

Roll No.

Question Booklet Number

O. M. R. Serial No.

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M. Sc. (Biochemistry) (Fourth Semester)

EXAMINATION, July, 2022

ENVIRONMENTAL BIOCHEMISTRY

Paper Code

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Questions Booklet
Series

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Time : 1:30 Hours]

[Maximum Marks : 100

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 60 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 50 questions are attempted by student, then the first attempted 50 questions will be considered for evaluation. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 60 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 50 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 50 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. Among the following crops, which one is the most important anthropogenic source of both methane and nitrous oxide ?

- (A) Cotton
- (B) Rice
- (C) Sugarcane
- (D) Wheat

2. Interlocking of two or more types of food chains at different trophic level is called

- (A) Food chain
- (B) Succession
- (C) Food web
- (D) Ecological pyramid

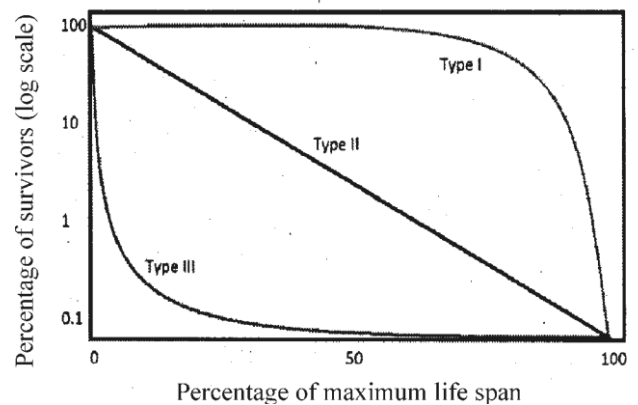
3. A keystone species is characterized by its

- (A) Disproportionate large impact on ecosystem
- (B) Very less impact on ecosystem
- (C) No impact at all
- (D) None of the above

4. A population that is at equilibrium is

- (A) Steadily decreasing.
- (B) Steadily increasing.
- (C) Intermixing rapidly with other populations.
- (D) Its number is almost stable over a period of time.

5. Which of the following organisms is likely to possess a type 3 curve ?



- (A) None of these species possess a type 3 survivorship curve.
- (B) A fish species that produces many offspring per annual reproductive event.
- (C) A rodent that has several offspring per annual reproductive event.
- (D) A large mammal that has 1 or 2 offspring per lifetime.

6. The most important strategy for the conservation of biodiversity together with traditional human life is the establishment of :
 - (A) Biosphere reserves
 - (B) Botanical gardens
 - (C) National Parks
 - (D) Wildlife Sanctuaries
7. In the grasslands, trees do not replace the grasses as a part of an ecological succession because of :
 - (A) insects and fungi
 - (B) limited sunlight and paucity of nutrients
 - (C) water limits and fire
 - (D) None of the above
8. The various levels through which energy passes into an ecosystem are called
 - (A) Consumers
 - (B) Trophic levels
 - (C) Autotrophs
 - (D) None of the above
9. The transitional area between two ecosystems is termed as
 - (A) Ecoline
 - (B) Ecotone
 - (C) Ecotourism
 - (D) None of the above
10. Population consists of
 - (A) Organisms in a species that are capable of reproducing among themselves.
 - (B) Different species that can interbreed.
 - (C) Collective members of a species living and interaction across the biosphere.
 - (D) Some organisms that may not belong to any species.
11. Which one of the following is the best description of the term “ecosystem” ?
 - (A) A community of organisms interacting with one another.
 - (B) That part of the earth which is inhabited by living organisms.
 - (C) A community of organisms together with the environment in which they live.
 - (D) The flora and fauna of a geographical area.

12. What is a producer ?
- (A) an organism that gets energy from eating other organisms.
 - (B) an organism that uses sunlight to make its own food.
 - (C) an organism that gets energy from eating dead organisms, non-living material or waste.
 - (D) an organism that uses chemical energy to make its own food.
13. Which is the most abundant biomolecule on earth ?
- (A) Mineral salts
 - (B) Proteins
 - (C) Lipids
 - (D) Carbohydrates
14. Which among the following is incorrect about *r*-strategist ?
- (A) Short lifespan
 - (B) Early reproduction
 - (C) Iteroparous
 - (D) Semelparous
15. A bird eats a worm. Who is the predator ?
- (A) The worm
 - (B) Both the bird and the worm
 - (C) The bird
 - (D) Neither the bird nor the worm
16. Consider the following :
- (1) Carbon monoxide
 - (2) Nitrogen oxide
 - (3) Ozone
 - (4) Sulphur dioxide
- Excess of which of the above in the environment is/are cause(s) of acid rain ?
- (A) (1), (2) and (3)
 - (B) (2) and (4) only
 - (C) (4) only
 - (D) (1), (3) and (4)
17. If you made a chart showing all the organisms living in the local lake, with arrows drawn between the various organisms showing the direction or pathway of energy flow, what kind of chart would you have made ?
- (A) energy pyramid
 - (B) food web
 - (C) food chain
 - (D) ecosystem chart
18. What is called for an organism that helps to define an entire ecosystem ?
- (A) Super species
 - (B) Keystone species
 - (C) Dominant species
 - (D) Precious species

19. Which one of the following terms describes not only the physical space occupied by an organism but also its functional role in the community of organisms ?
 - (A) Ecotone
 - (B) Ecological niche
 - (C) Habitat
 - (D) Home range
20. Why detritivores are considered at the zero level in the food web ?
 - (A) Because it eats only producers
 - (B) Because it eats only consumers
 - (C) Because it eats producers as well as consumers
 - (D) Because it do not eat producers as well as consumers
21. When the cleaners eat insect-pests from the skin of animals, is an example of :
 - (A) Commensalism
 - (B) Mutualism
 - (C) Predation
 - (D) None of the above
22. On which basis is the idea of productivity of an ecosystem based ?
 - (A) Pyramid of biomass
 - (B) Pyramid of number
 - (C) Ecological succession
 - (D) Pyramid of energy
23. What does pyramid of energy indicate because of which it is said to be the best representation of an ecosystem ?
 - (A) Number of all plants and animals
 - (B) Rate of respiration
 - (C) The total rate of photosynthesis
 - (D) The rate of flow of energy through the food chain
24. What is the position of herbivores in pyramid of energy ?
 - (A) Zero
 - (B) First
 - (C) Second
 - (D) Third
25. What is an adaptation in which an organism matches its color with the surrounding to get protection from predators called ?
 - (A) Mimicry
 - (B) Camouflage
 - (C) Parasitism
 - (D) Commensalism
26. The Ascaris, Entamoeba and Plasmodium are considered as example of :
 - (A) endoparasite
 - (B) ectoparasite
 - (C) digestion parasites
 - (D) synthetic parasites

27. The ability of a population of living species to increase under ideal environmental conditions sufficient food supply, no predators, and a lack of disease :
- (A) *r*-selected
 - (B) K-selected
 - (C) Biotic potential
 - (D) Survivorship pattern
28. Which of the following organisms would tend to have a Type I : convex curve to represent its survivorship ?
- (A) Elephants
 - (B) White tail deer
 - (C) Giant squid
 - (D) Mallard ducks
29. An example of a density dependent factor :
- (A) Natural Disaster
 - (B) Disease
 - (C) Density Independent Factor
 - (D) Height of Individuals
30. Phytoremediation uses to binds, extract and clean up pollutants.
- (A) metals
 - (B) plants
 - (C) pesticides
 - (D) bacteria
31. Which among the following organisms follow type II survivorship curve ?
- (A) Frog
 - (B) Man
 - (C) Gorillas
 - (D) Squirrels
32. Which of the following adapt themselves for a Prey-Predator relationship ?
- (A) Carnivore and decomposer
 - (B) Herbivore and carnivore
 - (C) Herbivore and omnivore
 - (D) Omnivore and carnivore
33. Which of the following can be found as pollutants in the drinking water in some parts of India ?
- (1) Arsenic
 - (2) Sorbitol
 - (3) Fluoride
 - (4) Formaldehyde
 - (5) Uranium
- Select the correct answer using the codes given below :
- (A) (1) and (3) only
 - (B) (2), (4) and 5 only
 - (C) (1), (3) and (5) only
 - (D) (1), (2), (3), (4) and (5)

34. Which of the following activities is correct about the impact and human activities on the ecosystem ?
- (A) Depletion of groundwater
 - (B) Extinction of species
 - (C) Decrease of forest area
 - (D) All of the above
35. EPA stands for :
- (A) Environmental Protection Agency
 - (B) Energy Policy Act
 - (C) Environmental Protection Administration
 - (D) Environment Protection Act
36. What does T_3 (secondary consumer) represent in trophic levels ?
- (A) Consumer
 - (B) Producer
 - (C) Herbivore
 - (D) Carnivore
37. The 3R principle is in which of the following order ?
- (A) Reduce, Reuse, Recycle
 - (B) Reuse, Reduce, Recycle
 - (C) Recycle, Reuse, Reduce
 - (D) None of the above
38. Order of basic processes involved in succession is :
- (A) invasion → stabilization → completion and coactions → reaction → nudation
 - (B) nudation → stabilization → completion and coaction → invasion → reaction
 - (C) invasion → nudation → completion and coaction → reaction → stabilization
 - (D) nudation → invasion → completion and coaction → reaction → stabilization
39. Name those organisms who can breed only once in their lifetime ?
- (A) Dispersed
 - (B) Clumped
 - (C) Iteroparous
 - (D) Semelparous
40. Among these which one is the primary greenhouse gas emitted through human activity ?
- (A) Nitrous oxide
 - (B) fluoroinated gases
 - (C) Methane
 - (D) Carbon dioxide

41. Which realltion does “sharing of food” describes ?
- (A) Competition
 - (B) Mutualism
 - (C) Parasitism
 - (D) Commensalism
42. The removal of top fertile soil by water is known as :
- (A) Leaching
 - (B) Siltation
 - (C) Weathering of soil
 - (D) Soil erosion
43. Which of the following is one of the secondary air pollutants ?
- (A) Ozone
 - (B) CO
 - (C) CO₂
 - (D) PANs
44. Which of the following heavy metals causes Minamata disease ?
- (A) Lead
 - (B) Mercury
 - (C) Magnesium
 - (D) Methyl chloride
45. Photochemical smog mainly is due to :
- (A) H₂ O₂
 - (B) Methyl chlorate
 - (C) Ozone
 - (D) Peroxyacetyl nitrate
46. Which one of the following would appear as the pioneer organisms on bare rocks ?
- (A) Green algae
 - (B) Lichens
 - (C) Liverworts
 - (D) Mosses
47. Who gave the following sentence “Two closely related species competing for the same resources cannot co-exist indefinitely and the competitively inferior will be eliminated eventually” ?
- (A) Gauss’ competitive exclusion principle
 - (B) Mutation theory
 - (C) Theory of special creation
 - (D) Theory of organic evolution
48. Which one of the following statements is correct for secondary succession ?
- (A) It is similar to primary succession except that it has a relatively fast pace.
 - (B) It begins on a bare rock.
 - (C) It follows primary succession.
 - (D) It occurs on a deforested site.

49. Match the following :

- | | |
|------------------|--------------|
| (a) Commensalism | (i) $-, 0$ |
| (b) Parasitism | (ii) $+, +$ |
| (c) Mutualism | (iii) $+, -$ |
| (d) Amensalism | (iv) $+, 0$ |

Codes :

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|------|-------|
| (A) | (iv) | (iii) | (ii) | (i) |
| (B) | (iii) | (ii) | (i) | (iv) |
| (C) | (ii) | (iii) | (iv) | (i) |
| (D) | (i) | (iv) | (ii) | (iii) |

50. Which ecosystem has the maximum biomass ?

- (A) Lake ecosystem
- (B) Pond ecosystem
- (C) Grassland ecosystem
- (D) Forest ecosystem

51. The relationship between two organisms in which one receives benefit at the cost of other is known as :

- (A) Predation
- (B) Parasitism
- (C) Scavenging
- (D) Symbiosis

52. In parasitic ecosystem, pyramid of number is :

- (A) Upright
- (B) Inverted
- (C) Bell-shaped
- (D) None of the above

53. In general, which is not a trait observed in *r*-selected species ?

- (A) Low offspring mortality
- (B) No parental care
- (C) Short lifespan
- (D) Small body size

54. The rate of variation of population (N) with time (t) represented by equation $dN/dt = rN$, follows :

- (A) J-shaped curve
- (B) S-shaped curve
- (C) Z-shaped curve
- (D) Parabolic curve

55. Which one of the following statements for pyramid of energy is incorrect ?
- (A) It is upright in shape.
 - (B) Its base is broad.
 - (C) It shows energy content of different trophic level organisms.
 - (D) It is inverted in shape.
56. Which layer of lake is known as benthic zone ?
- (A) Found at the bottom of the lake
 - (B) Deep open water
 - (C) Top layer of the lake
 - (D) Deep open water where it is too dark.
57. A habitat is
- (A) A particular area inhabited by plants and animals.
 - (B) An area inhabited by a community.
 - (C) A small part of ecosystem.
 - (D) The number of different organisms living in a specific area.
58. If we combine all the ecosystems present on earth, then it is called :
- (A) Biome
 - (B) Habitat
 - (C) Biosphere
 - (D) Ecology
59. All the energy in a food chain originates from
- (A) Plants
 - (B) Sun
 - (C) Sea
 - (D) All of the above
60. What phenomenon occurs during an ecological succession ?
- (A) All species disappear
 - (B) All species survive
 - (C) Some species grow while other species decline
 - (D) Species grow at the same rate

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ☒ (B) (C) (D)

Q. 2 (A) (B) ☒ (C) (D)

Q. 3 (A) ☒ (B) (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सबसे सही अथवा सबसे उपयुक्त उत्तर छोटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ☒ (B) (C) (D)

प्रश्न 2 (A) (B) ☒ (C) (D)

प्रश्न 3 (A) ☒ (B) (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।