) and (R) are true and (R) is the correct explanation of (Ass)
(B) Both (Ass) and (R) are true but (R) is not the correct explanation of (Ass)
(C) (Ass) is true but (R) is false
(D) Both (Ass) and (R) are false

32. Two statements are given below, one is Assertion (Ass) and the other is Reason (R). Select the correct answer from the codes given below :

Assertion (Ass) : Viruses are not included in any system of classification.

Reason (R) : Viruses are nonliving but develop living characters like multiplication etc. when they come in contact with suitable host.

Codes :

- (A) Both (Ass) and (R) are true and (R) is the correct explanation of (Ass)
(B) Both (Ass) and (R) are true but (R) is not the correct explanation of (Ass)
(C) (Ass) is true but (R) is false
(D) Both (Ass) and (R) are false

33. Select the correct answer for the following statements using codes :

- (i) Coacervate in the primitive earth were self-duplicating aggregates of proteins surrounded by lipid molecules
(ii) First living organisms were heterotrophs
(iii) Reproductive isolation does not let evolution to occur
(iv) Reproductive isolation brings about sympatric speciation

Codes : (i) (ii) (iii) (iv)

- (A) False True False False
(B) False True True False
(C) False False False True
(D) False True False True

34. Select the correct answer from the following statements using codes :

- (i) Plasmodesmata connect actin fibres of one cell to the extracellular matrix of another
(ii) An individual with two normal sets of autosomes and a single X-chromosome has Turner's syndrome
(iii) Zinc is a co-factor for the proteolytic enzyme carboxypeptidase
(iv) Mutations resulting in addition or deletion of a base within a gene are frameshift mutation

Codes : (i) (ii) (iii) (iv)

- (A) False True True True
(B) True True True False
(C) True False False True
(D) False True False True

35. Select the correct answer for the following statements using codes :

- (i) Conscious effort is a postulate of Darwinism
- (ii) De Vries has contributed to the modern synthetic theory of evolution
- (iii) "Ontogeny repeats phylogeny"— Statement is given by Lamarck
- (iv) Natural allopolyploidy has helped in the evolution of new species

Codes : (i) (ii) (iii) (iv)
(A) False False True False
(B) True True False True
(C) False True False True
(D) False True True False

36. Select the correct answer for the following statements using codes :

- (i) Auxin is the hormone in metabolism of food material in cereal grains during germination
- (ii) 'Genetic dwarfism' in plant can be overcome by Gibberellin.
- (iii) 'Triple response' is an important bioassay of ethylene
- (iv) Gibberellic acid is not related to etiolation phenomenon

Codes : (i) (ii) (iii) (iv)
(A) True False True True
(B) False True False True
(C) True False True False
(D) False True True False

37. Examine the following statements and select the correct answer from the codes given below :

- (a) The population reaching to carrying capacity will have the mortality rate $>$ birth rate
- (b) The population reaching to carrying capacity will have mortality rate $<$ birth rate
- (c) Environmental resistance is inversely related to the difference between carrying capacity and existing population
- (d) Population growth becomes zero when it reaches the carrying capacity.

Codes : (a) (b) (c) (d)
(A) False True False True
(B) True False True False
(C) False True True False
(D) True False False False

38. Select the correct answer for the following statements using codes :

- (i) Pancreas is an endocrine gland
- (ii) Islets of Langerhans are not encapsulated but remain separated by reticular fibres
- (iii) γ -cells are regarded as the precursors of α and β -cells of pancreas
- (iv) α -cells of pancreas secrete insulin

Codes : (i) (ii) (iii) (iv)
(A) False True True False
(B) False False True True
(C) True False True False
(D) True True False False

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39. Select the correct answer from the following statements using codes :

- (i) Linkage mapping can offer firm evidence that a disease transmitted from parent to child is linked to one or more genes.
- (ii) DNA markers don't by themselves identify the gene responsible for a trait.
- (iii) Markers are usually consist of DNA that contain a gene
- (iv) Genetic markers are valuable for tracking inheritance of traits through generations of a family.

Codes : (i) (ii) (iii) (iv)

- (A) True True False False
- (B) True True False True
- (C) True False False True
- (D) False False True False

40. Select the correct statement/ statements for population growth and choose the correct answer using codes :

- (i) The carrying capacity for a given population is represented by an equation

$$\frac{dN}{dt} = rN - \frac{N}{K}$$

- (ii) The logistic population growth is expressed by $dN / dt = rN$

- (iii) In a natural population at carrying capacity the equation representing the population growth will be

$$\frac{dN}{dt} = rN \left(1 - \frac{N}{K} \right)$$

- (iv) The equation for logistic growth of population of organism is —

$$\frac{dN}{dt} = rN \left(\frac{K - N}{K} \right)$$

Codes : (i) (ii) (iii) (iv)

- (A) False True False True
- (B) True True False False
- (C) False False True True
- (D) True True False True

41. The hormone related with adaptation to stress is :
- (A) Calcitonin
 - (B) Cortisol
 - (C) Aldosterone
 - (D) Adrenocortical hormone
42. Heparin presents normally in blood is formed by —
- (A) Granulocytes
 - (B) Clumped platelets
 - (C) Mast Cell
 - (D) Monocytes
43. The ovum together with its surrounding granulosa cells is called —
- (A) Graafian follicle
 - (B) Cumulus oophorus
 - (C) Corona radiata
 - (D) Corpus albicans
44. Which one of the following technique is particularly useful for studying gene expression ?
- (A) Inverted - PCR
 - (B) RT-PCR
 - (C) AFLP-PCR
 - (D) Nested - PCR
45. In *E. coli*, according to the operon theory, an operator gene combines with —
- (A) Regulator protein to switch on structural gene transcription
 - (B) Regulatory protein to switch off structural gene transcription
 - (C) Inducer gene to switch on structural gene transcription
 - (D) Regulator gene to switch on structural gene transcription.
46. Mammals are totally independent of water at the time of reproduction unlike lower chordates. The reproductive specialization permitting this is :
- (A) Internal fertilization
 - (B) Yolk storage
 - (C) Mammary glands
 - (D) Development of placenta

47. The ray florets in Asteraceae family are characterized by the presence of —

- (A) Unisexual, female or neuter, zygomorphic epigynous flowers whose sepals are modified into pappus
- (B) Unisexual female or neuter, actinomorphic, hypogynous flowers without modified sepals
- (C) Bisexual, zygomorphic hypogynous flowers with sepals modified into pappus
- (D) Bisexual, actinomorphic, epigynous flowers with modified sepals into pappus

48. Which one of the following is the correct sequence of flow of electrons in the photochemical reaction of photosynthesis?

- (A) PS-II, plastoquinone, cytochromes, PS-I and ferredoxin
- (B) PS-I, plastoquinone, cytochromes, PS-II and ferredoxin
- (C) PS-I, ferredoxin and PS-II
- (D) PS-I, plastoquinone, cytochromes, PS-II and ferredoxin

49. Which of the following algae is the copper container?

- (A) *Batrachospermum*
- (B) *Sarconema furcellatum*
- (C) *Acanthophora spicifera*
- (D) Both B and C

50. In eukaryotes 5' capping in mRNA is required for:

- (A) Initiation of transcription
- (B) Initiation of translation
- (C) Removal of introns
- (D) Termination of transcription

51. The end point of succession can be determined by:

- (A) abiotic causes
- (B) biotic causes
- (C) edaphic causes
- (D) climatic causes

52. Due to an accidental seepage one land locked lake of North East India is contaminated with some toxic compounds. Which of the following organisms are assumed to be most affected?

- (A) Phytoplankton
- (B) Zooplankton
- (C) Fish
- (D) Water birds