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SECTION -1
SET - ANDHRA PRADESH

2012

PAPER-II

1. Eukaryotic mRNA can be separated from the total RNA by
(A) Size Exclusion chromatography
(B) Ion-Exchange chromatography
(C) Affinity chromatography
(D) Partition chromatography

2. Which of the following involves the combining of two cells without cell walls
from different plants ?
(A) Clonal propagation
(B) Hybridization
(C) Protoplast fusion
(D) Mutant selection

3. Non-polar amino acid residues are found mostly
(A) In the core of proteins
(B) On the surface of proteins
(C) On alpha helix
(D) In no specific region

4. Which of the following organellae does not carry out transcription ?
(A) Nucleus (B) Peroxisome
(C) Chloroplast (D) Mitochondrian

5. Given below are two statements
Assertion (A): Hexokinase and Glucokinase have low and high km towards glucose respectively.
Reason (R) : Glucokinase operates under high glucose concentratian only .

Which of these statements are correct ?
(A) A is correct but R is wrong
(B) R is correct but A is wrong
(C) Both A and R are correct
(D) Both A and R are wrong

6. Given below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R)

Assertion (A): Protooncogenes are found in most of the animal cells.
Reason (R) : They are related to viral oncogenes.

In the context of these statements which one of the following is correct ?
(A) A is correct but R is wrong
(B) Both A and R are correct
(C) A is wrong but R is correct
(D) Both A and R are wrong

7. Given below are two statements

Assertion (A): All eukaryotic mRNAs are capped at 5'end
Reason (R) : 5' cap is not essential for efficient mRNA translation

Which of these statements are correct ?
(A) A is correct, R is wrong
(B) Both A and R are correct
(C) A is wrong R is correct
(D) Both A and R are wrong

8. Match the following

I	II
I. Nuclear Magnetic Resonance	(A) Microwaves
II. Electron Spin Resonance	(B) Radiowaves
III. Raman spectroscopy	(C) UV/Visible light
IV. Spectrophotometry	(D) Infrared waves

(A) I-b, II-a, III-d, IV-c (B) I-b, II-a, III-d, IV-c
(C) I-b, II-a, III-d, IV-c (D) I-b, II-a, III-d, IV-c

9. Match the following

I	II
I. Bt cotton	(A) Improved shelf life
II. Flavr Savr Tomato	(B) Improved nutritional quality
III. Roundup Ready	(C) Pest resistance Sorghum
IV. Golden Yellow Rice	(D) Herbicide tolerance

Choose the correct pair.
(A) I-c ,II-a, III-d, IV-b (B) I-c ,II-a, III-b, IV-d
(C) I-a ,II-c, III-d, IV-b (D) I-b ,II-a, III-d, IV-c

10. Viruses that persist in the cell and cause recurrent disease are called
(A) Oncogenic viruses (B) Latent viruses
(C) Cytopathic viruses (D) Resistant viruses

11. **Assertion (A):** Indirect somatic embryogenesis, embryos are developed without going through callus formation.
Reason (R) : This is possible due to the presence of preembryonically determined cells.

(A) Both A and R are true but R is not correct reason for A
(B) A is false but R is true
(C) A is true but R is false
(D) Both A and R are true and R is the correct reason for A

12. In complement cascade the complement 1 activate as follows
I. C1q II. C1r
III. C1s IV. C1d

(A) I, II, III, IV (B) II, III, IV, I
(C) III, IV, II, I (D) IV, III, II, I

13. Match the following

I	Pyridoxal phosphate	1	Vitamin B_1
II	Niacin	2	Vitamin B_6
III	Thiamin pyrophosphate	3	Vitamin B_2
IV	Flavin nucleotides	4	Vitamin B_3

(A) I -1, II-2, III-3, IV-4. (B) I-2, II-4, III-1, IV-3.
(C) I-4, II-3, III-2, IV-1 (D) I-3, II-4, III-2, IV-1.

14. The protein structure is stabilized by
I. Hydrogen bonds
II. Disulphide bonds
III. Glycolidic bonds
IV. Hydrophobic interactions

(A) I and II are correct (B) II, III and IV are correct
(C) I and IV are correct (D) I, II and IV are correct

15.Two dimensional electrophoresis involves
(A) SDS-PAGE in ^{1st} dimension and IEF in ^{2nd} dimension
(B) IEF in ^{1st} dimension and SDS-PAGE in ^{2nd} dimension
(C) IEF in ^{1st} dimension and PFGE in ^{2nd} dimension
(D) IEF $^{in\ 1st}$ dimension and TLC in ^{2nd} dimension

16. Electron Transport chain contains the following components :
I. Cytochrome C-oxidase
II. Succinate/COQ oxidoreductase
III. NADH : COQ oxidoreductase
IV. Coenzyme Q : cytochrome oxidoreductase

Choose correct one of following sequences
(A) III, II, IV, I (B) II, III, IV, I
(C) I, IV, III, II (D) IV, III, II, I

17. The correct order of chromatin organization from the following is
I. Nucleosome
II. Solenoid
III. Double stranded DNA
IV. Chromosome

Choose the correct sequence
(A) I, IV, II, III (B) III, I, II, IV
(C) I, II, III, IV (D) III, IV, I, II

18. Give the correct sequence of following steps used in Southern hybridization
1. Blotting membrane
2. Restriction digestion
3. Detection
4. Separation by electrophoresis

Choose the correct one
(A) 4, 1, 2, 3 (B) 2, 4, 1, 3
(C) 4, 2, 1, 3 (D) 2, 1, 4, 3

19. According to ICBN Rules the suffix of family name ends with "aceae", whereas prefix refers to
(A) Specific epithet
(B) Characteristic feature of the family
(C) Generic epithet
(D) Specific character of basic species

20. Pick up the correct combination of the following using valid name and part used
(A) Millets-Sorghum vulgare – Poaceae caryopsis Pulses-Cajanus cajan-Fabaceae Cotyledons Fibers-Gossypium herbaceum Malvaceae-Epidermal hairs of seed Fruit-Mangifera indica Anacardiaceae Epicarp and Mesocarp of drupe
(B) Millets-Sorghum vulgare – Poaceae Caryopsis Pulses-Cajanus cajanus-Fabaceae Cotyledons Fibers-Gossypium herbaceum Malvaceae-Epidermal hairs of seed Fruit-Mangifera indica Anacardiaceae Epicarp and Mesocarp of drupe
(C) Millets-Sorghum vulgare – Poaceae Caryopsis Pulses-Cajanus cajan-Fabaceae Cotyledons Fibers-Gossypium herbaceum Malvaceae - Epidermal hairs of fruit Fruit-Mangifera indica-Anacardiaceae-Epicarp and Mesocarp of drupe
(D) Millets – Sorghum vulgare – Poaceae Caryopsis Pulses-Cajanus cajan-Fabaceae Cotyledons Fibers-Gossypium herbaceum Malvaceae-Epidermal hairs of seed Fruit-Mangifera indica-Anacardiaceae Mesocarp and endocarp of drupe

21. **Assertion (A):** Apospory is not uncommon in some ferns like Pteris

Reason (R): In ferns some times the prothallus is formed from vegetative parts of sporophytic plant

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

22. This biosphere reserve is recently notified by the Government of India
(A) Valley of Flowers (B) Nanda Devi
(C) Nallamalais (D) Seshachalam

23. Epiphytes are rare in Delhi because it has
(A) Moist climate
(B) Semi-arid climate
(C) Large amount of factories
(D) Large number of automobiles

24. Arrange the following in progressive manner with special reference to ecological succession in xerosere
I. Funaria II. Rhizocarpon
III. Poa IV. Trees

(A) I, II, III, IV (B) II, I, IV, III
(C) II, I, III, IV (D) I, III, II, IV

25. Match the following :

1	Aquatic habitats	I	Sciophytes
2	Community in abundant light	II	Xerophytes
3	Community in shade	III	Heliophytes
4	Community in dry conditions	IV	Mesophytes
		V	Hydrophytes

(A) 1- V, 2- III,3-I, 4 –II. (B) 1-V, 2-IV, 3-I, 4 –II.
(C) 1-V, 2-III, 3-II, 4-I . (D) 1-V 2-II, 3-1, 4-3.

26. Pick up the sources of air pollution from the following :
I. Volcanic eruptions II. Dust storms
III. Domestic sewage IV. Pulp mills
V. CFMs

(A) I, II and III (B) I, II, III and V
(C) II, IV and V (D) I, II and V

27. Which of the following has more redox potential (E^0) value ?
(A) Flavo proteins
(B) Cytochrome B
(C) Nicotinamide adenine dinucleotide
(D) Ubiquinone

28. Respiratory quotient (R.Q) value of a simple sugar is
(A) Zero (B) More than one
(C) Less than one (D) Equal to one

29. Given below are two statements, one labeled as Assertion (A), and the other labeled as Reason (R)

Assertion (A): The pronounced decrease in quantum yield at red zone (greater than 680 nm) is termed as red drop. It is also known as Emerson's effect.

Reason (R) : Discovery of Emerson's effect has clearly shown the existence of two photosystems.

In the context of the above two statements which one of the following is correct ?

Codes :
(A) A is correct but R is wrong
(B) A is wrong but R is correct
(C) A is correct, R is also correct
(D) A is wrong, R is also wrong

30. Arrange the following compounds in order in which they appear in Krebs cycle. Use the code given below.

I. Succinic acid II. Fumaric acid
III. Oxaloacetic acid IV. Malic acid

Code :
(A) III, IV, II, I (B) I, II, IV, III
(C) II, III, I, IV (D) I, III, II, IV

31. Which one of the following combination or chromosome number (N) and DNAcontent (C) is true of the diplotene stage of mammalian oocytes ?
(A) 1N & 2C (B) 2N & 4C
(C) 2N & 2C (D) 1N & 4C

32. **Assertion (A)** : As polyspermy is being slowly blocked, the cortical granules explode and release their contents into the perivitelline space.

Reason (R) : Quick blocking of polyspermy sets in depolarization of the egg plasmalemma and mobilization of Ca^{2+} from stores with in the egg.

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

33. During early human brain development primary vesicles listed in List I gives rise to derivatives in List II

	LIST-I		LIST-II
I	Telencephalon	1	Mid brain
II	Mesencephalon	2	Optic vesicle
III	Diencephalon	3	Cerebellum
IV	Myelencephalon	4	Hippocampus

(A) I-4, II-1, III-2, IV-3. (B) I-2, II-1, III-3, IV-4.
(C) I-4, II-2, III-1, IV-3 (D) I-3, II-2, III-1, IV-4.

34. During neural tube formation in the chick embryo the neural plate involves following events in sequences
(A) Shaping, convergence, folding, elevation, clockwise
(B) Convergence, elevation, folding, shaping, clockwise
(C) Shaping, folding, elevation, convergence, clockwise
(D) Convergence, shaping, elevation, folding, clockwise

35. The order of evolutionary pattern of nitrogen excretion in animals is as follows
(A) Urea, Uric acid, Ammonia
(B) Ammonia, Uric acid, Urea
(C) Urea, Ammonia, Uric acid
(D) Ammonia, Urea, Uric acid

36. Mammalian heterodonty is expressed by a dental formul(A) Match the dental formula to the organism

LIST 1	LIST 2
$\frac{0,0,3,3}{3,1,3,3} = 32$	1. Rabbit
$\frac{2,0,3,3}{1,0,2,3} = 28$	2. Man
$\frac{1,0,2,3}{1.0.1.3} = 22$	3. Sheep
$\frac{2,1,2,3}{2,1,2,3} = 32$	4. Squirrel

(A) I-3, II-1, III-4, IV-2 (B) I-2, II-1, III-3, IV-4
(C) I-1, II-4, III-2, IV-3 (D) I-4, II-1, III-2, IV-3

37. **Assertion (A) :** Absorption of the products of carbohydrates and protein digestion are against a concentration gradient, whereas the absorption of the products of lipids are different.

Reason (R) : The end products of carbohydrates, proteins are absorbed into the epithelial cells of intestineis by active transport, whereas the products of lipids are by diffusion.

In the context of the above two statements which one of the following is correct
(A) A is correct but R is wrong
(B) Both A and R are correct
(C) A is wrong but R is correct
(D) Both A and R are wrong

38. The Bohr effect represents an interactionbetween
(A) O_2 equilibrium and Electrondissociation of Hb
(B) O_2 equilibrium and Proton dissociation of Hb
(C) CO_2 equilibrium and Electrondissociation of Hb
(D) CO_2 equilibrium and Protondissociation of Hb

39. Which one of the following chromosome combinations is expected in an offspring obtained after selfing a plant having AA BB CC DD homologous pairs ?
I. AA II. BB
III. CC IV. DD

The correct sequence of the above is
(A) I, III, II and IV
(B) I, II, III and IV
(C) I, IV, III and II
(D) I, III, IV and II

40. Match the most commonly detected bloodgroup systems with probable number of their alleles

	BLOOD GROUP		**ALLELS**
I	Abo	1	20
II	MNSc	2	5
III	P	3	30
IV	Rh	4	4

(A) I-2, II-1, III-4, IV-3
(B) I-1, II-2, III-3, IV-4
(C) I-4, II-3, III-2, IV-1
(D) I-3, II-4, III-2, IV-1

41. **Assertion (A)** : Gene is a biological entitya heritable function detected by observing the effect of a mutation. A gene consists of all the DNA sequences necessary to produce a single peptide or RNA product.

Reason (R) : The gene is single, contiguous protein encoding stretch of DN(A)

In the context of the above two statements, which one of the following is correct ?
(A) Both A and R are true and R is correct explanation of A
(B) Both A and R are true but R is not the correct explanation of A
(C) A is true but R is false
(D) Both A and R are false

42. Sex linked genes on the entire X-chromosome of Drosophila melanogaster mapped and found to have a length of
(A) 78 map units (B) 68 map units
(C) 80 map units (D) 82 map units.

43. What are the two theories that are combined in the synthetic theory of evolution ?
(A) Darwin's theory of natural selection and Lamarck's theory of use and disuse
(B) Mendel's theory of heredity and Heckel's theory of ontogeny repeats phylogeny
(C) Darwin's theory of natural selection and Mendel's theory of heredity
(D) Lamarck's theory of use and disuse and Heckel's theory of ontogeny repeats phylogeny

44. Match the various types of isolating mechanisms that prevent gene exchange between population of related species of organisms.

	LIST-I		**LIST-II**
I	Habitat Isolation	1	Populations are isolated by different and incompatible behaviour
II	Seasonal Isolation	2	Restricted by differences in structure of reproductive organs
III	Ethological Isolation	3	Populations live in same regions but occupy different habitats
IV	Mechanical Isolation	4	Population exist in the same region but are sexually mature at different times

(A) I-1, II-3, III-4, IV-2 (B) I-3, II-4, III-1, IV-2
(C) I-2, II-4, III-1, IV-3 (D) I-3, II-2, III-1, IV-4

45. Arrange following fossils in a row leading from more like reptiles to more like mammals
I. Pelycosauria II. Cyanodonta
III. Therapsida IV. Mammalia

(A) I, II, III and IV (B) II, III, I and IV
(C) I, III, II and IV (D) II, I, III and IV

46. **Assertion (A)** : The finches beaks evolved to be larger in times of food shortage and smaller in times of abundance.
Reason (R) : The food supply fluctuated through time according to weather.
(A) Both A and R are true and R is the correct explanation
(B) Both A and R are true, but R is not the correct explanation
(C) A is true but R is false
(D) A is false but R is true

Q.No. 47–50
Read the passage below, and answer the questions that follow based on your understanding of the passage.

DNA replication takes place at a 'Y'-shaped structure called a replication fork. A self correcting DNA polymerase enzyme catalyzes nucleotide polymerization in a 5'-to-3' direction, copying a DNA template strand with remarkable fidelity. Since the two strands of a DNA double helix are antiparallel, this 5'-to-3' DNA synthesis can take place continuously on only one of the strands at a replication fork (the leading strand. On the lagging strand, short DNA fragments must be made by a 'backstiching'process. Because the self correcting DNA polymerase cannot start a new chain, these lagging strand DNA fragments are primed by a short RNA primer molecules that are subsequently erased and replaced with DNA. DNA replication requires the cooperation of many proteins. These include
i. DNA polymerase and DNA primase to catalyze nucleotide triphosphate polymerization;
ii. DNA helicases and single strand DNA binding (SSB) proteins to help in opening up DNA helix so that it can be copied ;
iii. DNA ligase and an enzyme that degrades RNA primers to seal together the discontinuously synthesized lagging strand DNA fragments; and
iv. DNA topoisomerases to help to relieve helical winding and DNA tangling problems. Many of these proteins associate with each other at a replication fork to form a highly efficient 'replication machine', through which the activities and spatial movements of the individual components are coordinated.

47. Helical winding of DNA is removed by an enzyme
(A) DNA polymerase (B) DNA primase
(C) DNA helicase (D) DNA topoisomerase

48. Discontinually synthesized lagging strand DNA fragments are sealed by which one
of the following enzyme ?
(A) RNA primase (B) DNA ligase
(C) SSB proteins (D) DNA polymerase

49. Which one of the following four statements is incorrect ?
(A) Leading strand is synthesized in3 ' →5' direction
(B) Lagging strand is synthesized by 'backstitching' process
(C) DNA polymerase can directly synthesize new chain of DNA
(D) Antiparallel strands of DNA are separated by helicases

50. Which one of the following four statements is correct?
(A) Leading strands is synthesized in fragments
(B) DNA fragments synthesis is initiated by DNA primer
(C) Leading and lagging strands are synthesized in different manner because the DNA strands are antiparallel
(D) DNA polymerase alone coordinates replication of DNA process

PAPER-III

1. The highest concentration of cystine can be found in
(A) Myosin (B) Keratin
(C) Collagen (D) Spectrin

2. A membrane bound enzyme that catalyses the formation of cAMP from ATP is
(A) MAP Kinase
(B) Receptor Kinase
(C) ATP phosphorylase
(D) Adenyl cyclase

3. **Assertion (A)**: Quarum sensing is the ability of bacteria to communicate and coordinate behaviour.

Reason (R): Bacteria those use Quarum sensing to producer and secrete a signaling chemical called as "Inducer".

(A) Both A and R are true and R is the correct explanation
(B) Both A and R are true, but R is the false explanation
(C) A is true, but R is false
(D) A is false, but R is true

4. **Assertion (A)** : Interferons are produced by the host against viral infection.

Reason (R): Interferons are essential for viral replication.

(A) Both A and R are true and R is the correct explanation
(B) Both A and R are true, but R is the false explanation
(C) A is true, but R is false
(D) A is false, but R is true

5. Chylomicrons, Intermediate density lipoproteins (IDL), Low density Lipoproteins (LDL) and very low density Lipoproteins all are serum Lipoproteins. What is correct ordering of these particles from the lowest to the greatest density ?
(A) LDL, IDL, VLDL, Chylomicra
(B) Chylomicra, VLDL, IDL, LDL
(C) VLDL, IDL, LDL, Chylomicra
(D) Chylomicra, IDL, VLDL, LDL

6. The sequence of the steps involved in the viral replication
(I) Attachment
(II) Penetration
(III) Genome replication and Expression
(IV) Uncoating Arrange the above steps in chronologically

(A) I, II, III, IV (B) III, II, I, IV
(C) II, III, IV, I (D) I, II, IV, III

7. In the area of desmosome the adjacent cells have
(I) Intercellular thickening material
(II) Cilia
(III) Transmembrane linkers
(IV) Protein sheath

(A) I and IV are correct (B) II and IV are correct
(C) I, II and III are correct (D) I and III are correct

8. Viruses contain the following
(I) Genome (II) Capsid
(III) Capsule (IV) Enzyme

(A) I, II, III are correct (B) I, II, III, IV are correct
(C) I, II, IV are correct (D) II, III, IV are correct

9. DNA polymerase I are multifunctional enzymes because it promotes
(I) Polymerisation reaction
(II) Removal of nucleotides from 3' terminus in DNA
(III) Removal of nucleotides from 5' terminus in DNA
(IV) Joining of ends of DNA fragments

(A) I & IV are correct (B) II & IV are correct
(C) III & IV are correct (D) I, II & III are correct

10. Most of DNA binding proteins insert the following structure into the major groove of DNA during binding
(A) Beta-sheet (B) Alpha-helix
(C) Beta-Turn (D) Triple-helix

11. Coding region of an mRNA is 336 nucleotides long, including the initiator and termination codons. What is the number of amino acids in the protein translated from this mRNA ?
(A) 109 (B) 110
(C) 111 (D) 112

12. Origin of replication in *E. coli* consists of
(I) Repetitive elements (II) GC rich regions
(III) AT rich regions (IV) Series of U residues

(A) III is correct
(B) I and III are correct
(C) I, III and IV are correct
(D) IV is correct

13. Bt Cotton contains
(A) dry gene (B) Cry gene
(C) Nif gene (D) AmpR gene

14. Choose the correct signal transduction pathway.
(A) Hormone → 7 TM Receptor → G Protein → cAMP → PKA
(B) Hormone → G protein → 7 TM Receptor → cAMP → PKA
(C) Hormone → 7 TM Receptor → G protein → PKA → cAMP
(D) Hormone → 7 TM Receptor → cAMP → G protein → PKA

15. Which of the following can form a part of a Biosensor?
(I) Enzyme (II) Antibody
(III) Lipid (IV) Vitamin

(A) III and IV are correct
(B) II and IV are correct
(C) I and II are correct
(D) I, II and III are correct

16. Name the enzyme act as Intracellular mediator for growth factor receptor
(A) MAP Kinases
(B) Phosphodiesterases (PDE)
(C) JAK Kinases
(D) β– adrenergic receptor Kinase (BARK)

17. DNA can be radiolabelled with
(I) P^{32} (II) I^{125}
(III) P^{33} (IV) S^{35}

(A) I, II and III are correct
(B) I and III are correct
(C) I, III and IV are correct
(D) II and IV are correct

18. Electrophoresis of a purified protein called X in the presence of SDS and betaMercaptoethanol shows a single band of 60 KDa In gel filtration experiment protein X elutes between alcohol dehydrogenase (160 KD(A) and beta-amylase (190 KDa). How many identical subunits in the protein X composed of?
(A) 1 (B) 2
(C) 3 (D) 4

19. Branched hydrophobic amino acids are
(I) Valine (II) Leucine
(III) Isoleucine (IV) Threonine

(A) I & IV are correct (B) I, II & III are correct
(C) I & II are correct (D) Only I is correct

20. **Assertion (A):** Olfaction and taste are important sensory modalities for insects, particularly in mating, oviposition and food selection.

Reason (R): Chaemo reception in insects is well established than the other animals.

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

21. Match the Jaw suspension type in various organisms.

	LIST-I		**LIST-II**
I	Autodiastylic	1	elasmobranchs
II	Amphistylic	2	mammals
III	Hyostylic	3	bony fishes
IV	Autostylic	4	shark

(A) I-1, II-2, III-3, IV-4 (B) I-2, II-1, III-4, IV-3
(C) I-3, II-4, III-1, IV-2 (D) I-4, II-2, III-1, IV-3

22. Arrange the transport pigments in the order of evolutionary origin from more recent
(A) Haemoglobin, Myoglobin, Chlorocruorin, Haemocyanin
(B) Myoglobin, Chlorocrcruorin, Haemoglobin, Haemocyanin
(C) Haemocyanin, Chlorocrcruorin, Myoglobin, Haemoglobin
(D) Haemocyanin, Haemoglobin, Myoglobin, Chlorocruorin

23. Match List I (genes) with List II (character) and select the correct answer using the codes given below the Lists

	LIST-I		**LIST-II**
I	Incomplete dominance	1	Human skin colour
II	Codominance	2	Purple colour in maize due to anthocyanin
III	Polygenes	3	Human being belonging to AB blood group
IV	Complementary genes	4	Pink colour in 4 O' clock plant

(A) I-4, II-3, III-1, IV-2 (B) I-3, II-4, III-2, IV-1
(C) I-4, II-3, III-2, IV-1. (D) I-3, II-4, III-2, IV-1

24. The cross over percentage between linked genes J and M is 20%, J and L is 35%, J and N is 70%, L and K is 15%, M and N 50%. Thus the sequence of genes on the chromosome is
(A) J, N, M, L, K (B) J, M, L, N, K
(C) J, M, L, K, N (D) M, J, L, K, N

25. Mammals and birds were originated in which of the following era/epoch/period ?
(A) Jurassic period
(B) Eocene and Oligocene
(C) Carboniferous and Permian
(D) All of these

26. The Hardy-Weinberg law is expressed as $(p+q)^2$, where 'p' and 'q' stands for
(A) Frequency of heterozygotes
(B) Frequency of alleles in population
(C) Gene frequencies in population
(D) Genotype frequencies in population

27. **Assertion (A):** Autonomous specification gives rise to a pattern of embryogenesis referred to as mosaic development. If particular blastomere is removed early in its development, that isolated blastomere will produce the same type of cells that it would have made if it were still part of the embryo.

Reason (R): The embryo appears to be constructed like a file mosaic of independent, self differentiating parts.

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

28. **Assertion (A)**: Structures of globular proteins are accurately determined with X-ray diffraction.

Reason (R): Wave length of X-rays is less than 2°A and the resolution of structural information achievable is around 2°(A)
(A) A & R are correct. R is explanation for A
(B) A is false, but R is correct
(C) A is correct, but R is false
(D) Both A and R are false

29. Given below are two statements :

Assertion (A): Foreign genes can be cloned into plasmid cloning vectors.

Reason (R): Cloning vectors can be used for expressing the foreign genes in bacterial systems.

Which of these statements is correct ?
(A) Both A and R are correct
(B) Both A and R are wrong
(C) A is correct, R is wrong
(D) A is wrong, R is correct

30. Given below are two statements

Assertion (A) : Plant breeders have an advantage over the animal breeders.

Reason (R) : Plant breeders can employ clonal propagation.

Which of the statements are correct ?
(A) A and R are correct and R is the explanation for A
(B) A and R are correct and R is not the explanation for A
(C) A is wrong, but R is correct
(D) Both A and R are wrong

31. Identify the correct statement
(A) Went's theory explains the reasons for geotropism
(B) Thigmotropic movements are shown by Desmodium gyrans
(C) Coiling of tendrils around a hard stem are nyctinastic movements
(D) Movements of tentacles of Drosera are chemotropic movements

32. Given below are two statements, one labeled as Assertion (A), and the other labeled as Reason (R):

Assertion (A) : Several factors are responsible for seed dormancy. One of the factors is immature embryo.

Reason (R) : Seed dormancy caused by immature embryo can be overcome by scarification.

In the context of the above two statements which one of the following is correct ?
Codes :
(A) A is correct, R is also correct
(B) A is wrong, R is correct
(C) A is correct, R is wrong
(D) A is wrong and R is also wrong

33. List I consists of some terms and List II includes their corresponding definitions. Select the code showing correct matching

	LIST-I		**LIST-II**
I	Photooxidation	1	Influence of duration of day and night on flowering of plants
II	Photoperiodism	2	Splitting of water molecule by light
III	Photolysis	3	Damage of cells under high intensity of light
IV	Photorespiration	4	Respiration in chloroplasts during day time

(A) I- 4, II- 3, III- 1, IV- 2
(B) I- 3, II- 4, III- 2, IV- 1
(C) I- 2, II- 1, III- 4, IV- 3
(D) I- 3, II- 1, III- 2, IV- 4

34. The light sensitive plant pigment phytochrome was first isolated by
(A) Borthwick and Coworders
(B) Garner and Allard
(C) Butler and his colleagues
(D) Hammer and Bonner

35. Which one of the following is NOT a correct statement ?
(A) Calcium is a component of chlorophyll
(B) Iron is a structural component of porphyrin molecules
(C) Boron plays an important role in translocation of sugars
(D) Molybdenum plays active role in nitrogen fixation

36. List I consists of some terms and List II includes corresponding definitions. Select the code showing correct matching

	LIST-I		**LIST-II**
I	Nitrification	1	Conversion of nitrates to gaseous nitrogen
II	Denitrification	2	Conversion of NH3 to NO3
III	Nitrogen fixation	3	Conversion of proteins to ammonia
IV	Ammonification	4	Conversion of gaseous nitrogen to ammonia

(A) I-1, II-2, III-3, IV-4 (B) I-2, II-1, III-4, IV-3
(C) I-3, II-4, III-2, IV-1. (D) I-4, II-1, III-2, IV-3

37. The following proteins are involved in protein synthesis on ribosomes
(1) EF-TU (2) RF1
(3) RRF (4) EF-G
(5) IF2

What is the sequence of their involvent in the translation process ?
(A) 1, 5, 2, 3, 4 (B) 2, 3, 1, 4, 5
(C) 5, 2, 3, 1, 4 (D) 5, 1, 4, 2, 3

38. Choose the correct sequence of the following tools applied in proteomic
(I) MALDI – TOF (II) IEF
(III) SDS-PAGE (IV) Isolation of proteins
(A) III, II, I, IV (B) II, III, IV, I
(C) IV, II, III, I (D) I, III, IV, II

39. Five proteins with the following PI values were separated by isoelectric focusing
(1) 3.6 (2) 2.9
(3) 7.2 (4) 6.5 (5) 8.5

What is the order of their migration from the anode (closest to farthest) ?
(A) 5, 3, 4, 1, 2 (B) 3, 4, 5, 1, 2
(C) 2, 1, 4, 3, 5 (D) 5, 2, 3, 1, 4

40. Match the following :

	LIST-I		**LIST-II**
I	Somaclonal variation	1	Anther culture
II	Haploid culture	2	Suspension culture
III	Protoplast isolation	3	Callus culture
IV	Secondary metabolite production	4	Cell wall degrading enzymes

(A) I-2, II-3, III-4, IV-1 (B) I-4, II-1, III-2, IV-3
(C) I-3, II-2, III-1, IV-4 (D) I-3, II-1, III-4, IV-2

41. Match the items of Column – A with Column – B

	COLUMN -1		**COLUMN-2**
I	Plasma Membrane	1	DNA polymerase
II	Nucleus	2	5' Nucleotidase
III	Mitochondria	3	Catalase and peroxidase
IV	Microbodies	4	SDH

(A) I- 2, II-1, III-4, IV-3 (B) I- 1, II-2, III-3, IV-4
(C) I- 4, II-3, III-2, IV-1 (D) I- 3, II-4, III-2, IV-1

42. Which of the following pairs is not matched correctly ?
(A) Production of recombinant protein – Expression vector
(B) Type of molecular marker –
(C) Immunological detection method – ELISA
(D) Measurement of radioactivity – scintillation counting

43. Match the following

LIST - 1	**LIST - 2**
(I) Allosteric enzyme	(1) PDC
(II) Isoenzyme	(2) Acetyl CoA
(III) Multienzyme complex	(3) LDH
(IV) Coenzyme	(4) ATcase

(A) I-1, II-4, III-4, IV-2. (B) I-4, II-3, III-1, IV-2
(C) I-3, II-1, III-4, IV-2. (D) I-2, II-4, III-3, IV-1.

44. Which of the following pairs is matched correctly ?
(A) Protein involved in transcription termination in prokaryotes – RF1
(B) General transcription factor involved in initiation of transcription in eukaryotes – sigma factor
(C) Protein involved in elongation of translation – EF-TU
(D) Enzyme involved in unwinding of DNA helix – Topoisomerase

45. Which of the following pairs is not paired correctly?
(A) All family of repetitive elements – LINES
(B) Transposons identified in Drosophila – Pelement
(C) Tandemly repeated elements – VNTRs
(D) Mobile elements found in maize – Ac-Ds elements

46. Given below are two statements

Assertion (A) : Aminoacylation of t RNA is a very accurate process.

Reason (R) : Proof reading does not occur during aminoacylation of t RNA by aminoacyl tRNA synthetases.

Which of these statements are true ?
(A) Both A and R are true
(B) A is true, but R is false
(C) Both A and R are false
(D) A is false, but R is true

47. Given below are two statements

Assertion (A) : Lac operon is activated in bacteria by the presence of lactose in the medium.

Reason (R) : Lac operon is not affected by glucose concentration in the medium.

Which of these statements are true ?
(A) (A) is false, but (R) is true
(B) Both (A) and (R) are false
(C) Both (A) and (R) are true
(D) (A) is true, but (R) is false

48. **Assertion (A)** : (A) Monellin is a sweetner and it is a protein. When it is heated its sweetness is lost

Reason (R) : The reason for its sweetness lies in its confirmation
(A) A and R are correct
(B) A and R are wrong
(C) A is correct and R is wrong
(D) A is wrong and R is correct

49. In a flower odd sepal is anterior, petals arranged in dessendingly imbricate aestivation. This flowers belong to the family
(A) Fabaceae (s.s.) (B) Fabaceae (s.e.)
(C) Caesalpiniaceae (D) Mimosaceae

50. Taxonomy refers to
(I) Identification and Nomenclature
(II) Nomenclature and classification
(III) Classification
(IV) Classification and evolution

(A) I & IV (B) I & II
(C) I & III (D) II only

51. **Assertion (A)** : Based on formation of mucilage due to partial dissolution of outer pectin wall in water, spirogyra is also called pond silk.

Reason (R) : In a matured cell of Spirogyra the cytoplasm is peripheral with a central vacuole

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

52. Match the following

	LIST-I		**LIST-II**
I	Engler	1	Chemosystematic
II	Secondary metabolite	2	Oak metabolite
III	Natural system	3	Embryophyta siphanogama
IV	Nut	4	Alpha taxonomy
		5	Marigold

(A) I-4, II-1, III-3, IV- 5. (B) I-3, II-1, III-4, IV- 5
(C) I-4, II-1, III-3, IV- 2. (D) I-3, II-1, III-4, IV- 2.

53. Indicate the four correct statements from the following :
I) Cotton is used either alone or in combination with other fibres in manufacturing all types of textiles
II) Cotton seed oil is used as lubricant and the oil cake is used as poultry feed
III) Mercerised cotton is resulted by treating the cotton fibres with caustic soda
IV) The fuzz (short hairs) is used in preparation of pillows, cushions and mattresses
V) Cotton treated with nitric acid to produce gun powder, which is used in making explosives

(A) I, II, III & IV (B) I, III, IV & V
(C) II, III, IV & V (D) I, II, IV & V

54. The system of classification proposed by these scientists is also called as NeoAdansonian system
(A) Engler & Prantl (B) Bentham & Hooker
(C) Sokal & Sneath (D) Camp & Gilly

55. Pick up the wrong statement from the following :
(A) The rate of production of total organic material is known as gross primary productivity
(B) The balance energy or biomass remaining after meeting the cost of respiration of producers is called net primary productivity
(C) The productivity is of three kinds : primary, secondary and tertiary
(D) Net productivity = Gross productivity – Respiration and other losses

56. The several stages of hydrosere along with their suitable examples are given. Indicate the correct matches from them.
I) Plank stage – Diatoms
II) Woodland stage – Juncus
III) Floating stage – Nymphaea
IV) Submerged stage – Hydrilla
V) Reed swamp stage – Sagittaria

(A) I, II, III & IV (B) I, III, IV & V
(C) II, III, IV & V (D) I, II, III & V

57. Addition of consortium or cocktail of micro-organisms to the polluted soil is known as
(A) Biostimulation (B) Biomagnification
(C) Biofencing (D) Bioaugmentation

58. Match the following :

Column I	Column II
(1) Littoral and swamp	(I) Savannas forests
(2) Montane wet temperate	(II) Mangroves forests
(3) Natural grasslands	(III) Relics
(4) Species show a restricted distribution but cover large areas in course of time Progressive endemics	(IV) Sholas

(A) I-2, II-4, III-1, IV-5 (B) I-2, II-4, III-1, IV-3
(C) I-4, II-3, III-1, IV-5 (D) I-4, II-2, III-1, IV-3

59. The study of migration of birds is known as
(A) Phrenology (B) Phenology
(C) Pedology (D) Odentology

60. **Assertion (A)** : The Japanese and Philippine lakes are volcanic lakes in which the extreme chemical conditions are seen.

Reason (R) : Acid or alkaline lakes associated with volcanic regions are called volcanic lakes.

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

61. If the fertilized egg of a plant has 40 chromo-mes, the number of chromosomes present in the pollen mother cell is
(A) 80 (B) 160
(C) 40 (D) 60

62. The female gametophyte of a typical dicot (polygonum) at the time of fertilization is
(A) 8 nucleate and 7 celled
(B) 7 nucleate and 8 celled
(C) 4 nucleate and 4 celled
(D) 8 nucleate and 8 celled

63. **Assertion (A)** : In cleodic egg, the development of embryo is arrested in freshly laid eggs

Reason (R) : Freshly laid eggs show drop in temperature so they need incubation

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

64. Match the pattern of embryonic cleavage type (in List 1) with organisms (in List 2)

	LIST-I		**LIST-II**
I	Radial cleavage	1	Echinoderms
II	Spiral cleavage	2	Tunicates
III	Bilateral cleavage	3	Mammals
IV	Rotational cleavage	4	Annelids

(A) I-1, II-2, III-3, IV-4 (B) I-3, II-2, III-1, IV-4
(C) I-4, II-3, III-1, IV-2 (D) I-1, II-4, III-2, IV-3

65. During differentiation different cell types make different sets of proteins at several levels in following sequences
I) Differential gene transcription
II) Differential RNA translation
III) Differential RNA processing
IV) Differential protein modification

(A) III, II, I and IV (B) I, II, III and IV
(C) I, III, II and IV (D) I, IV, II and III

66. If the deleterious effect of a mutation in a gene are overcome by a mutation in another gene, the process is called
(A) Extra genetic (or) intragenic suppression
(B) Non-sense mutation
(C) Frame shift mutation
(D) Somatic mutation

67. Extra chromosomal inheritance of male sterility was discovered in maize by
(A) Dhawan and Paliwal
(B) M.(A) Overman and H.E. Warmke
(C) Jones and Clarke
(D) M.M. Rhodes

68. **Assertion (A)**: Mental and motor retardation and death by ages 2-4 years are phenotypic effects in the individuals of TaySachs disease.

Reason (R): In the individuals of TaySachs disease galactose-1-phosphate uridyl transferase fails to catalyze transformation of galactose into glucose.

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

69. **Assertion (A)** : Adapted characters acquired by an organism are not inherite(D)

Reason (R) : They do not get the sufficient time to be fixed at the genetic level.

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

70. **Assertion (A)** : Geological evidence indicates that free oxygen began accumulating in the atmosphere about two billion years ago.

Reason (R) : The free oxygen in the atmosphere is produced by cyanobacteria like forms.

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

71. **Assertion (A)** : The records of evolution of birds is sketchy.

Reason (R) : The pneumatic bones of birds make poor fossils.

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

72. Match List I with List II and select the correct answer using the codes given below the lists.

	LIST-I		LIST-II
I	Protopterus Australian	1	Australian Opossum
II	Opossum	2	Ethiopian
III	Sphenodon	3	Nearctic
IV	Prehensile	4	Neotropical tailed monkey

(A) I-2, II-3, III-1, IV-4 (B) I-2, II-1, III-3, IV-4
(C) I-4, II-1, III-3, IV-2 (D) I-4, II-3, III-1, IV-2

73. According to Darwinism which one represents the correct sequence of events in the origin of new species ?
(I) Natural selection
(II) Variation and their inheritance
(III) Survival of the fittest
(IV) Struggle for existence

The correct sequence of these scales from the earliest to the most recent
(A) I, II, III, IV (B) II, III, I, IV
(C) III, IV, I, II (D) IV, II, III, I
74. Enterokinase stimulates
(A) Trypsin (B) Trypsinogen
(C) Pepsin (D) Pepsinogen

75. In the detoxification of ammonia, the key intermediate product i.e., the synthesis of citrulline is appeared to be present in the following extra hepatic tissues
(I) Brain (II) Intestine
(III) Kidney (IV) Lungs

(A) I, II and III are correct
(B) I and II are correct
(C) I and III are correct
(D) I, III and IV are correct

ANSWER KEY 2012 PAPER II

QUE	ANS	QUE	ANS	QUE	ANS	QUE	ANS
1	C	16	A	31	B	46	A
2	C	17	B	32	B	47	D
3	A	18	B	33	A	48	B
4	B	19	C	34	C	49	C
5	C	20	A	35	B	50	C
6	B	21	A	36	A		
7	A	22	D	37	B		
8	C	23	B	38	D		
9	B	24	C	39	B		
10	B	25	A	40	A		
11	D	26	ALL	41	B		
12	A	27	C	42	B		
13	B	28	D	43	C		
14	D	29	B & C	44	B		
15	B	30	B	45	A		

ANSWER KEY 2012 PAPER III

Q.No	KEY	Q.No	KEY	Q.No	KEY
1	B	26	B	51	B
2	D	27	A	52	D
3	A	28	A	53	B
4	C	29	C	54	C
5	B	30	A	55	C
6	D	31	A	56	B
7	D	32	C	57	D
8	C	33	D	58	A
9	D	34	C	59	B
10	B	35	A	60	A
11	B	36	B	61	C
12	B	37	D	62	A
13	B	38	C	63	A
14	A	39	C	64	D
15	C	40	D	65	C
16	C	41	A	66	A & D
17	B	42	B	67	D
18	C	43	B	68	C
19	B	44	C	69	C
20	A	45	A	70	A
21	C	46	B	71	A
22	A	47	D	72	A
23	A	48	A	73	D
24	C	49	A & B	74	B
25	A	50	C	75	B

2013

PAPER -II

1. Choose the correct sequence in signal transduction pathway.
I. Hormone II. 7 TM Receptor
III. G. Protein IV. C AMP
V. PKA

(A) I → II→ III→IV→V (B) II→ III→IV→V→ I
(C) III→IV→V→ I → II (D) IV→V→ I→ II→ III

2. Identify the correct order of seminal tract in male reproductive system
(A) Vasa deferens, Ejaculatory duct, epididymis, Urethra.
(B) epididymis, Vasa deferens, Ejaculatory duct, Urethra
(C) Ejaculatory duct, Vasa deferens, epididymis, Urethra
(D) epididymis, Ejaculatory duct, Vasa deferens, Urethra

3. The correct sequence of gastrulatioin in frog is.
I. Involution II. Epiboly
III. Inavagination IV. convergance

(A) III and IV are correct
(B) I and II are correct
(C) I, II and III are correct
(D) IV and I are correct

4. Origin of first seed palnts occurred during
(A) Carboniferus (B) Ordovician
(C) Devonian (D) Silurian

5. The 11 th conference parties to CBD meeting was held at
(A) Bangalore (B) Kolkata
(C) New delhi (D) Hyderabad

6. Write the order of rhizosphere effect in applied agriculture
I. Algae II. Fungi
III. Bacteria IV- Actinomycetes
(A) I ,II ,III ,IV (B) II, III ,IV ,I
(C) III ,IV, I,II (D) IV ,I ,II ,III

7. In the cell cycle of a typical eukaryote, the sequence of events operating at the time of cell division is
(A) S phase → G2 phase → G1 phase → M phase
(B) S phase → M phase → G1 phase → G2 phase
(C) S phase → G2 phase → M phase → G1 phase
(D) S phase → G1 phase → M phase → G2 phase

8. Specify the order of fractionation upon application of the following organellae in cell-free extract in differential centrifugation
I. Nucleus II. Golgi
III. Peroxisomes IV. Mitochondria

(A) II, III, IV and I (B) III, II, IV and I
(C) I, IV, III and II (D) I, IV, II and III

9. Match inventors in List I with discoveries in List II.

	List I		List II
I.	Knoll and Ruska	1.	Restriction endonuclease
II.	Meellis	2.	Electron microscopy
III.	Arber and Smith	3.	Reverse transcriptase
IV.	Baltimore	4.	PCR

(A) I- 2,II- 4,III- 1, IV- 3 (B) I- 3, II- 4 ,III- 2, IV- 1
(C) I- 3,II- 4,III- 1, IV- 2 (D) I-2 ,II- 4, III- 3, IV -1

10. Arrange the following “suffixes” of names of taxonomic ranks from top rank to low in the light of ICBN rules
1. “ales” 2. “oideae”
3. “opsida” 4. “aceae”
(A) 1, 2, 3, 4 (B) 1, 3, 2, 4
(C) 3, 1, 4, 2 (D) 3, 2, 1, 4

11. Specify sequential order of occurrence of the following events for utilisation of lactose by E. coli cells
I. Synthesis of all biomolecules needed for growth
II. Metabolism of galactose and glucose through glycolytic pathway
III. Hydrolysis of lactose to galactose and glucose
IV. Transport of lactose into E. coli cells

(A) I, II, III, IV (B) II, I, III, IV
(C) IV, III, II, I (D) III, I, IV, II

12. Given below are two statements :

Assertion (A) : DNA fragments / molecules are usually separated on Agarose gels but not on polyacrylamide gels in an electrical field.

Reason (R) : Agarose gels contain smaller size pores through which DNA molecules of larger size migrate easily.

(A) A is true but R is not correct explanation for A
(B) A is true and R is false
(C) Both A and R are false
(D) A is false but R is true

13. Pick up the correct combinations from the following :

1. Rhizophora mucronata – halophyte
2. Capparis aphylla – xerophyte
3. Salicornia herbacea – hydrophyte
4. Picea species – sciophyte

(A) 1, 2 and 3 (B) 1, 2 and 4
(C) 1, 3 and 4 (D) 1 and 3

14. Brinjal, cabbage, cauliflower lettuce, potato, radish and tomato belong to
(A) only one plant family
(B) two plant families
(C) three plant families
(D) four plant families

15. In pseudo allelism, genes are
(A) structurally allelic and functionally non-allelic
(B) structurally as well as functionally non-allelic
(C) functionally allelic and structurally non-allelic
(D) structurally as well as functionally allelic

16. Haemolysis is the process in which
(A) All the blood cells are destroyed
(B) Only RBC are destroyed
(C) Only WBC are destroyed
(D) Only platelets are destroyed

17 . Consider the following statements : Linkage is the phenomenon in which
1. The effect of linkage is more clearly noticeable in back cross generation
2. The intensity of linkage between two genes is indirectly proportional to the distance between them
3. Linked genes do not show independent segregation
4. The frequency of recombination between two linked genes can not exceed 50% Which of the statements given above are correct ?

(A) 1, 2 and 4 (B) 2, 3 and 4
(C) 1, 3 and 4 (D) 1, 2 and 3

18. Match the following pathogen and related type of vaccine.

	List - I		**List - II**
I.	Hepatitis – A	1.	Live attenuated
II.	Rotavirus	2.	Inactivated
III.	Tetanus	3.	Recombinant
IV.	Hepatitis – B	4.	Inactivated exotoxin

(A) I-1, II-2, III- 3, IV- 4 (B) I- 2, II- 3, III- 4, IV- 1
(C) I- 2, II- 1, III- 4, IV- 3 (D) I- 4, II- 3, III- 2, IV- 1

19. **Assertion (A)** : Genetic engineering can be used to develop transgenic animals capable of producing proteins of pharmaceutical value, process called Pharming.

Reason (R) : Proteins of this type are not made in an active form by microorganisms or by plants. Which of these statements are **correct** ?

(A) A is correct but R is wrong
(B) Both A and R are correct
(C) Both A and R are wrong
(D) R is correct but A is wrong

20. Match the following :

	List - I		**List - II**
I.	Latimeria	1.	Connecting link
II.	Archaeopteryx	2.	Mutation theory
III.	HMS Beagle	3.	Living Fossil
IV.	Evening Primrose	4.	Charles Darwin

(A) I-1 , II-3, III- 4,IV- 2 (B) I-3,II-1 ,III-4,IV- 2
(C) I- 1, II- 3, III- 2,IV- 4 (D) I-3 ,II-1 ,III-2,IV- 4

21. **Assertion (A)** : Geographical isolation occurs when original population is divided by geological barrier.
Reason (R) : These population due to mutation in their gene pool do interbreed when they contact again.

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

22. **Assertion (A)** : Rapid extinction of species observed in tropical countries.

Reason (R) : Intensive agriculture practices are common in tropical countries.

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

23. Small intestine consists of these parts
I. Duodenum II. Jejunum
III. Ileum IV. Caecum

(A) I, II and III are correct
(B) I, II and IV are correct
(C) I, III and IV are correct
(D) II, III and IV are correct

24. Which one of the following cell is diploid ?
(A) Primary polar body
(B) Spermatid
(C) Primary spermatocyte
(D) Spermatozoa

25. Which of the following pair of plants are C4 plants?
I. Maize, Sugarcane II. Pea, Rose
III. Potato, Rice IV. Sorghum, Bajra

(A) I & II are correct (B) III & II are correct
(C) II & IV are correct (D) I & IV are correct

26. Which one of the following is correctly matched ?

A	The number of individuals in each population in any ecosystem is limited	Carrying capacity
B	The common plant used as green manure	Salicornia
C	Epiphytic orchids are abundantly seen	moist deciduous forest
D	Amphibious plant	Nymphaea

27. **Assertion (A)** : Overgrazing contributes to "endemism".

Reason (R) : Overgrazing affects the species diversity.
In the context of above statements, which one of the following statement is correct ?

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

28. Cell cycle regulators are
(A) cdks (B) cyclins
(C) cyclins and cdks (D) cyclases

29. Sperm lysins include
I. Hyaluronidase II. Acrosin
III. Pepsin IV. Antifertilizin

(A) I & II are correct (B) II & III are correct
(C) III & IV are correct (D) I & IV are correct

30. **Assertion (A)** : Translocation heterozygotes are semisterile and accompanied with multivalent association.
Reason (R) : The gametes formed through alternate disfunction are functional while those formed by adjacent disfunction are non viable.

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

31. Arrange the following in correct path of energy flow in an ecosystem :
1. decomposers 2. herbivores
3. producers 4. carnivores

(A) 3, 2, 4, 1 (B) 2, 3, 4, 1
(C) 1, 3, 2, 4 (D) 1, 2, 3, 4

32. Study the following lists and match them :

	List - I		**List - II**
I.	20th century	1.	Genetic engineering studies
II.	18th century	2.	Taxonomy and physiology
III.	17th century	3.	Role of chromosomes in heredity
IV.	19th century	4.	Discovery of cell
		5.	Laws of Inheritance

(A) I-1, II- 2, III- 4, IV- 5 (B) I-3, II-2, III-4, IV- 5
(C) I- 1, II- 2, III- 5, IV- 4 (D) I-3, II- 4, III- 2, IV- 5

33. Transcription activator protein
(A) Transcribe a message off a DNA template
(B) Bring regions near in eukaryotic gene and allow gene to be transcribed
(C) Bind to ribosomes to activate the production of specific protein
(D) Are essential to function of tRNA during translation

34. Which of the following sequences is most common in territorial behaviour ?
(A) Threat, combat, advertisement
(B) Advertisement, threat, combat
(C) Combat, threat, advertisement
(D) Threat, advertisement, combat

35. The faithful replication of genomic DNA is facilitated by
I. Insertion of correct complementary bases as guided by the template DNA strand
II. Proof reading function of DNA pol III
III. Proof reading function of DNA pol I
IV. 5′ → 3′ exonuclease activity of DNA pol III
(A) I and IV are correct
(B) II and III are correct
(C) II, III and IV are correct
(D) I, II and III are correct

36. **Assertion (A)** : The Larynx or voice box is responsible for the production of sound and the pitch of voice.

Reason (R) : Without vocal cords help the sound cannot be produce(D)

(A) Both 'A' and 'R' true and 'R' is the correct explanation
(B) Both 'A' and 'R' true but 'R' is not the correct explanation
(C) 'A' is true but 'R' is false
(D) 'A' is false but 'R' is true

37. Match the following blood cells and their nucleus shape.

	List – I (Blood cell)		**List – II (Nucleus shape)**
I.	Neutrophils	1.	Bi-lobed
II.	Eosinophils	2.	Kidney shape
III.	Basophils	3.	Multi lobed
IV.	Limphocytes	4.	Oval shape Code

(A) I-3 , 1-II ,III-2,IV- 4
(B) I- 1,II- 2,III- 4,IV- 3
(C) I-2, II- 1, III- 4,IV- 3
(D) I-4,II- 2,III- 1,IV- 3

38. List I consists of some terms and List II includes their corresponding examples. Select the code showing correct matching.

	List – I (Terms)		**List – II (Examples)**
I.	Guttation	1.	Shrinkage of cells in hypertonic solution
II.	Imbibition	2.	Loss of water in transpiration
III.	Plasmolysis	3.	Swelling of seeds during germination
IV.	Diffusion	4.	Exudation of water from leaves

(A) I-4 ,II- 3,III- 1,IV- 2
(B) I- 3, II- 1,III- 2,IV- 4
(C) I- 1,II- 3,III- 4, IV- 2
(D) I-2,II- 3,III- 1,IV- 4

39. Match the following :

	List – I		**List – II**
I.	Hapten	1.	Necrosis
II.	J-chain	2.	Shoot apex
III.	High con(C) of Auxinin	3.	Monovalent
IV.	Sudden death of cells	4.	IgA

(A) I-1, II- 2,III- 3,IV- 4
(B) I-4 ,II-3 ,III-2,IV- 1
(C) I-3,II- 4,III- 2,IV- 1
(D) I-2,II- 3,III- 1,IV- 4

40. **Statement (A) :** Both chlorophyll a and chlorophyll b contain C, H, O, N and Mg. However they differ structurally.

Reason (R) : Chlorophyll a and chlorophyll b differ with each other with regard to the number of carbon and nitrogen atoms. In the context of above two statements which one of the following is correct ?

(A) A is wrong R is correct
(B) A is wrong B is wrong
(C) A is correct B is wrong
(D) A is correct B is correct

41. If in 8 hours an exponentially growing cell population increases from 62 × 10 to 92 × 10 cells/ml, calculate generation time
(A) 51.6 min
(B) 87.2 min
(C) 21.8 min
(D) 10.9 min

42. Given below are two statements, one labeled as **Assertion (A)** and other labeled as **Reason (R)**.

Assertion (A) : In the zygote, there is no cytoplasmic contribution from parental side.

Reason (R) : The cytoplasmic part of the sperm is discarded just before fertilization.

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

43. Which one of the following is **NOT** correct matched pair ?
(A) Sigma factor – Transcription
(B) Rho factor – Translation
(C) Amino acyl – Attachment of synthetase amino acid to Trna
(D) Primase – DNA replication

44. Which one of the pairs is **NOT** correctly matched ?
(A) P element – Drosophila
(B) Composite transposon – Tn10
(C) Complex transposon – Tn3
(D) Retro transposon – Mu

45. Given below are two statements.

Assertion (A) : In view of availability of amino acids – Histidine and Tryptophan in the medium, their synthesis by E. coli cells does not take place.

Reason (R) : Synthesis of the above two amino acids by E. coli cells is regulated by attenuation process.
(A) A is wrong and R is correct
(B) A is correct and R is correct explanation of A
(C) A and R are wrong
(D) A is correct and R is wrong

46. DNA microarray technique
I. is used to assess transcription from multiple genes at a time
II. works best for organisms whose genomes are completely sequenced
III. Uses gene chip IV. Scanners employ lasers, special microscope and camera to create image of array
(A) I, II, III, IV are correct
(B) I, II, III are correct
(C) I, III, IV are correct
(D) I, III are correct

47. An operon consists of
I. Promotor
II. Operator
III. Functionally related structural genes
IV. Transcription of functionally related structural genes from a single promoter

(A) I and II are correct
(B) II and III are correct
(C) I, II, III and IV are correct
(D) I, II and IV are correct

48. Phaeoporphyrin nucleus of chlorophyll a contains _____ double bonds in a conjugated fashion.
(A) 10 (B) 11
(C) 13 (D) 9

49. In photosystem II of photosynthesis, the order of flow of electrons through different carriers
(A) Plastoquinone, plastocyanin, cytochrome – 559, cytochrome – 553
(B) Plastoquinone, cytochrome – 559, cytochrome – 553, plastocyanin
(C) Plastocyanine, plastoquinone, cytochrome – 559, cytochrome – 553
(D) Cytochrome – 559, cytochrome – 553, plastoquinone, plastocyanin

50. Xenobiotic compounds are recalcitrant because they are
(A) Not recognized as substrate by micro organisms
(B) Chemically not stable
(C) Highly non-toxic to micro-organisms
(D) Recognized as substrate by micro organisms

Paper III

1. The class interval of the continuous grouped data of 10 – 19, 20 – 29, 30 – 39, 40 – 49, 50 – 59 is
(A) 9 (B) 10
(C) 12 (D) 20

2. Nucleosome consists of
(A) Octomeric complex (H2A, H2B, H3 and H4) + Linker DNA
(B) Non histone proteins and DNA
(C) Histone proteins alone
(D) Less dense euchromatin

3. Match the following:

	List I		List II
I.	Christe	1.	Ribosomal structure
II.	Linus Pauting	2.	Mitochondrial and Corey structure
III.	Mitchell	3.	Protein structure
IV.	Venkataraman	4.	Chemoosmotic hypothesis

(A)I- 2,II- 3,III- 4,IV- 1 (B) I-3,II- 2,III- 4,IV- 1
(C) I-4,II- 1,III- 3,IV- 2 (D) I-1 ,II-2,III- 3,IV- 4

4. Arrange the compounds in ascending order based on their energy content
I. Glucose 6-phosphate II. ATP
III. Phosphoenol pyruvate IV. Creatine phosphate
(A) I II III IV (B) II IV I III
(C) IV III II I (D) III IV II I

5. **Assertion (A)** : Larger proteins over 40 kb can pass through nuclear pons in eukaryotes.

Reasoning (R): Entry of larger proteins carrying nuclear localisation sequence through nuclear pons is allowe(D)

(A) Both A and R are true and R is the correct explanation
(B) Both A and R are true but R is the false explanation
(C) A is true but R is false
(D) A is false but R is true

6. A phosphoglyceride is constituted with
I. Fatty acids II. Glycerol
III. Phosphate IV. Head alcohol

(A) I and II are correct (B) II and III are correct
(C) I and III are correct (D) I, II, III and IV are correct

7. Glycogen and cellulose consist of 100% D-glucose but they differ in
(A) Glycosidic bonds (B) Covalent bonds
(C) Ionic bonds (D) Peptide bonds

8. T-cell receptors are transmembrane structures consisting of
(A) Four polypeptide chains (2β + 2α)
(B) Two polypeptide chains (1β + 1α)
(C) Three polypeptide chains (2β + 1α)
(D) One polypeptide chain (α)

9. Which one of the following pairs is NOT correctly matched?
(A) Stress protein Hsp 70
(B) Decline phase Secondary metabolites
(C) Log phase Exponential growth
(D) Pro toxin Inactive toxin

10. In a classical model of transcription, a repressor binds to
(A) An enhancer (B) AUG sequence
(C) An operator (D) TATA Box

11. Given below are two statements:
Assertion (A) : In fermentation glucose consumption by yeast cells increases.
Reasoning (R): Yeast cells generate only two ATP molecules for one glucose molecule.

(A) A is correct, R is also correct
(B) A is wrong but R is correct
(C) A is correct but R is wrong
(D) Both A and R are wrong

12. Which one of the following pairs is NOT correctly matched?
(A) The gas responsible for global warming CO_2
(B) Plants growing in acid soils Oxylophytes
(C) Mangrove region in Andhra Pradesh Coringa
(D) Ecology is the study of structure and function of nature Tansley

13. **Statement (A) :** Atmospheric pressure is one of the factors influencing rate of transpiration. As the atmospheric pressure decreases, the rate of transpiration increases.
Reasoning (R) : The plants growing in high altitude places exhibit xerophytic characteristics.

In the light of above two statements which one of the following is correct?
(A) Both the statements are correct
(B) Both the statements are wrong
(C) A is correct but R is wrong
(D) A is wrong but R is correct

14. Match isotopes in List I with emissions in List II:

	List I		List II
I.	Cobalt – 60	1.	No emission
II.	Carbon – 14	2.	Gamma rays
III.	Nitrogen – 15	3.	Beta rays
IV.	Phosphorus – 31	4.	Stable

(A) I- 2,II- 3,III- 1,IV- 4 (B) I-3,II- 1,III- 2,IV- 4
(C) I-2,II-4 ,III-1 ,IV-3 (D) I- 4,II- 2 ,III-3 ,IV-1

15. **Assertion (A)** : Metagenomic cloning gives large numbers of novel genes.
Reason (R) : In metagenomics, genes for useful products are cloned directly from environmental samples without first isolating the organisms that carry them.
(A) Both A and R are false
(B) Both A and R are true, R is correct explanation
(C) A is true but R is not correct explanation
(D) A is false but R is not correct explanation

16. β-galactosidase enzyme hydrolyses
(A) Isopropyl β-thiogalactosidase
(B) X-gal
(C) Maltose
(D) Sucrose

17. Choose the correct sequence of the following steps for determination of sequence of residues of amino acids in peptide.
I. Recovery of N-terminal amino acid as phenyl thiohyadantoin derivative
II. Retrieving of peptide shortened by one amino acid residue for the repetitive cycles of the events III. Coupling reaction between peptide and phenyl isothiocyanate
IV. Exposure of phenyl thiocarbamoyl derivative of peptide to dry acid vapours
(A) II, I, III and IV (B) III, IV, I and II
(C) I, II, IV and III (D) IV, III, II and I

18. Limits for correlation co-efficient
(A) $-1 \leq r \leq 1$ (B) $1 \leq r \leq 0$
(C) $-1 \leq r \leq 0$ (D) $1 \leq r \leq 2$

19. Match the following lists:

	List I (Transcription Factors)		**List II (Activity)**
I.	TF II A	1.	TATA Box recognition
II.	TF II B	2.	Recruitment of RNA pol II
III.	TF II D	3.	Selection of start point of transcription
IV.	TF II F	4.	Stabilizes TBP binding

Code :

	I	**II**	**III**	**IV**
(A)	4	3	1	2
(B)	2	3	4	1
(C)	4	3	2	1
(D)	2	4	1	3

20. In spectroscopic methods, absorption of radiation energy by solute molecules generally depends on
I. Concentration of solute in solution
II. Path length of cuvettes used
III. Thickness of walls of cuvettes used
IV. Inherent property of solute

(A) I and II are correct
(B) I, II and III are correct
(C) I, II and IV are correct
(D) I, II, III and IV are correct

21. Which one of the following is **NOT** correct associated pair?
(A) DNA polymerase PCR
(B) Reverse transcriptase cDNA library
(C) EPSP synthase Leucine
(D) DNase I Foot printing

22. The orderly arrangement of biosensor activation
(A) Biological material + Analyte → Bound analyte → Biological response → Electronic response → Measurement
(B) Biological material + Analyte → Biological response → Bound analyte → Electronic response → Measurement
(C) Biological material + Analyte → Electronic response → Biological response → Bound analyte → Measurement
(D) Measurement → Electronic response → Biological response → Bound analyte → Biological material + Analyte

23. Which hormones help in breaking the dormancy of seed?
I. ABA II. CK
III. GA IV. IAA
(A) II and III are correct (B) I, II, IV are correct
(C) II, III, IV are correct (D) I and III are correct

24. Yeast artificial chromosome (YA(C) is used for
(A) Cloning large segment of DNA
(B) Cloning only yeast genomic sequences
(C) Cloning of only cDNA sequences
(D) All DNA except plant DNA sequences

25. Courtship behaviour is a form of
(A) Taxis
(B) Imprinting
(C) Fixed action pattern
(D) Kinesis

26. Match the following used in plant tissue culture:

	List I		List II
I.	Meristem culture	1.	Virus elimination
II.	Suspension	2.	Homozygosity culture
III.	Protoplast culture	3.	Packed cell volume
IV.	Anther culture	4.	Liposome

Code:

	I	II	III	IV
(A)	1	2	3	4
(B)	1	3	2	4
(C)	1	4	3	2
(D)	4	3	2	1

27. The chromosomes whose number and morphology do not differ between males and females of a species are called
(A) Autosomes
(B) Allosomes
(C) Giant chromosomes
(D) Heterosomes

28. Which one of the following pairs serves as biofertilisers?
(A) Aspergillus and Actinomycetes
(B) Albugo and Nostoc
(C) Azotobacter and Nostoc
(D) Pseudomonas and E. coli

29. The ecozones of ocean are
I. Polar zone II. Temperate zone
III. Tropical zone IV. Boreal zone
(A) I, II and III are correct
(B) I and IV are correct
(C) I, II and IV are correct
(D) II, III and IV are correct

30. Intrinsic apoptotic pathway consists of
I. Caspase – 3 – activation
II. Mitochondrial changes
III. Apoptosome formation
IV. Caspase – 9 – activation

The correct order of the events is
(A) II, III, IV, I (B) I, II, III, IV
(C) IV, III, II, I (D) III, II, I, IV

31. Which one of the following is **NOT** correctly matched?
(A) The precursor amino acid for IAA biosynthesis is – tryptophan
(B) Guard cells differ from epidermal cells with regard to – chloroplasts
(C) Ascent of sap takes place through – phloem
(D) In C4 pathway, CO_2 is fixed by – PEP carboxylase

32. Which of the following pairs is correctly matched?
(A) Programmed cell death at site of Infection - Hyper-sensitive response
(B) Hormone upregulated during flooding stress - IAA
(C) Pathogen-derived resistance - Enveloped gp of virus
(D) Gamma immunoglobulin - Pentameric

33. In two-component regulatory system for regulation of nitrogen assimilation (Ntr) in many bacteria, which is the response regulator for activation of transcription promoters of genes recognized by sigma factor 38?
(A) NR I (B) NR II
(C) P II (D) P I

34. Consider the following fruits
1. Sapota 2. Guava 3. Papaya

Which of the above are berry type of fruits?
(A) 1 and 2 only (B) 1 and 3 only
(C) 2 and 3 only (D) 1, 2 and 3

35. **Assertion :** DNA replication is discontinuous.

Reasoning : DNA polymase can synthesize DNA in 3' – 5' direction only.

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

36. Given below are two statements:

Assertion (A) : Certain effector enzymes catalyze the rapid production of water soluble molecules.

Reason (R) : The water soluble molecules – cAMP, cGMP, IP_3 act as second messengers.

(A) A is true and R is false
(B) A is true and R is true
(C) A is false and R is false
(D) A is false and R is true

37. Specify sequence of binding of the following components for formation of functional complex in translation process in prokaryotes
I. 30S. ribosomal subunit + IF3 + IF1
II. 50S. ribosomal subunit
III. F met – tRNA – IF2
IV. mRNA

(A) IV, I, III and II (B) I, II, III and IV
(C) III, I, II and IV (D) II, III, I and IV

38. Events in cell transformation by a virus-induced cancer.
I. Infection
II. Integration
III. Transcription
IV. Translation
V. Transformation

(A) I, II, III, IV, V (B) II, III, IV, V, I
(C) III, IV, V, I, II (D) IV, V, I, II, III

39. If a cross is made between two plants of Aa, Bb, cc, Dd and Aa, bb, CC, DD genotypes, then what will be the expected frequency of obtaining a progeny with AA, Bb, Cc, Dd ?
(A) 1/16 (B) 1/32
(C) 1/64 (D) 1/128

40. Identify the correct sequence of process in animal development:
(A) Cell differentiation – regional specification – morphogenesis – growth
(B) Regional specification – cell differentiation – morphogenesis – growth
(C) Morphogenesis – regional specification – cell differentiation – growth
(D) Regional specification – cell differentiation – growth – morphogenesis

41. **Assertion (A)** : Potato tubers do not sprout immediately after harvest.
Reason (R) : Immediately after harvest, potato tubers contain high amount of abscissic acid which prevents sprouting.

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

42. The activation of sperm in mammals is known as
(A) Acrosome reaction (B) Capacitation
(C) Fertilization (D) Cortical reaction

43. In the biosynthesis of sesquiterpene the following are the intermediates
I. Isopentyl pyrophosphate
II. Geranyl pyrophosphate
III. β-hydroxy – B – methyl – glutaryl CoA
IV. Mevalonic acid diphosphate
The correct order of intermediates leading to the synthesis of sesquiterpene is

(A) I, II, IV, III (B) III, II, I, IV
(C) IV, III, II, I (D) III, IV, I, II

44. **Assertion (A)** : Competence is the ability of the cell responding to induction.

Reason (R) : Enzyme complement of the embryonic cell to adopt to metabolites.

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

45. In photosynthesis, the products of light phase reactions are
(A) Carbohydrates, Oxygen
(B) Glucose, CO_2 , ATP
(C) ATP, $NADPH^+_2$, Oxygen
(D) Oxygen, Glucose, ATP

46. Arrange the following stomach layers in order from the upper part to inner in a transverse section. Use the code given below :
I. Mucus coat II. Submucous coat
III. Peritoneal coat IV. Muscular coat

Code :
(A) I, II, III, IV (B) II, III, I, IV
(C) III, IV, II, I (D) III, IV, I, II

47.

	List I (Theories of evolution/ (Proposed by) inheritance)		List II
I.	Catastrophism	1.	Cuvier
II.	Inheritance of	2.	Lamarck acquired characters
III.	Preformation	3.	Bonnet
IV.	Pangenesis	4.	Darwin

Code:

	I	II	III	IV
(A)	1	2	3	4
(B)	4	3	2	1
(C)	1	3	2	4
(D)	4	2	3	1

48. In prokaryotes, cell division apparatus, called Divisome is constituted with

I. Fts Z II. Zip A
III. Fts A IV. Fts I

(A) I and II are correct
(B) I and III are correct
(C) I, II and III are correct
(D) I, II, III and IV are correct

49. Match List I with List II and select the correct answer using the codes given below the list

	List I(Structure)		**List II**(Availability)
I.	Amnion	1.	Mammalian ovum
II.	Primitive streak	2.	Amphibian gastrula
III.	Dorsal lip of	3.	Chick's gastrula blastapore
IV.	Zona radiata	4.	Reptilian embryo

Codes :

	I	II	III	IV
(A)	4	3	2	1
(B)	4	2	3	1
(C)	3	4	2	1
(D)	3	4	1	2

50. The Beta subunit of RNA polymerase is inhibited by

I. Rifampicin II. Actinomycin D
III. Streptoly digin IV. Mitomycin C

(A) I, II and III are correct
(B) I and II are correct
(C) I and III are correct
(D) I, III and IV are correct

51. **Statement (A) :** The major phytohormones are IAA, GA and AB(A) Ethylene induces the ripening of fruits.

Reasoning (R): Parthenocarpic fruits can be induced by exposure with ethylene. In the context of above two statements which one of the following is correct?

(A) A is wrong, R is correct
(B) A is correct, R is correct
(C) A is wrong, R is wrong
(D) A is correct, R is wrong

52. **Assertion (A)** : The pulmonary arteries carry the deoxygenated blood to the lungs where exchange of gases takes place.

Reason (R) : Without pulmonary arteries the deoxygenated blood cannot be carried to lungs.

(A) Both 'A' and 'R' are true, but 'R' is not the correct explanation
(B) Both 'A' and 'R' are true and 'R' is the correct explanation
(C) 'A' is true but 'R' is false
(D) 'A' is false but 'R' is true

53. The two parts of brain stem are
(A) Cerebrum and Pons Varolii
(B) Medulla Oblongata and Spinal Cord
(C) Pons Varolii and Cerebellum
(D) Pons Varolii and Medulla Oblongata

54. Which one of the following is correctly matched?
(A) Gibberellins induce - Internodal elongation
(B) Artificially synthesized auxin - 2, 4 – D
(C) Citric acid is a - Secondary metabolite
(D) The most abundant enzyme protein on the earth is - Rubisco

55. In a population the Hardy – Weinberg equilibrium would not prevail in the
(A) presence of random mating
(B) absence of selection
(C) presence of mutation
(D) absence of immigration or emigration

56. **Assertion (A)** : Mendel did not explain the phenomenon of linkage.

Reason (R) :Factors (genes) for all seven characters in garden pea considered by Mendel are present in different chromosomes.

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

57. **Assertion (A)** : Neutral theory of protein evolution suggest random evolutionary changes in proteins.

Reason (R) : Such mutations are assumed to be adaptively equivalent.
(A) Both A and R are true and R is the correct explanation
(B) Both A and R are true but R is not the correct explanation
(C) A is true but R is false
(D) A is false but R is true

58. The genes P, Q, R and S are linke(D) The cross over map distances as determined by two point crosses are :R – P = 7; S – Q = 10; P – Q = 8; S – P = 2 and R – S = 5. Based on the above data indicate the relative positions of the linked loci from the following :
(A) RSPQ (B) SPRQ
(C) RPSQ (D) SPQR

59. Miller proved the organic compounds were basis of life using the following gases:
I. Methane II. Ammonia
III. Hydrogen IV. Water vapour

Code:
(A) I, II and III are correct
(B) I and II are correct
(C) II and III are correct
(D) I, II, III and IV are correct

60. Major mechanisms for the termination of receptor-dependent signal transduction are in the order
I. Receptor inactivation II. Receptor internalization
III. Receptor down-regulation
(A) I, II, III correct (B) II, III, I correct
(C) I, III, II correct (D) II, I, III correct

61. Given below are two statements, one labeled as Assertion (A), and the other labeled as Reason (R).
Assertion (A) : The fruits of ground nut plant are not nuts but underground pods. **Reason (R)** : The pods will not develop until the fertilised ovary is pushed under the soil. In the context of the above two statements which one of the following is correct?
(A) Both (A) and (R) are true and (R) is the correct explanation of (A)
(B) Both (A) and (R) are true but (R) is not a correct explanation of (A)
(C) (A) is true but (R) is false
(D) Both (A) and (R) are false

62. Vanillin, a popular flavouring agent for ice creams, is obtained from
(A) latex (B) leaf
(C) fruit (D) root

63. Assertion 'A' : Unsustainable population growth, increased natural resource consumption and unplanned development are the causes of loss of biodiversity.

Reason 'R' : Deficiency of knowledge concerning natural ecosystem, over exploitation of natural resources, pollution, global climate change are also the causes.
In the context of the above two statements which one of the following is correct ?
Codes :
(A) 'A' is correct, but 'R' is wrong
(B) Both 'A' and 'R' are wrong
(C) Both 'A' and 'R' are correct
(D) 'A' is wrong, but 'R' is correct

64. The gram-negative plant pathogen Agrobacterium tumefaciens contains a large plasmid used in production of transgenic plants called
(A) Ri plasmid (B) Ag plasmid
(C) E plasmid (D) Ti plasmid

65. In the experimentation pertaining to prove the DNA as genetic material the following scientists contribute(D) Arrange them in chronological order.
1. Avery, MacLeod and McCarty
2. Griffith
3. Hershey and Chase
(A) 3, 2, 1 (B) 2, 3, 1

(C) 2, 1, 3 (D) 3, 1, 2

66. Which one of the following families has sepals, petals, stamens and carpels in the ratio of 2 : 2 : 3 : 1 ?
(A) Asteraceae (B) Brassicaceae
(C) Liliaceae (D) Solanaceae

67. In a nitrogen cycle the sequence of events in the order beginning with death are
(A) Ammonification, Nitrification, Denitrification, Decomposition
(B) Decomposition, Ammonification, Nitrification, Denitrification
(C) Denitrification, Decomposition, Ammonification, Nitrification
(D) Nitrification, Ammonification, Denitrification, Decomposition

68. The term grey crescent is associated with the region in the egg of
I. Animal pole II. Vegital pole
III. Frog IV. Chick

(A) I & II are correct (B) II & III are correct
(C) III & IV are correct (D) I & III are correct

69. The correct sequence in which these occur with in a cell to form enzymes leading to the adaptive potential of an organism is
I. Transcription II. Configuration
III. Translation IV. Replication
Code :
(A) I, IV, III and II are correct
(B) IV, I, II and III are correct
(C) I, IV, II and III are correct
(D) IV, I, III and II are correct

70. When the plants are subjected to a stress of low temperature
I. Abscissic acid increases
II. Gibberellic acid increases
III. Both Abscissic acid and Gibberellic acid decrease
IV. Gibberellic acid decreases

(A) I & IV are correct (B) I & II are correct
(C) II and III are correct (D) II & IV are correct

71. The bony labyrinth contains these structures :
I. Vestibule II. Semicircular canals
III. Circular canals IV. Cochlea

(A) I, II and III are correct
(B) I, III and IV are correct
(C) II, III and IV are correct
(D) I, II and IV are correct

72. Which one of the following pairs is **NOT** correctly matched?
(A) C-shaped cartilages - Trachea
(B) Voice Box - Larynx
(C) Pharynx - Passage way for both air and food
(D) Oxygenated blood - Pulmonary artery

73. Consider the following features :
I. Population consists of inter breeding groups of individuals
II. Population does not form the basis as unit of study in population genetics
III. Gene frequency is the important single index characterizing the population Which of these are characteristic of Mendelian population?
(A) I and II (B) I and III
(C) II and III (D) I, II and III

74. Number of chromosomes in a diploid plant is 24. Indicate the correct number of chromosomes in the endosperm, in an order, obtained by the following crosses.
I. Male 2n × female 4n
II. Male 4n × female 2n
III. Male 2n × female 2n
IV. Male 4n × female 8n

	I	II	III	IV
(A)	60	48	36	120
(B)	72	72	48	144
(C)	60	72	48	120
(D)	72	48	36	144

75. Match List I with List II and select the correct answer using the codes given below the lists :

	List I (Name of plant)		**List II** (Characteristic compoun(D)
I.	Coleus blumei	1.	Morphine
II.	Papaver	2.	Scopolamine somniferum
III.	Datura stramonium	3.	Digitalin
IV.	Stevia rebaudiana	4.	Stevioside
		5.	Rosmarinic acid

Code :

	I	II	III	IV
(A)	3	1	2	4
(B)	5	2	3	4
(C)	2	3	5	4
(D)	5	1	2	4