



Previous Year Question Paper
of

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

2013, February

(Original Question Paper with Answer Key)

State Eligibility Test



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Life Science Paper II

Time Allowed : 75 Minutes]

[Maximum Marks : 100

Note : This Paper contains Fifty (50) multiple choice questions, each question carries Two (2) marks. Attempt *All* questions.

1. Which one of the following is *not* a modification of a compound light microscope ?

- (A) Phase contrast microscope
- (B) Fluorescence microscope
- (C) Electron microscope
- (D) Dark-field microscope

2. In *Drosophila melanogaster*, sex is determined by :

- (A) X and Y chromosomes
- (B) X/A ratio
- (C) Ploidy
- (D) Z and W chromosomes

3. Organelle found in plant seeds that oxidise stored lipids as source of carbon and energy for growth are :

- (A) peroxisomes
- (B) chloroplasts
- (C) glyoxysomes
- (D) lysosomes

4. Which of the following represents mammalian mitotic cyclins ?

- (A) Cyclins A and D
- (B) Cyclins B and D
- (C) Cyclins E and B
- (D) Cyclins A and B

[P.T.O.]

5. The valency of Immunoglobulin M molecule is :
- (A) 8
 - (B) 10
 - (C) 12
 - (D) 14
6. Bivalent formation and crossing over take place during :
- (A) Zygotene
 - (B) Pachytene
 - (C) Diplotene
 - (D) Leptotene
7. Induction of new blood vessels that invade the tumor and nourish it is known as :
- (A) metastasis
 - (B) neogenesis
 - (C) angiogenesis
 - (D) extravasation
8. GLUT 1 is a well studied example of a protein that mediates :
- (A) active transport
 - (B) facilitated diffusion
 - (C) osmosis
 - (D) differentiation
9. Cadherins are a family of cell adhesion molecules dependent on :
- (A) Ca^{2+}
 - (B) K^{1+}
 - (C) Na^{1+}
 - (D) Mg^{2+}
10. Cellulose is formed by repeated units of :
- (A) glucose and galactose
 - (B) galactose
 - (C) glucose
 - (D) fructose

11. The acetyl groups required for cytoplasmic fatty acid biosynthesis generated due to activity of :

- (A) citrate lyase
- (B) citrate synthase
- (C) isocitrate lyase
- (D) isocitrate dehydrogenase

12. A non-competitive inhibitor :

- (A) increases K_m and V_{max} both
- (B) decreases K_m and increases V_{max}
- (C) decreases K_m and V_{max} both
- (D) K_m remains unaltered, V_{max} decreases

13. Which one of the following is *not* a proton pump ?

- (A) NADH-Q reductase
- (B) Succinate-Q reductase
- (C) Cytochrome C reductase
- (D) Cytochrome oxidase

14. Two molecules of double stranded DNA have same length (1000 basepairs) but differ in base composition. Molecule 1 contains 20% A + T, molecule 2 contains 60% A + T. Which molecule has a higher T_m and how many C residues are there in molecule 2 ?

- (A) 1 ; 400
- (B) 1 ; 200
- (C) 2 ; 400
- (D) 2 ; 40

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15. Which of the following is NOT involved in the lagging strand synthesis ?
- (A) RNaseA
 - (B) Primase
 - (C) Reverse Transcriptase
 - (D) DNA Pol I
16. There are three kinds of RNA polymerases (I, II, III) in eukaryotic cells, each specific for one class of RNA molecule (*mRNA*, *tRNA* and *rRNA*). Which of the following is a *correct* match ?
- (A) I-*rRNA*, II-*tRNA*
 - (B) II-*mRNA*, III-*rRNA*
 - (C) I-*rRNA*, II-*mRNA*
 - (D) I-*tRNA*, III-*rRNA*
17. Which of the following *does not* inhibit translation ?
- (A) chloramphenicol
 - (B) streptomycin
 - (C) tetracycline
 - (D) rifampicin
18. For a spontaneous reaction ΔG should be :
- (A) positive
 - (B) negative
 - (C) equal to zero
 - (D) may be negative or zero

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19. Cold stress—induced increase in membrane fluidity is caused due to :
- (A) increase in cholesterol
 - (B) increase in long chain fatty acids
 - (C) increase in unsaturated fatty acids
 - (D) increase in sphingolipids
20. Which of the following statements is *true* ?
- (A) Intestinal cells have Na⁺/glucose antiporters
 - (B) Intestinal cells have Na⁺/amino acid symporters
 - (C) Maintenance of low Ca⁺⁺ concentration in cytosol is due to primary active transport of Na⁺ and Ca⁺⁺
 - (D) Cells have Na⁺/H⁺ symporters.
21. Which of the following is an osmoregulatory hormone in lower vertebrates ?
- (A) Thyroxine
 - (B) Malatonin
 - (C) Prolactin
 - (D) Epinephrine
22. “Mottled enamel” a condition which makes teeth particularly more resistant to decay is due to :
- (A) vitamin A excess
 - (B) fluoride excess
 - (C) vitamin B₁₂ deficiency
 - (D) selenium excess

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23. Blue-light receptors in the plant are :
- (A) Cryptochromes
 - (B) Carotenoids
 - (C) Cytochromes
 - (D) Phytochromes
24. Echo location is characteristic of :
- (A) Bats
 - (B) Whales
 - (C) Birds
 - (D) Birds, whales and bats
25. Genes that are located at identical loci of homologous chromosomes are called :
- (A) alleles
 - (B) polygenes
 - (C) homozygous
 - (D) pseudogenes
26. The Okazaki fragments of the lagging strand of DNA template are joined by :
- (A) DNA gyrase
 - (B) DNA ligase
 - (C) DNA polymerase
 - (D) RNA primer
27. The name of chromosome map unit is :
- (A) Inter locus distance
 - (B) Cytomorgan
 - (C) Chromomere
 - (D) Centimorgan

28. The basic unit of chromatin nucleosome consists of :

- (A) H₁A, H₂B, H₃, H₄ histones and 200 bp of DNA
- (B) H₁, H₂, H₃, H₄ histones and 180 bp of DNA
- (C) H_{2A}, H_{2B}, H₃, H₄ histones and 140 bp of DNA
- (D) DNA polymerase, DNA helicase and histones

29. The human hereditary disease associated with DNA repair is :

- (A) Klinefelter's syndrome
- (B) Haemophilia
- (C) Thalassemia
- (D) Bloom's syndrome

30. A molecular technique that can be used to isolate contiguous regions of genomic DNA beginning with previously cloned DNA fragments that map near a gene of interest is called :

- (A) chromosome walking
- (B) chromosome painting
- (C) chromosome scanning
- (D) chromosome mapping

31. Renewability, pluripotency and ability to differentiate are properties of :

- (A) endocrine cells
- (B) endodermal cells
- (C) oocytes
- (D) stem cells

32. Exception to universal genetic code

is seen in :

- (A) plasmids
- (B) viruses
- (C) mitochondria
- (D) transposons

33. Characteristics that have arisen as

a result of common evolutionary

descent are said to be :

- (A) analogous
- (B) homologous
- (C) heterologous
- (D) heterogamous

34. The effect of natural selection may

be countered by :

- (A) gene flow
- (B) genetic drift
- (C) mutation
- (D) inbreeding

35. In a population of 100 persons, there

are 30 persons with M blood group

and 20 persons with N blood group.

The gene frequency for M and N

blood groups is :

- (A) 0.20, 0.80
- (B) 0.60, 0.40
- (C) 0.20, 0.30
- (D) 0.65, 0.45

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36. Which of the following definitions correctly depicts “biological species” concept ?
- (A) A species is the most inclusive population of organisms that share a common fertilization system
 - (B) A species is a single lineage of population that maintains an identity separate from other such lineages
 - (C) Species are groups of actually or potentially interbreeding natural populations that are reproductively isolated from other such groups
 - (D) A species is the smallest unit of group of individuals sharing common ancestry
37. During the early stages of development, embryos of reptiles, birds and mammals look very similar. This suggests that reptiles, birds and mammals :
- (A) have a common ancestor
 - (B) live in the same type of environment
 - (C) have undergone parallel evolution
 - (D) are no longer undergoing evolution
38. Speciation is more likely to occur in cases of :
- (A) sympatry
 - (B) allopatry
 - (C) antipatry
 - (D) panmixis

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39. The ecosystem without stress is :
- (A) highly productive
 - (B) highly diverse and stable
 - (C) highly unstable
 - (D) less productive and unstable
40. A sustainable development practice involves :
- (A) control of pathogens using biopesticides
 - (B) reclamation of soils using chemical fertilizers
 - (C) use of chemicals for control of pathogens
 - (D) use of fossil fuels
41. Which of the following ecosystems is represented by inverted pyramid of biomass ?
- (A) Forest
 - (B) Grass land
 - (C) Pond
 - (D) Rhizosphere
42. The organism used for large scale production of vit B₂ is :
- (A) *Penicillium chrysogenum*
 - (B) *Aspergillus niger*
 - (C) *Ashbya gossypi*
 - (D) *Trichoderma harzianum*

43. Assimilatory microbial SO_4

reduction occurs in :

- (A) flowing water
- (B) surface water
- (C) atmosphere
- (D) water sediments

44. Bt toxin is active in the gut

environment having :

- (A) alkaline pH
- (B) alkaline protease
- (C) alkaline pH and alkaline protease
- (D) neutral pH and protease

45. Bentham and Hooker's system

classifies :

- (A) all tracheophytes
- (B) all seed plants
- (C) all embryophytes
- (D) thallophytes, bryophytes and pteridophytes

46. Botanical gardens serve the purpose

of conservation of plants.

- (A) *ex situ, ex vitro*
- (B) *in situ, ex vitro*
- (C) *ex situ, in vitro*
- (D) *in situ, in vitro*

47. The common mushroom puffballs and truffles belong to the class of fungi :

- (A) Ascomycetes
- (B) Basidiomycetes
- (C) Oomycetes
- (D) Deuteromycetes

48. The biological name of common brewing and baking yeast is :

- (A) *Candida albicans*
- (B) *Escherichia coli*
- (C) *Cryptococcus neoformans*
- (D) *Saccharomyces cerevisiae*

49. A pair of halteres is seen in :

- (A) Damsel fly
- (B) May fly
- (C) Butterfly
- (D) Fruit fly

50. The group which contains all Cnidaria is :

- (A) Obelia, Acetabularia, Hydra, Coral
- (B) Hydra, Jellyfish, Rotifer, Coral
- (C) Obelia, Hydra, Jellyfish, Sea Anemone
- (D) Jellyfish, Ascon, Physalia, Sea Anemone

Test Booklet No.

प्रश्नपत्रिका क्र.

F

Paper-II

LIFE SCIENCE

Seat No.

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(In figures as in Admit Card)

Signature and Name of Invigilator

1. (Signature)

(Name)

2. (Signature)

(Name)

Seat No.

(In words)

OMR Sheet No.

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(To be filled by the Candidate)

FEB - 34213**Time Allowed : 1¼ Hours]****[Maximum Marks : 100****Number of Pages in this Booklet : 16****Number of Questions in this Booklet : 50****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 50 objective type questions. Each question will carry two marks. All questions of Paper-II 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 50 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 आवश्यक तपासून पहाव्यात.
 - 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 पहावी. 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 वेळी 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 काढा/निळ 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 पटले अशी कोणतीही खूप केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांने 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 निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

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