



Previous Year Question Paper
of

SET – MAHARASHTRA
LIFE SCIENCES: Paper – III
State Eligibility Test

2013, December

(Original Question Paper with Answer Key)

State Eligibility Test



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Test Booklet No.

प्रश्नपत्रिका क्र.

M

Paper-III

LIFE SCIENCE

Signature and Name of Invigilator

1. (Signature)

(Name)

2. (Signature)

(Name)

Seat No.

(In figures as in Admit Card)

Seat No.

(In words)

OMR Sheet No.

(To be filled by the Candidate)

DEC - 34313**Time Allowed : 2½ Hours]****[Maximum Marks : 150****Number of Pages in this Booklet : 24****Number of Questions in this Booklet : 75**

Instructions for the Candidates

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- This paper consists of 75 objective type questions. Each question will carry two marks. All questions of Paper-III will be compulsory, covering entire syllabus (including all electives, without options).
- At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
 - 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 or open booklet.
 - Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to missing pages/questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.**
 - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- Each question 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 : where (C) is the correct response.

(A)	(B)	(C)	(D)
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- Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only**. If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done at the end of this booklet.
- If you write your Name, Seat Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
- You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and duplicate copy of OMR Sheet on conclusion of examination.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table, etc., is prohibited.**
- There is no negative marking for incorrect answers.**

विद्यार्थ्यांसाठी महत्वाच्या सूचना

- परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
- सदर प्रश्नपत्रिकेत 75 बहुपर्याय प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून घ्याव्यात.
 - प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
 - पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून घ्यावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.
 - वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
- प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळा करावा.
उदा. : जर (C) हे योग्य उत्तर असेल तर.

(A)	(B)	(C)	(D)
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- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
- आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
- प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
- जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांनी मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
- फक्त निळा किंवा काळा बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

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Life Science
Paper III

Time Allowed : 2½ Hours]

[Maximum Marks : 150

Note : This Paper contains **Seventy Five (75)** multiple choice questions, each question carrying **Two (2)** marks. Attempt *All* questions.

1. The following tree species are common in Sahyadri range of Western Ghats :

- (A) Arjun, Kuda, Kamla
- (B) Poplar, Castanea, Dhavda
- (C) Abies, Deodar, Waras
- (D) Pine, Chinar, Kakad

2. Location of merismatic zone in a sporophyte of *Anthoceros* is :

- (A) Apical
- (B) Intercalary
- (C) Basal
- (D) Diffused

3. Ring porous wood results due to :

- (1) Continuous activity of cambium
- (2) Seasonal activity of cambium
- (3) Interrupted activity of cambium
- (4) Abnormal origin of cambium

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

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4. The immediate product of meiosis in pollen mother cells are :
- (A) Male gametes
- (B) Male gametophytes
- (C) Microspores
- (D) Pollen grains
5. 'Eugenol' the antiseptic active chemical compound which is used in dental surgery is obtained from :
- (A) Steam distillation of flower buds of *Eugenia caryophyllata*
- (B) Steam distillation of bark of *Cinnamomum camphora*
- (C) Steam distillation of *Cinnamomum zeylanica*
- (D) Steam distillation of *Cinnamomum tamala*
6. C_3 plant with a transpiration ratio of 500 have a water use efficiency of :
- (A) 0.001
- (B) 0.002
- (C) 0.003
- (D) 0.004
7. A vegetative shoot apex exposed to a certain condition will be converted to flowering shoot apex. Which of the following is most appropriate condition to achieve this ?
- (A) Increase in the endogenous levels of GA
- (B) Achievement of minimum apex size
- (C) Low level of carbohydrate supply
- (D) Exposure to low light conditions

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8. Which of the following groups of species exhibits lack of interbreeding depression ?
- (A) Self pollinated
 - (B) Apogamous and apomictic
 - (C) Cross pollinated
 - (D) Hybrids
9. The relationship expressed in the word pair Amoeba : Protozoologist also exists in :
- (A) Filaria : Parasitologist
 - (B) Spider : Archaeologist
 - (C) Cobra : Ichthyologist
 - (D) Cockroach : Etymologist
10. Presence of lung fish in Australia, Africa and South America is said to be a consequence of :
- (A) Convergent evolution
 - (B) Adaptive radiation
 - (C) Continental drift
 - (D) Parallel evolution
11. Which four of the following six statements explain why erythrocytes have specialised for oxygen transport ?
- (i) The erythrocytes contain haemoglobin
 - (ii) Erythrocytes lack a nucleus
 - (iii) Erythrocytes contain an abundance of carbonic anhydrase
 - (iv) The biconcave shape of the erythrocyte provides a large surface area for diffusion of gas molecules
 - (v) Erythrocytes can bind up to four oxygen molecules to each hemoglobin molecule
 - (vi) Erythrocytes contain mitochondria and thus generate ATP
- (A) (i) (iii) (v) (vi)
(B) (ii) (iii) (iv) (v)
(C) (i) (iv) (v) (vi)
(D) (i) (ii) (iv) (v)

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12. In amphibians, due to injury lens is damaged, it is replaced by iris tissues through reprogramming of differentiation. It is referred to as :
- (A) Dedifferentiation
(B) Dedifferentiation and transdifferentiation
(C) Re-commitment and differentiation
(D) Redifferentiation
13. In most of the vertebrates the eggs are asymmetrical, particularly in the distribution of cytoplasmic determinants. Upon fertilization, there is reorganization of cytoplasmic determinants. In tunicates, it is evident in the formation of :
- (A) Diffusion of yolk
(B) Epibody
(C) Grey crescent
(D) Fate maps
14. A randomly interbreeding population of animals is known as :
- (A) Panmictic
(B) Oligomictic
(C) Endemic
(D) Pandemic
15. The two greatest challenges a parasite faces are moving itself or its progeny from one host to another (transmission) and overcoming the host's defenses. Some parasites are transmitted from host parent to her offspring as in case of *Wolbachia* bacteria which are transmitted in insects' eggs. This is known as :
- (A) Vertical transmission
(B) Horizontal transmission
(C) Virulence
(D) Parasite-host interactions

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16. The association between a Crab living in molluscan shell and a sea anemone, in which the former carries the latter, is mutually beneficial. It is termed as :
- (A) Phoretic commensalism
(B) Mutualism
(C) Protoco-operation
(D) Symbiosis
17. A genotype involving three alleles A1, A2, A3 at a locus with their corresponding gene frequencies $p = 0.2$, $q = 0.5$ and $r = 0.3$ and if the population attains the equilibrium stage, the genotype A, A and A3 A3 will be in the following proportion :
- (A) 0.10, 0.06
(B) 0.04, 0.09
(C) 0.25, 0.15
(D) 0.06, 0.06
18. Point mutation induced in a codon UAC to UAU gives rise to which mutation ?
- (A) Non-sense
(B) Missense
(C) Silent
(D) Frame shift
19. In Hardy-Weinburg law gene and gene frequencies remain constant from generation to generation. Gene frequency changes in randomly mating large population can be brought out by :
- (A) Epistasis, imprinting
(B) Mutation, selection, migration
(C) Position effect variegation
(D) Bottlenecks, random genetic drift and epistasis
20. Exposure to UV light causes mutations and this may result in changes in phenotype or lethality. These mutations are due to :
- (A) Formation thymine dimers
(B) Deamination of bases
(C) Tautomerization of bases
(D) Mismatching of bases

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21. In yeast, anaphase promoting complex triggers the separation of sister chromatids during the change from metaphase of anaphase. The following are the possible mechanisms :

- (i) Active securin cohesion factor ubiquitinates and destroys securin which in turn allows separase to cleave a subunit of the cohesion
- (ii) Cohesion cleavage is facilitated by phosphorylation of the cohesion complex by cohesion activated kinase
- (iii) Active anaphase promoting complex ubiquitinates and destroys securin which in turn allows separase to cleave a subunit of the cohesion complex
- (iv) Cohesion cleavage is facilitated by phosphorylation of the cohesion complex by polokinase

Choose the *correct* answer :

- (A) (i) and (ii)
- (B) (iii) and (iv)
- (C) (i) and (iv)
- (D) (ii) and (iii)

22. Nucleosomes are the basic units of chromatin. Although nearly every DNA sequence can, in principle, be folded into a nucleosome, the spacing of nucleosomes in the cell can be irregular. The reasons could be :

- (i) Due to difficulty of bending the DNA double helix into two right turns around the outside of the histone octamer.
- (ii) Adenine-thymine-rich sequences in the minor groove are easier to compress than Guanine-Cytosine rich sequences
- (iii) Specific DNA sequences favour formation of nucleosomes
- (iv) Histone modifications of the neighbouring nucleosomes influence the nucleosome formation

Choose the *correct* answer :

- (A) (i) and (iv)
- (B) (i) and (ii)
- (C) (ii) and (iii)
- (D) (ii) and (iv)

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23. Taxol, has a profound effect on cytoskeleton of a cell and therefore taxol and other similar compounds are used as anti-cancer drugs. Taxol :

- (A) binds to microtubule subunits and prevents their polymerization
- (B) binds and stabilizes microtubules
- (C) binds to actin filaments and depolymerizes microfilaments
- (D) Indirectly interferes with microtubule polymerization

24. In mammals and Drosophila sex determination and dosage compensation mechanisms differ. They involve :

- (A) Presence of Y chromosome in males and inactivation of X chromosome in females (mammals) and X/A ratio and hyperactivation of single X in male in drosophila
- (B) X/A ratio and X-inactivation (mammals) and Y chromosome inactivation of X (Drosophila)
- (C) Presence of X and Y chromosomes in mammals and temperature mutant in Drosophila
- (D) Single gene and hyperactivation in mammals and differential splicing and X-hyperactivation in Drosophila

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25. From the solar energy falling on autotrophs, energy available to heterotrophs is about :
- (A) 50%
- (B) 10%
- (C) 1%
- (D) 0.1%
26. Heavy grazing in a grassland is indicated by :
- (A) increased growth of palatable grasses
- (B) decreased growth of fibrous legumes
- (C) increased growth of fibrous legumes
- (D) decreased growth of aromatic composites
27. A waterbody is said to be eutrophicated when it contains higher concentration of :
- (A) Carbonates and silicates
- (B) Carbonates and bicarbonates
- (C) Nitrates and phosphates
- (D) Nitrates and silicates
28. In a typical experiment, bacterial population was exposed to mutagenic dose of UV light. The exposed cells were grown for 24 hours in the nutritionally minimum medium containing penicillin. Subsequently, they were grown in nutritionally rich medium that lacked penicillin.
- This procedure would yield :
- (A) β -lactamase producers
- (B) Auxotrophic mutants
- (C) Phototrophic revertants
- (D) Penicillin-resistant mutants

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29. The medium containing only inorganic components will probably support the growth of :
- (A) Auxotrophs
 - (B) Autotrophs
 - (C) Heterotrophs
 - (D) Myxotrophs
30. The production of ethanol is important to yeast cells growing under anaerobic condition. Which of the following statements best explains the reason ?
- (A) Ethanol keeps the electron transport system functioning
 - (B) Yeast would be unable to activate the enzymes of the Krebs cycle without ethanol
 - (C) The process generates oxygen, which is required for glycolysis
 - (D) The process regenerates NAD, which is required for glycolysis
31. The term “protected fermentation” refers to a process which is not prone to contamination because :
- (A) nutrients are not commonly attacked
 - (B) Fermentation product prevents contamination
 - (C) External addition of antibiotics checks contamination
 - (D) development of acidic pH during fermentation prevents contamination
32. The significance of class switching of immunoglobulin is that the B cell lineage can :
- (A) recognize the same antigen but perform different effector functions
 - (B) perform the same effector function on different antigens
 - (C) convert itself to a T cell lineage
 - (D) convert itself to stem cells

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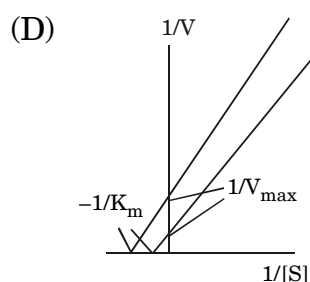
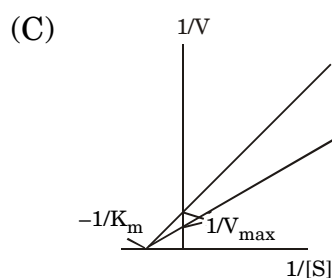
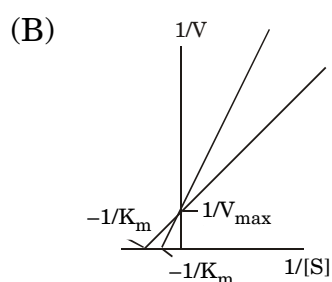
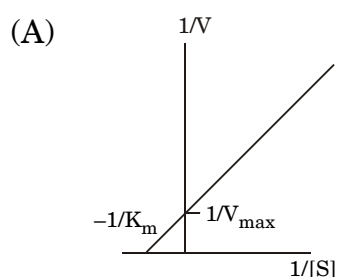
33. The Lineweaver-Burk plot is used to graphically determine K_m and V_{max} from enzyme that obeys classic Michaelis-Menten kinetics. When V is the reaction velocity at substrate concentration S , the Y-axis experimental data in the Lineweaver-Burk plot are expressed as :

- (A) V
- (B) S
- (C) $\frac{1}{V}$
- (D) $\frac{1}{S}$

34. Allosteric enzymes regulate the formation of product by :

- (A) Competitive inhibition
- (B) Non-competitive inhibition
- (C) Feedback inhibition
- (D) Uncompetitive inhibition

35. An experiment was performed to examine the effect of various inhibitors on K_m and V_{max} . Experimental data obtained was used to construct Lineweaver-Burk plot. Which one of the following indicates the non-competitive inhibition ?



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36. Which of the following DNA do not obey Chargaff's principle ?
- (1) E.coli
 - (2) Drosophila melanogaster
 - (3) M13
 - (4) $\phi\times 174$
- Choose the *correct* alternative :
- (A) (1) and (2)
 - (B) (1) and (4)
 - (C) (3) and (4)
 - (D) (2) and (3)
37. Sucrose *does not* occur in its anomeric form while its hydrolyzed products glucose and fructose have anomers. The reason is :
- (A) C1 of glucose and C1 of fructose are bonded in glycosidic bond
 - (B) C1 of glucose and C2 of fructose are bonded in glycosidic bond
 - (C) Sucrose is not soluble in water
 - (D) Sucrose is polysaccharide
38. If one arginine has molecular weight of 174 Daltons, then what would be the molecular weight (in Daltons) of a circular polymer of 38 arginines ?
- (A) 6612
 - (B) 5928
 - (C) 5946
 - (D) 6594
39. Lesch-Nyhan syndrome is a genetic defect in salvage pathway of nucleotide synthesis. Which nitrogen bases would show increased concentration in this disorder ?
- (A) Hypoxanthine-adenine
 - (B) Hypoxanthine-guanine
 - (C) Hypoxanthine-cytosine
 - (D) Hypoxanthine-thymine

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40. Interconversion of hexoses and pentoses is catalyzed by :
- (A) Aldolase and dehydrogenase
 - (B) Transaldolase and transketolase
 - (C) Isomerase and epimerase
 - (D) Lyase and ligase
41. In order to fully oxidize a saturated fatty acid containing 13 carbon atoms, besides the enzymes of β -oxidation, one additional enzyme required is
- (A) Methyl malonyl-CoA mutase
 - (B) Acyl-CoA dehydrogenase
 - (C) Enoyl-CoA hydratase
 - (D) Carnitine acyl transferase
42. Which one of the following is a fundamental mode of energy exchange in biological system ?
- (A) ATP—AMP cycle
 - (B) ADP—creatine phosphate cycle
 - (C) ATP—ADP cycle
 - (D) ADP—Arginine phosphate cycle
43. A laboratory technician was rushed to hospital, where she was found dead. The most dramatic symptom found was that her body was very hot indicating extremely high fever. You can learn that her laboratory has been working on metabolic inhibitors and she might have injected one. Which one of the following is the most likely culprit ?
- (A) Barbiturate
 - (B) Dimercaprol
 - (C) Dinitrophenol
 - (D) Cyanide

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44. If more is the negative standard, reduction potential of a redox pair, greater is the tendency to :
- (A) Loose electron
 - (B) Gain electron
 - (C) Gain a proton
 - (D) Loose a proton
45. When chromosomes were treated with micrococcal nuclease, which digests DNA based on its tree accessibility, fragments of 166-200 bp were observed. This represented basic unit of chromatin, i.e. the nucleosome. Nucleosome leads to protection of DNA and modulating active and inactive components due to :
- (A) Presence of histones H2A, H2B, H3, H4 and relevant histone modifying enzymes
 - (B) Presence of histones H2A, H, H2B, H2C and ribozymes
 - (C) Presence of chromodomains proteins and histones H1, H2A, H2B and H2C
 - (D) Presence of histones H1, H2, H3, H4, H5, H6 and ribozymes
46. Gene can be defined as a functional transcriptional unit. In Eukaryotes, this will consist of promoter, ribosome binding site, ORF and termination signals. Mutations or changes in the following can abolish gene expression.
- (A) Promoter deletion, deletion of ribosome binding site
 - (B) Promoter duplication, missense mutation
 - (C) Additional enhancer and silencer mutation
 - (D) Missense mutation and sensitivity to transacting factor

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47. DNA repair mechanisms involve removal of the damaged bases followed by repair synthesis, or containing DNA synthesis is by passing the damaged bases. Which of the following repair mechanisms involve tolerating the damaged bases and continuing DNA synthesis ?

(A) Photoreactivation

(B) Nucleotide excision repair

(C) SOS repair

(D) Mismatch repair

48. The following is true for genetic code :

(A) it is triplet, commaless and generally universal

(B) it is triplet, punctuated and species specific

(C) it is degenerate, genus specific and different in plants and animals

(D) it shows hairpin loops and varies between prokaryotes and eukaryotes

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49. A permanent alteration in the DNA of an organism is called

- (A) a mutation
- (B) an allele
- (C) a hereditary marker
- (D) a replicon

50. Which of the following is *not* a part of prokaryotic transcription process ?

- (A) Polyadenylation
- (B) Polymerization of ribonucleotides
- (C) Processing of transcript
- (D) Involvement of sigma factor

51. Constitutive expression of *Lac* operon is due to mutation in :

- (A) Lac Z
- (B) Lac O
- (C) Lac I
- (D) Lac a

52. Which of the following antibiotics is *not* specific to prokaryotes ?

- (A) Cycloheximide
- (B) Chloramphenicol
- (C) Ampicillin
- (D) Streptomycin

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53. The following is the silk fibroin-specific DNA agarose gel electrophoresis pattern obtained after digestion of DNA with Msp I and Hpa II. DNA from fibroin expressing (E) and non-expressing (S) glands were used.

Control		Msp I		Hpa II	
S	E	S	E	S	E
—	—	—	—	—	—
		—		—	
			—	—	—
		—	—	—	—
		—	—	—	—
		—	—	—	—

Observations suggest that fibroin gene is :

- (A) not methylated at CCGG in both S and E samples
- (B) methylated at C residue(s) in “E” samples
- (C) methylated at C residue(s) in “S” samples
- (D) methylated at certain C residues in “S” samples

54. In case of Turner syndrome and Down’s syndrome, chromosome balance is altered. The karyotype in each case can be determined by cytogenetic analysis. The distinguishing features of these genetic diseases are

- (A) Monosomy of ‘X’ and trisomy of 21
- (B) Balanced translocations
- (C) Trisomy of 21 and monosomy of 22
- (D) Ring chromosomes and double minutes

55. Cancer of the liver can be caused by

- (A) Virus alone
- (B) Chemicals alone
- (C) Both viruses and chemicals
- (D) UV-irradiation

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56. Retinoblastoma in children is caused by an antioncogene Rb. Which one of the following conditions leads to this cancer ?
- (A) One of the two alleles (Rb) is non-functional due to mutation
 - (B) Both the Rb alleles are functional, but not expressed
 - (C) Both the Rb alleles are non-functional
 - (D) One allele is functional; however, gene product is not functional
57. A frameshift mutation occurs when :
- (A) an adenine is inserted into DNA sequence of an organism
 - (B) a thymine replaces a guanine in the DNA sequence
 - (C) three new bases are inserted into DNA
 - (D) three bases are deleted from DNA
58. A lytic cycle is usually a result of infection by :
- (A) a prophage
 - (B) a virulent phage
 - (C) a temperate phage
 - (D) an antiphage
59. Which of the following restriction enzyme sets forms an isoschizomer group ?
- (A) MboI(↓GATC), Sau3AI(GATC), DpnI(↓GATC)
 - (B) MspI (↓CCGG), HpaII(↓CCGG), SmaI(C↓CCGGG)
 - (C) MspI(CCGG), HpaII(CCGG), Sau3AI(GATC)
 - (D) ApaI(GGGCCC), SmaI(CCCGGG)

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60. DNA foot-printing technique is useful in :
- (A) DNA of genomic variations
 - (B) detection of predisposition of genetic diseases
 - (C) detection of protein-DNA interactions
 - (D) Prenatal sex determination
61. The differences between a genomic and cDNA library are :
- (A) No intrinsic sequences and non-coding sequences in genomic library
 - (B) Genomic library will have truncated genes and no minisatellites
 - (C) Each cDNA library will have different set of genes and no introns
 - (D) Genomic library will have no representation of micro RNAs
62. In a standard experiment using tobacco pith explants grown on different ratios of auxin! cytokinin. What response will be expected with a high ratio of auxin : cytokinin ?
- (A) development of undifferentiated callus
 - (B) formation of roots
 - (C) development of shoot buds
 - (D) induction of both shoot buds and roots
63. Embryonic stem cells are useful for regeneration therapy. These cells are also useful for transgenics. They are :
- (A) Pluripotent
 - (B) Totipotent
 - (C) Unipotent
 - (D) Omnipotent

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64. Which of the following is *true* for second messengers ?
- (A) they are small extracellular signalling molecules
 - (B) they are small intracellular mediators of cell signalling
 - (C) they cannot participate in signal transduction
 - (D) they can be large proteins as well
65. Knowing that Na^+/K^+ ATPase is the molecular basis of Na–K pump and that the pump extrudes Na^+ ions and brings in K^+ ions, which of the following cells/tissues are likely to have the highest level of Na^+/K^+ ATPase activity in their membranes ?
- (A) Neurons
 - (B) Myocytes
 - (C) RBC
 - (D) Kidney cells
66. Which of the following techniques has been used by Meselson-Stahl to prove that DNA replication occurs in semiconservative manner ?
- (A) Density gradient centrifugation
 - (B) Differential centrifugation
 - (C) Ion exchange chromatography
 - (D) Electron microscopy
67. Which of the following compounds is used as internal standard in NMR spectroscopy ?
- (A) Chloroform
 - (B) Dimethyl sulfoxide
 - (C) Trimethyl amine
 - (D) Tetramethyl silane

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68. The patient is suffering from cancer and for the treatment of it, which radioisotope will be preferred ?
- (A) ^{60}Co
(B) ^{55}Fe
(C) ^{32}P
(D) ^{35}S
69. Which of the following peptides can be quantified by using UV-spectroscopy ?
- (1) Ala—gly—leu—pro—phe
(2) Val—trp—leu—Ser—tyr
(3) Lys—arg—Val—his—gln
(4) Trp—Tyr—thr—gly—ileu
- Choose the *correct* answer :
- (A) (1), (2) and (4)
(B) (2) and (4)
(C) (1) and (4)
(D) (2), (3) and (4)
70. There is a need for accurate identification of gene sequence by using polymerase chain reaction. In this two sets of primers are used along with template, d NTPs and Taq polymerase. This process is called as :
- (A) Nested PCR
(B) Multiplex PCR
(C) Degenerate PCR
(D) Inverse PCR
71. You have isolated and purified a protein and you want to determine the molecular weight. Which of the following techniques you will use ?
- (1) Gel filtration
(2) Ion exchange chromatography
(3) Ultracentrifugation
(4) SDS-PAGE
(5) Affinity chromatography
- Choose the *correct* answer :
- (A) (1), (3) and (5)
(B) (1), (3) and (4)
(C) (2), (3) and (5)
(D) (2), (4) and (5)

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72. Thyroid hormone levels in body fluid can be estimated by which of the following methods ?
- (1) Radioimmunoassay
 - (2) ELISA
 - (3) Agglutination inhibition assay
 - (4) HPLC
- Choose the *correct* answer :
- (A) (1) and (2)
 - (B) (1), (2) and (3)
 - (C) (1), (2) and (4)
 - (D) only (1)
73. Which of the following reagents are used in the peptide sequencing ?
- (1) 1-Fluoro 2,4 dinitrobenzene
 - (2) Phenyl isothiocyanate
 - (3) Diisopropyl fluorophosphate
 - (4) Phenyl methyl sulfonyl fluoride
- Choose the *correct* answer :
- (A) (1) and (2)
 - (B) (3) and (4)
 - (C) (1) and (4)
 - (D) (2) and (3)
74. Validation of an analytical method is made by applying :
- (A) Mean
 - (B) Standard deviation
 - (C) t-test
 - (D) Q-test
75. If the permeability of a neuron's membrane to K^+ is increased, what effect would this be most likely to have on the membrane potential assuming that the neuron is at rest ?
- (A) hyperpolarization
 - (B) action potential would occur
 - (C) no change
 - (D) depolarization

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