SUBJECT CODE	SUBJECT	PAPER
A-09-03	LIFE SCIENCES	III

HALL TICKET NUMBER								

OMR SHEET NUMBER					

QUESTION BOOKLET NUMBER

DURATION	MAXIMUM MARKS	NUMBER OF PAGES	NUMBER OF QUESTIONS
2 HOUR 30 MINUTES	150	24	75

This is to certify that, the entries made in the above portion are correctly written and verified.

Candidate's Signature _____ **Name and Signature of Invigilator** _____

Instructions for the Candidates

1. Write your Hall Ticket Number in the space provided on the top of this page.
2. This paper consists of seventy five multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested **to open the booklet and compulsorily examine it as below** :
   (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
   (iii) After this verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example: (A) (B) ● (D)
   where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Answer Sheet given to you**. If you mark at any place other than in the circle in the Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. **The candidate must handover the OMR Answer Sheet to the invigilators at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. The candidate is allowed to take away the carbon copy of OMR Sheet and used Question paper booklet at the end of the examination.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table etc., is prohibited.**
12. **There is no negative marks for incorrect answers.**

అభ్యర్థులకు సూచనలు

1. ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్ టికెట్ నంబరు రాయండి.
2. ఈ ప్రశ్న పత్రము డెభ్భైఐదు బహుళైచ్ఛిక ప్రశ్నలను కలిగి ఉంది.
3. పరీక్ష ప్రారంభమున ఈ ప్రశ్నాపత్రము మీకు ఇవ్వబడుతుంది. మొదటి ఐదు నిమిషములలో **ఈ ప్రశ్నాపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా సరిచూసుకోండి.**
   (i) ఈ ప్రశ్న పత్రమును చూడడానికి కవర్‌పేజి అంచున ఉన్న కాగితపు సీలును చించండి. స్టిక్కర్ సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నాపత్రమును మీరు అంగీకరించవద్దు.
   (ii) **కవరు పేజి పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్నపత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను సరిచూసుకోండి. పేజీల సంఖ్యకు సంబంధించి గానీ లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా నిజప్రతి కాకపోవుట లేదా ప్రశ్నలు క్రమపద్ధతిలో లేకపోవుట లేదా ఏవైనా తేడాలుండుట వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని వెంటనే మొదటి ఐదు నిమిషాల్లో పరీక్షా పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగ్గా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అదనపు సమయం ఇవ్వబడదు.**
   (iii) పై విధంగా సరిచూసుకొన్న తర్వాత ప్రశ్నాపత్రం సంఖ్యను OMR పత్రము పై అదేవిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నాపత్రము పై నిర్దిష్టస్థలంలో రాయవలెను.
4. ప్రతి ప్రశ్నకు నాలుగు ప్రత్యామ్నాయ ప్రతిస్పందనలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతిప్రశ్నకు సరైన ప్రతిస్పందనను ఎన్నుకొని కింద తెలిపిన విధంగా OMR పత్రములో ప్రతి ప్రశ్నా సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన ప్రతిస్పందనను సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్‌తో కింద తెలిపిన విధంగా పూరించాలి.
   ఉదాహరణ : (A) (B) ● (D)
   (C) సరైన ప్రతిస్పందన అయితే
5. ప్రశ్నలకు ప్రతిస్పందనలను ఈ ప్రశ్నపత్రముతో ఇవ్వబడిన OMR పత్రము పైన ఇవ్వబడిన వృత్తాల్లోనే పూరించి గుర్తించాలి. అలాకాక సమాధాన పత్రంపై వేరొక చోట గుర్తిస్తే మీ ప్రతిస్పందన మూల్యాంకనం చేయబడదు.
6. ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
7. చిత్తుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీస్థలములో చేయాలి.
8. OMR పత్రము పై నిర్ణీత స్థలంలో సూచించవలసిన వివరాలు తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గానీ లేదా ఇతర చిహ్నాలను పెట్టడం గానీ చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
9. **పరీక్ష పూర్తయిన తర్వాత మీ OMR పత్రాన్ని తప్పనిసరిగా పరీక్ష పర్యవేక్షకుడికి ఇవ్వాలి.** వాటిని పరీక్ష గది బయటకు తీసుకువెళ్లకూడదు. పరీక్ష పూర్తయిన తరువాత అభ్యర్థులు ప్రశ్న పత్రాన్ని, OMR పత్రం యొక్క కార్బన్ కాపీని తీసుకువెళ్లవచ్చు.
10. **నీలి/నల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.**
11. **లాగరిథమ్ టేబుల్స్, క్యాలిక్యులేటర్లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్షగదిలో ఉపయోగించడం నిషేధం.**
12. **తప్పు సమాధానాలకు మార్కుల తగ్గింపు లేదు.**

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LIFE SCIENCES

Paper – III

1. The standard free energy change for oxidative phosphorylation using NADH as a substrate is about – 53 Kcal/mole and the free energy in the 2.5 moles of ATP generated is –17.5 Kcal/mole. You can conclude all of the following EXCEPT

(A) Only about 33% of the free energy in NADH was used to generate ATP

(B) About 66% of the free energy in NADH was converted to heat

(C) Overall change in free energy of the reaction was –35.5 Kcal/mole

(D) Oxidative phosphorylation is a reversible reaction

2. Match the following segments of an average human gene with respect to the number of base pairs in each segment.

List I Gene segment	**List II** Number of base pairs
I. 5' untranslated region	1. 1400
II. Coding sequence	2. 27000
III. 3' untranslated region	3. 800
IV. Intron sequence	4. 300

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

3. In Meselson and Stahl's experiment, the heavy DNA was replicated in the presence of light nucleotides. What results would have been seen in the first generation of products, if replication is conserved ?

(A) Half of the duplexes would be heavy and half would be light

(B) All the duplexes would be intermediate in density

(C) Half of the duplexes would be heavy and half would be intermediate in density

(D) All the duplexes would be light

4. Src Protein possesses the following catalytic activity

(A) Tyrosine kinase

(B) Serine kinase

(C) Phosphoinositide kinase

(D) GTPase

5. Morphogenetic fields reflect

(A) Developmental potency

(B) Polarity but not Axis

(C) Break of communication

(D) Developmental fate

6. Match the following concerning the precursor of phytohormone and its physiological action.

List – I	List – II
I. Methionine	1. Delay in senescence
II. Acetyl coenzyme A	2. Phototropism
III. Tryptophan	3. Fruit ripening
IV. Adenosine monophosphate	4. α-amylase synthesis

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

7. Glutathione (GSH) prevents damage of the Haemoglobin (Hb). To keep GSH in reduced state which of the following enzyme found in RBC is necessary ?

(A) Glucose-6-phosphate dehydrogenase

(B) Fructose-6-phosphate dehydrogenase

(C) Glyceraldehyde-3-phosphate dehydrogenase

(D) Phosphofructokinase

8. A newborn is noted to have microcephaly after birth. His mother is 38-year-old. She also has a 5-year-old son who is mentally retarded and she had one previous second-trimester miscarriage. In addition, she has a genetic disease that required a special diet, but she discontinued the diet many years ago. On physical examination, the infant's weight and length are both below the 10th percentile for his gestational age. He is also noted to have a grade III systolic ejection murmur best heard at the lower left sternal border. Which of the following conditions does the mother most likely to have ?

(A) Fragile X Syndrome

(B) Galactosemia

(C) Hypothyroidism

(D) Phenylketonuria

9. The following are the drugs obtained one each from root, stem bark, leaf and fruit. Arrange them in the correct sequence. Use the codes given.

I. Atropine *(Atropa)*

II. Quinine (*Cinchona*)

III. Brahmi *(Centella)*

IV. Opium *(Papaver)*

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

10. **Assertion (A) :** Eutrophic refers to lakes that are highly productive in terms of organic matter and well supplied with nutrients.

Reason (R) : The lakes receives point source of wastes and supporting thick algal growth.

(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) is false

11. **Assertion (A) :** Assortative mating involving individuals of similar phenotype cause the change in the frequency of genotypes in the resulting population.

Reason (R) : Random mating under ideal conditions facilities the unaltered frequency of alleles and phenotypes across generations.

(A) A is true

(B) R is true

(C) Both A and R are true

(D) Both A and R are false

12. Match the following at left with appropriate answer given in the right.

List – I	**List – II**
I. *Escherichia coli*	1. Recombinent vaccine
II. Foot & Mouth disease vaccine	2. Endospore
III. Toxoid vaccine	3. Single cell protein
IV. *Bacillus subtilis*	4. Potable water test
V. Yeast	5. Tetanus

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

13. We have a mixture of proteins with following properties

	MW	$_{P}I$
Protein 1	12 kDa	10
Protein 2	62 kDa	4
Protein 3	28 kDa	6
Protein 4	9 kDa	5

Predict the order of emergence of these proteins when a mixture of the four is chromatographed in DEAE cellulose of pH 7.0.

(A) 1, 3, 4, 2

(B) 2, 4, 3, 1

(C) 2, 3, 1, 4

(D) 4, 1, 3, 2

14. **Assertion (A) :** The peptide bonds in a protein have partial double bond character.

Reason (R) : The planar peptide group limits polypeptide conformations.

(A) Both A and R are false

(B) Both A and R are true and R is the consequence of A

(C) A is true but R is false

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

15. **Assertion (A) :** Vertebrate cells use several different CdKs to manage various transitions in the cells cycle, yet budding yeast is able to get by with a single CdK.

Reason (R) : In yeast the single CdK (CdK1) binds to different cyclins. These cyclins could activate CdK1 and also influence its target specificity.

(A) A is correct but R is not correct explanation

(B) A is not correct but R is correct

(C) Both A and R are correct

(D) Both A and R are incorrect

16. Which of the following sequence of events occur in *E. coli* and are released from catabolite repression by transfer to low glucose medium ?

(A) cAMP level rises, cAMP binds to CAP. cAMP-CAP complex binds to the site on a DNA and activates transcription.

(B) cAMP level rises, cAMP binds to CAP, cAMP-CAP complex binds to the site on a DNA and represses transcription.

(C) cAMP level rises, cAMP binds to CAP, cAMP-CAP complex is removed from a site on DNA and activates transcription.

(D) cAMP level falls, cAMP is removed from CAP, CAP then binds to a site on DNA and activates transcription.

17. H-ras and K-ras oncogenes differ with C-ras in aminoacid substitution at these positions

(A) 12, 59, 61

(B) 12, 60, 64

(C) 11, 60, 61

(D) 12, 60, 61

18. In chick gastrulation the following events occur.

I. Formation of posterior marginal zone

II. Elaboration of hypoblast

III. Formation of primitive streak

IV. Formation of primitive node

Of the above events which are associated with the beginning of the gastrulation.

(A) I and II

(B) II and III

(C) III and IV

(D) I and IV

19. Arrange the following events in photorespiration in correct order starting from oxygenation of Ribulose-1,5-bis phosphate.

I. Decarboxylation of glycine

II. Oxidation of glycolate

III. Deamination of serine

IV. Reduction of hydroxy pyruvate

(A) I III IV II

(B) II I III IV

(C) II III I IV

(D) IV I II III

20. In fast glutamate neurotransmission

I. Glutamate is inhibitory neurotransmitter

II. Release of neurotransmitter by microionophoresis

III. The neurotransmitter carries positive charge at physiological pH

IV. 35-40% of synapses use glutamate as neurotransmitter

Identify the correct pair of distractors

(A) I and II

(B) II and IV

(C) I and III

(D) III and IV

21. A geneticist studying the number of bristles on the second leg of *Drosophila melanogaster* determined that a wild-type strain has a mean number of 486.3 bristles per leg. A sample of males and females from this population with 420 bristles were bred and the offspring had a mean bristle number of 432. What is the h2 for this population ?

(A) 0.82

(B) 0.28

(C) 0.84

(D) 0.50

22. In this method of speciation the new species evolves in geographical isolation from the parent species.

(A) Sympatric speciation

(B) Parapatric speciation

(C) Allo-parapatric speciation

(D) Allopatric speciation

23. Arrange the following atmospheric layers in order to nearest to farthest from surface of the earth.

I. Exosphere

II. Mesosphere

III. Ionosphere

IV. Stratosphere

V. Troposphere

(A) V IV II III I

(B) V II III IV I

(C) I V IV III II

(D) V III IV I II

24. **Assertion (A) :** Species is composed of populations whose members mate with each other member and produce fertile offspring.

Reason (R) : According to Earnst-Mayor species groups of actually interbreeding natural populations which are reproductively isolated from other such groups.

(A) Both (A) and (R) are wrong

(B) Both (A) and (R) are correct and (R) is a correct explanation to A

(C) Only (A) is correct and (R) is wrong

(D) Both (A) and (R) are correct but (R) is not correct explanation to (A)

25. In the fermentative production of vinegar by two fermenting organisms namely *Saccharomyces* sp. and *Acetobacte*r sp., the biochemical function of each organism

(A) Saccharomyces sp. ferments glucose to vinegar and *Acetobacter* sp. stabilizes it to give sour taste

(B) *Acetobacter* sp. ferments glucose to ethanol and *Saccharomyces* oxidizes it to acetic acid

(C) *Acetobacter* sp. ferments glucose to acetic acid and *Saccharomyces* sp. oxidizes it to vinegar

(D) *Saccharomyce*s sp. ferments glucose to ethyl alcohol and *Acetobacter* sp. oxidizes it to acetic acid

26. Which of the following are the types of mass analysers in Mass Spectroscopy ?

1. ESI
2. TOF
3. MALDI
4. Quadrupole
5. Electron Multiplier

(A) 1 and 3 are correct

(B) 2 and 4 are correct

(C) 3 and 5 are correct

(D) 1, 3 and 5 are correct

27. In the leucine Zipper DNA binding domain at what position is the leucine present in the primary sequence ?

(A) Every 3^{rd}

(B) Every 7^{th}

(C) Every 9^{th}

(D) Every 5^{th}

28. The chloroplast genes encode both RNAs and proteins involved in gene expression as well as a variety of proteins that function in photosynthesis. Arrange the following in the order of highest to lowest number of gene encoded by chloroplast DNA.

1. tRNAs
2. Photosystem I
3. Photosystem II
4. Ribosomal proteins
5. Ribulose bis phosphate carboxylase

(A) 5 2 3 4 1

(B) 1 4 3 2 5

(C) 5 3 2 4 1

(D) 1 4 5 2 3

29. The higher order structure of DNA shows symmetry, whereas the higher order structures of most proteins do not. Why a protein does not take a more regular shape like DNA ?

(A) DNA has one main function in cells whereas proteins have many

(B) The many different amino acid R groups in proteins confer different shapes

(C) Some S amino acids cause proteins to bend, others cause proteins to flatten

(D) All the above statements are correct

30. Fusion protein expression helps in

I. Elevated stability

II. Expression analysis

III. Easy purification

IV. Localization studies

(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

31. The following is the criteria for purity of an enzyme.

(A) Enzyme activity

(B) Specific activity

(C) SDS-PAGE

(D) Gel-filtration chromatography

32. Match the following :

List – I	List – II
I. Spina bifida	1. Caudal element
II. N-catherin	2. Neural tube
III. Primary neurulation	3. Adhesion molecule
IV. Chordoneural hinge	4. Failure of posterior neuropore to close
	5. Anencephaly

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

33. Arrange the following enzymes in proper sequence in carbon assimilation pathway in CAM plants beginning with nocturnal opening of stomata.

I. Phosphoenolpyruvate carboxylase

II. Ribulose 1,5-bisphosphate carboxylase

III. Malic enzyme

IV. Malate dehydrogenase

(A) IV, III, II, I

(B) I, III, IV, II

(C) IV, I, III, II

(D) I, IV, III, II

34. **Assertion (A) :** Reproductive timing is much more important in female vertebrates because of a relatively high degree of reproductive investment by them.

Reason (R) : Biologically eggs are more expensive to produce than are sperms.

(A) Both (A) and (R) wrong

(B) Both (A) and (R) are correct, and (R) is correct explanation to (A)

(C) Both (A) and (R) are correct but (R) is not correct explanation to (A)

(D) Only (A) is correct and (R) is wrong

35. Which one of the following conditions correctly describes the manner of determining the sex in the given example ?

(A) Homozygous sex chromosomes (XX) produce male in *Drosophila*

(B) Homozygous sex chromosomes (ZZ) determine female sex in birds

(C) XO type of sex chromosomes determine male sex in grasshopper

(D) XO condition in humans as found in Turner Syndrome, determines female sex

36. Pick up the correct combinations from the following

I. Eastern Himalayas – Rich phytodiversity enriched with primitive angiosperms

II. Eastern Ghats – Shola forests

III. Western Ghats – Silent valley

IV. Sheshachalam hills – *Pterocarpus santalinus*

(A) I, II, III and IV

(B) I, III & IV only

(C) I, II & IV only

(D) II, III & IV only

37. Genetic drift is resulted due to

I. Founder effect

II. Large populations

III. Small populations

IV. Bottleneck effect

(A) I and II

(B) I, III and IV

(C) I, II and IV

(D) III and IV

38. Match the following with the appropriate answer given at the right to the one given at left.

I. Penicillin	1. Cellulose
II. Root nodule	2. Chemoautotroph
III. *Nitrosomonas sp.*	3. Secondary metabolite
IV. *Trichoderma reesei*	4. Phosphate nutrition
V. Mycorrhizae	5. Biological enrichment

Identify the correct matching from the following :

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

39. Assertion (A) : DNA fingerprinting technique examine non-coding STRs in samples from individuals.

Reason (R) : The number of repeats in a STR at any given site on DNA does not vary among individuals.

(A) Both A and R are false

(B) Both A and R are true and R is the correct explanation

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

(D) A is true but R is false

40. Among the following compounds which two components cannot form hydrogen bonds with water.

i. Methanol

ii. Toluene

iii. Methyl Acetate

iv. Hexane

(A) (i) and (iii) are correct

(B) (ii) and (iv) are correct

(C) (ii) and (iii) are correct

(D) (i) and (iv) are correct

41. Assertion (A) : If the mutant ARF1 were the only form of ARF 1 in the cell, it is likely that it would prove lethal.

Reason (R) : Disassembly of the COPI coat requires hydrolysis of GTP by ARF1 and thus all ARF1-mediated transport involving COPI-coated vesicles would be blocked in the cells with mutant ARF1.

(A) A is true and R is correct explanation

(B) A is true but R is not correct explanation

(C) A and R are not correct

(D) A is not correct but R is correct

42. **Assertion (A) :** Every chromosome, during metaphase, has two chromatids.

Reason (R) : Synthesis of DNA takes place in the S-phase of interphase.

(A) Assertion is true statement but Reason is false

(B) Assertion is false statement but Reason is true

(C) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion

(D) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion

43. Killer lymphocytes trigger apoptosis in target cell by activation of

(A) Procaspase 8

(B) Procaspase 9

(C) Procaspase 3

(D) Procaspase 8 or 10

44. Left – Right Axis formation in chick envisages the following :

I. Signalling for asymmetry is initiated

II. Establishment of left and right coordinator

III. Induction of Asymmetric gene expression

IV. Asymmetric expression of transcription factors

V. Establishment of mid line block

Arrange them in correct sequence that leads to the formation of Left-Right Axis formation.

(A) I $\rightarrow$ II $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ V

(B) II $\rightarrow$ III $\rightarrow$ I $\rightarrow$ IV $\rightarrow$ V

(C) II $\rightarrow$ I $\rightarrow$ III $\rightarrow$ V $\rightarrow$ IV

(D) II $\rightarrow$ III $\rightarrow$ I $\rightarrow$ V $\rightarrow$ IV

45. Match the following :

List – I	**List – II**
I. PMA	1. Increase vase-life period of cut flowers
II. 2,4-D	2. Reduce transpiration
III. Ethephon	3. Suppression of elongation growth
IV. BAP	4. Eradication of weeds

Code :

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

46. During the muscle contraction, the following events are seen

I. Power stroke develops

II. Action potential develops on sarcolemma

III. Loosening of the tie between Troponin and Actin

IV. Release of Ca^{++} ions from the cistern of 'T' tubule

V. Sliding of Actin

Arrange these in correct sequence to depict the muscle contraction.

(A) II, IV, III, I and V

(B) I, II, III, IV and V

(C) II, III, IV, V and I

(D) I, III, IV, V and II

47. **Assertion :** An organism with lethal mutation may not even develop beyond the zygote state.

Reason : All types of gene mutations are lethal.

(A) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion

(B) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion

(C) Assertion is a true statement but Reason is false

(D) Both Assertion and Reason are false

48. Arrange the following, which they appeared, in the chronological order. Use the codes given below.

I. Classification of Angiosperms by Takhtajan

II. Classification of Anthophyta by Bessey

III. Species plantarum by Linnaeus

IV. Genera plantarum by Bentham and Hooker

(A) III, IV, II and I

(B) IV, III, II and I

(C) II, III, IV and I

(D) III, IV, I and II

49. **Assertion (A) :** r-selected populations have a high intrinsic rate of growth and tend to 'boom' when environmental conditions are favourable.

Reason (R) : K'-selected populations have relatively constant density at or near the carrying capacity of the environment

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

50. Match the following for an appropriate answer from the right to the term given in the left.

I. Obligate parasitic pathogen	1. Poliovirus
II. Pathogen of eukaryotic nature	2. *Salmonella typhi*
III. Pyogenic pathogen	3. *Tryponema pallidum*
IV. Agent to cause enteric fever	4. *Staph aureus*
V. Dermatophytic pathogen	5. *Candida albicans*
VI. Pathogen affecting nervous system	6. *Trichophyton rubrum*

Code :

	I	II	III	IV	V	VI
(A)	2	4	3	6	5	1
(B)	3	2	1	6	5	4
(C)	4	5	2	3	6	1
(D)	3	5	4	2	6	1

51. Widely used gene sequences for the determination of phytogenetic relation of different species

I. Rubisco large subunit encoding gene

II. γ-RNA gene

III. Cytochrome oxidase gene

IV. t-RNA gene

(A) I and III

(B) I, II and III

(C) I, II and IV

(D) I, III and IV

52. Which of the following is an example of a negative interaction of a species ?

(A) Symbiosis

(B) Predation

(C) Mutualism

(D) Proto-cooperation

53. Assertion (A) : Fluorescence involves emission of electromagnetic radiation by matter upon excitation.

Reason (R) : The wavelength of absorbed radiation must be higher than that of emitted radiation.

(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) Both A and R are false

(D) A is true but R is false

54. The sidechains of which of the following amino acids can be phosphorylated in proteins ?

i. Tyrosine

ii. Glycine

iii. Aspartic acid

iv. Serine

(A) (ii) and (iii) are correct

(B) (i) and (ii) are correct

(C) (ii) and (iv) are correct

(D) (i) and (iv) are correct

55. In the membrane of human red blood cell, the ratio of the mass of protein (average MW = 50000) to phospholipid (average MW = 800) to cholesterol (MW = 386) is about 2 : 1 : 1. How many lipid molecules are there for every protein molecule ?

(A) 104

(B) 65

(C) 84

(D) 95

56. **Assertion :** Replication and transcription occur in the nucleus but translation occurs in the cytoplasm.

Reason : mRNA is transferred from the nucleus into the cytoplasm where ribosomes and amino acids are available for protein synthesis.

(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.

(B) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

(C) Assertion is true statement but Reason is false.

(D) Both Assertion and Reason are false statements.

57. Phosphorylation of retinoblastoma (Rb) protein results in the following :

(A) Activation of genes required in G-phase

(B) Activation of gene required in S-phase

(C) Repression of genes required in S-phase

(D) Repression of genes required in M-phase

58. **Assertion (A) :** Development of Eye lens from epidermis is a established example of embryonic induction process.

Reason(R) : The exact nature of stimulus for lens induction is not known, although RNA has been implicated as a messenger.

(A) Both (A) and (R) correct, but (R) is not correct explanation for (A).

(B) Only (A) is correct (R) is wrong

(C) Both (A) and (R) wrong

(D) Both (A) and (R) correct, (R) is correct explanation for (A)

59. Match the following :

List – I (Protein with)	List – II (Substance)
I. Copper	1. *Cytochrome*
II. Non-heme iron	2. *Nitrate reductase*
III. Molybdenum	3. *Ferredoxin*
IV. Heme iron	4. *Plastocyanin*

Code :

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

60. Match the following :

List – I	List – II
I. FSH	1. Steroid
II. Progesterone	2. Polypeptide
III. Relaxin	3. Nonapeptide
IV. Vasopressin	4. Carbohydrate
	5. Glycoprotein

Code :

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

61. **Assertion :** The adapted characters acquired by an organism are not inherited.

Reason : They do not get sufficient time to be fixed at genetic level.

(A) Both Assertion and Reason are true and the Reason is the correct explanation of Assertion.

(B) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

(C) Assertion is a true statement but Reason is false.

(D) Both Assertion and Reason are false.

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

List – I (Name of the plant	**List– II** (Characteristic compound
I. *Papaver somniferum*	1. Vincristine
II. Artemisia cina	2. Morphine
III. Catharanthus roseus	3. Pyrethrum
IV. Chrysanthemum cinerariaefolium	4. Santonin
	5. Quinine

Code :

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

63. The succession starts from the primitive substratum where there was no previously any sort of living matter is known as

(A) Primary succession

(B) Secondary succession

(C) Autogenic succession

(D) Allogenic succession

64. Bio-fertilizer organisms enhance the plant growth; biopesticides kill crop pests. Which one of the following is correctly matched ?

(A) Rhizobium, Trichoderma – Biofertilizers

(B) Baculoviruses, Nostoc – Biopesticides

(C) Mycorrhizae, Actinorhiza – Biopesticides

(D) Azotobacter, Aztobacter – Biofertilizers

65. Assertion (A) : Real time PCR is widely used for measuring levels of gene espression.

Reason (R) : Capillary electrophoresis is used for the separation of amplified products in real time PCR.

(A) Both A and R are true

(B) Both A and R are false

(C) A is true but R is false

(D) A is false but R is true

66. In an anion exchange chromatography the bound protein is eluted by

I. increasing salt concentration

II. decreasing salt concentration

III. increasing pH of the buffer

IV. decreasing pH of the buffer

(A) I and IV are correct

(B) I and III are correct

(C) II and IV are correct

(D) II and III are correct

67. **Assertion (A) :** Removal of bark as a ring (Ringing) results in the death of the tree.

Reason (R) : Ringing results in disruption of Xylem strands.

(A) Both (A) and (R) are true and (R) is the correct explanation for (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation for (A)

(C) (A) is true but (R) is false

(D) (A) is false but (R) is true

68. Match the following buffers with their pH range

I. Acetate buffer	1. 7.8 – 8.8
II. Tris HCl buffer	2. 2.8 – 4.0
III. Phosphate buffer	3. 4.0 – 5.0
IV. Citrate buffer	4. 6.0 – 7.2

Code :

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

69. *E-coli* cells may divide into two cells every 15 minutes in a particular medium. If 1000 cells are inoculated in a culture, how many cells are produced after 4 hours of time ?

(A) 4,09,60,000

(B) 48,96,00,000

(C) 4,89,600

(D) 40,96,000

70. A transposon has been removed and inversed the sequences shown in the box

5′ AT GCTAATGGCT AA3′
3′ TA CGATTACCGA TT5′

The correct rearranged DNA sequences is:

(A) 5′ ATCGATTACCGAAA 3′
3′ TAGCTAATGGCTTT 5′

(B) 5′ ATTCGGTAATCGAA 3′
3′ TAAGCCATTAGCTT 5′

(C) 5′ ATAGCCATTAGCAA 3′
3′ TATCGGTAATCGTT 5′

(D) 5′ ATGCTAATGGCTAA 3′
3′ TACGATTACCGATT 5′

71. Match the following codons with their corresponding amino acid.

I. Arg	1. UAA
II. Stop	2. AAU
III. Met/Start	3. AGG
IV. Asn	4. AUG

Code :

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

72. The first biosphere reserve established in India is

(A) Nanda Devi

(B) Nilgiri

(C) Sunderbans

(D) Gulf of Mannar

73. The following are the parts of Renal tubule

I. Bowman's capsule

II. Collection tubule

III. Distal convoluted tubule

IV. Proximal convoluted tubule

V. Duct of Bellini

Arrange these in a sequence to depict the functional Renal tubule

(A) I → II → III → IV → V

(B) I → III → IV → V → II

(C) I → IV → III → II → V

(D) I → IV → V → III → II

74. Mixed lymphocyte reaction test is carried out to determine

(A) MHC I function

(B) MHC II function

(C) Both MHC I and MHC II functions

(D) Antibody secretion

75. Match the following techniques to their applications in protein analysis.

1. Mass spectroscopy	I. Solution structure
2. X-ray diffraction	II. Secondary structure
3. Nuclear Magnetic Resonance	III. Molecular Mass
4. Circular Dichroism	IV. Crystal structure

Code :

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

Space for Rough Work

Space for Rough Work

Space for Rough Work