

Roll No.

Question Booklet Number

O. M. R. Serial No.

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M. Sc. (Biotechnology) (Fourth Semester)

EXAMINATION, July, 2022

(Elective)

ENVIRONMENTAL BIOTECHNOLOGY

Paper Code					
MBT	4	0	0	3	(B)

Questions Booklet
Series

A

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. Biosurfactants are :
 - (A) Amphiphilic molecules
 - (B) Hydrophobic molecules
 - (C) Hydrophilic molecules
 - (D) None of the above
2. Bioemulsifiers are complex mixtures of :
 - (A) heteropolysaccharides
 - (B) lipopolysaccharides
 - (C) lipoproteins and proteins
 - (D) All of the above
3. The BOD of polluted water is related to :
 - (A) Amount of organic pollutant
 - (B) Inorganic pollutant
 - (C) Heavy metal pollution
 - (D) None of the above
4. Which of the following is not an environmental problem ?
 - (A) Acid rain
 - (B) Loss of biodiversity
 - (C) Transgenic plants
 - (D) Afforestation
5. Pre-treatment of waste water is removal of :
 - (A) Supernatants
 - (B) Organic pollutants
 - (C) Heavy metals
 - (D) Settable solids
6. Removal of heavy metal pollutants by bacterial strain is :
 - (A) Microbial culture
 - (B) Bioculture
 - (C) Bioremediation
 - (D) All of the above
7. The main Nitrogen reservoir in biosphere is :
 - (A) Atmosphere
 - (B) Living organism
 - (C) Dead organism
 - (D) Ocean
8. Which one is the sedimentary cycle ?
 - (A) Carbon cycle
 - (B) Phosphorus cycle
 - (C) Hydrogen cycle
 - (D) None of the above

9. Nitrification is :
- (A) Conversion of NH_3 into NO_3^-
 - (B) Conversion of N_2 into NH_3
 - (C) Conversion of NO_3^- into NH_3
 - (D) None of the above
10. Which of these statements is correct for Xylanases ?
- (A) Depolymerize plant cells content xylan.
 - (B) It is produced by fungi, bacteria, yeast, marine algae, protozoans.
 - (C) Principal commercial source is filamentous fungi.
 - (D) All are correct
11. Which of the following is mainly responsible for the causes of water pollution ?
- (A) Afforestation
 - (B) Oil refineries
 - (C) Paper factories
 - (D) Both (B) and (C)
12. The main sources of Arsenic in water are :
- (A) Floods
 - (B) Fertilizers
 - (C) Industrial waste
 - (D) Both (B) and (C)
13. What is the reason for increase in BOD ?
- (A) Collection of sewage water
 - (B) Dumping of sewage in water
 - (C) Growth of fungus
 - (D) Excess growth of green algae
14. Which source of waste water contains biodegradable waste such as organic matter ?
- (A) Domestic waste
 - (B) Medical wastes
 - (C) Agricultural wastes
 - (D) Thermal wastes
15. In Sedimentary cycle, the reserve pool is :
- (A) An atmospheric component
 - (B) An aquatic component
 - (C) Lithosphere
 - (D) Lithosphere and atmosphere

16. Inclusion of bioemulsifiers in a bioremediation treatment helps in :
- Removal of hydrocarbon pollutant
 - Removal of diseases causing microorganism
 - Removal of heavy metals from soil
 - Adhesion of microorganism on polluted surface
17. Acid rain is mixture of :
- Nitric acid and Sulphuric acid
 - Sulphuric acid and Citric acid
 - Nitric acid and Hydrochloric acid
 - Sulphuric acid and Ascorbic acid
18. Lightning and thunder helps in :
- N₂ Cycle
 - P Cycle
 - S Cycle
 - All of the above
19. The biogas is a sustainable source of energy because :
- Independent of any fossil fuel
 - Renewable
 - Reduces the emission of greenhouse gases to the environment
 - All of the above
20. Biotechnological approaches helps in :
- Detecting pollutants
 - Converting waste products into energy resources
 - Restoring ecosystem
 - All of the above
21. The metabolic pathways of biohydrogen production from biomass sources include :
- Biophotolysis, Electrochemical
 - Fermentation, Biophotolysis
 - Eleetrochemical, Fermentation
 - Fermentation, Biophotolysis, Electrochemical
22. The reaction for Direct Biophotolysis process is :
- $2 \text{H}_2\text{O} + \text{light energy} \rightarrow 2\text{H}_2 + \text{O}_2$
 - $2 \text{H}_2\text{O} + \text{CO}_2 + \text{light energy} \rightarrow 2\text{H}_2 + \text{O}_2$
 - $\text{C}_6\text{H}_{12}\text{O}_6 + 12 \text{H}_2\text{O} + \text{light energy} \rightarrow 12 \text{H}_2 + 6 \text{CO}_2$
 - All of the above
23. Bacterial leaching of metal is carried out in :
- Acidic pH
 - Basic pH
 - Both (A) and (B)
 - No use of pH

24. The bacteria most active in bioleaching belong to genus :
- (A) *Pseudomonas*
 - (B) *Bacillus*
 - (C) *Thiobacillus*
 - (D) *Streptobacillus*
25. High CO₂ level in atmosphere causes :
- (A) Air pollution
 - (B) Acid rain
 - (C) Increase in photosynthesis
 - (D) Global warming
26. Which of the following metals is recovered by microbial leaching ?
- (A) Gold, Uranium and Magnesium
 - (B) Gold, Copper and Mercury
 - (C) Gold, Uranium and Copper
 - (D) Gold, Lead and Copper
27. The Secondary air pollutant :
- (A) Sulfuric acid and nitric acid
(component of acid rain)
 - (B) Particulate matter
 - (C) Nitrogen
 - (D) Peroxyacyl nitrates (PANs)
28. Select the correct statement :
- (A) Microbial leaching method is applied for metal recovery from low grade ores.
 - (B) Most bacteria which carried out bioleaching are chemolitho-autotrophs.
 - (C) The bioleaching bacteria only grow under anaerobic condition.
 - (D) Both (A) and (B)
29. Select incorrect statement :
- (A) Bioinsecticides are natural materials that are meant to kill or control insects.
 - (B) Natural source materials of bioinsecticides may include animals, plants, bacteria.
 - (C) Bioinsecticides are made by living things and are found in nature.
 - (D) All are correct
30. The waste water treatment unit which has both aerobic and anaerobic mechanism of organic pollutant removal is :
- (A) Trickling filter
 - (B) Oxidation ditch
 - (C) Activated sludge process
 - (D) Stabilization pond

31. A trickling filter is designed to remove :
- (A) Dissolved organic matter
 - (B) Colloidal solids
 - (C) Floating solids
 - (D) Dissolved organic matter
32. Activated sludge process is an activation of which growth process :
- (A) Anaerobic suspended
 - (B) Aerobic suspended
 - (C) Aerobic attached
 - (D) Anaerobic attached
33. Use of microorganisms and/or their derivatives to clean-up environmental contaminants is called as :
- (A) Bioremediation
 - (B) Bioemulsification
 - (C) Biocontrol
 - (D) All of the above
34. The main gases responsible for the greenhouse effect include :
- (A) Carbon dioxide
 - (B) Methane
 - (C) Water vapor
 - (D) All of the above
35. Suspended solids in the waste water are :
- (A) Soil, biological solids
 - (B) Decaying organic matter
 - (C) Particles discharged in waste water
 - (D) All of the above
36. Which of the following is a substrate for biomass production ?
- (A) E-waste
 - (B) Municipal and residential waste
 - (C) Metallic wastes
 - (D) Gaseous effluents
37. Leaching of metals by producing agents responsible for oxidation of minerals without direct involvement of microorganisms is :
- (A) Direct leaching
 - (B) *In-situ* leaching
 - (C) *Ex-situ* leaching
 - (D) Indirect leaching
38. What is the size of the particulate matter ?
- (A) Larger than 2.5 micrometers and smaller than 10 micrometers in diameter
 - (B) Larger than 5 micrometres and smaller than 10 micrometres in diameter
 - (C) Larger than 3 micrometres and smaller than 5 micrometres in diameter
 - (D) Larger than 2.5 micrometres and smaller than 5 micrometres in diameter

39. Select the correct statement :
- (A) Particulate matter is a complex mixture of extremely small particles and liquid droplets.
 - (B) Particle pollution is made up acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.
 - (C) Particulate matter, also known as particle pollution or PM.
 - (D) All are correct
40. Carbon monoxide, nitrogen oxides, particulate matter, sulfur oxides are :
- (A) Water pollutant
 - (B) Air pollutant
 - (C) Soil pollutant
 - (D) All of the above
41. Long-term health effects from air pollution include :
- (A) heart disease
 - (B) lung cancer and respiratory diseases
 - (C) Both (A) and (B)
 - (D) None of the above
42. Which of the following is called the secondary air pollutant' ?
- (A) PANs
 - (B) Ozone
 - (C) Carbon monoxide
 - (D) Nitrogen dioxide
43. Which of the following particles is called the particulate pollutants ?
- (A) Ozone
 - (B) Radon
 - (C) Fly Ash
 - (D) Ethylene
44. Which of the following statements is true about SMOG ?
- (A) SMOG is derived from the fog.
 - (B) SMOG is derived from smoke.
 - (C) SMOG is derived from water vapour.
 - (D) SMOG is derived from both fog and smoke.
45. Which of the following statements is true about the Air Quality Index ?
- (A) It indicates the colour of the air.
 - (B) It predicts ozone levels in your area.
 - (C) It determines the intensity of sound and sound pollution.
 - (D) It estimates air pollution mainly sulphur content in the air.

46. DDT and Aluminium cans are examples of :
- (A) Primary pollutants
 - (B) Secondary pollutants
 - (C) Biodegradable pollutants
 - (D) Non-biodegradable pollutants
47. High coliform count in water is an indicator of :
- (A) Industrial pollution
 - (B) Sewage contamination
 - (C) Hardness of water
 - (D) Oil pollution
48. Biogas is produced by :
- (A) Anaerobic digestion
 - (B) Fermentation
 - (C) Aerobic digestion
 - (D) All of the above
49. Which is used to check water pollution caused by industrial effluents ?
- (A) Water Hyacinth
 - (B) Parthenium
 - (C) Elephant Grass
 - (D) All of the above
50. One of the following is the chief source of water and soil pollution :
- (A) Agro industry
 - (B) Mining
 - (C) Thermal power stations
 - (D) All of the above
51. Ozone depletion is caused due to increase in the level of :
- (A) Water vapour
 - (B) Oxygen
 - (C) Chlorofluorocarbon
 - (D) Carbon monoxide
52. Water pollution :
- (A) Increases oxygenation
 - (B) Decreases turbidity
 - (C) Increases turbidity and deoxygenation
 - (D) Increases photosynthesis
53. Water pollution can be stopped best by :
- (A) Treating effluents to remove injurious chemicals
 - (B) Rearing more fishes
 - (C) Cultivating useful water plants
 - (D) Spraying with DDT

54. The excessive discharge of fertilizers into water bodies results in :
- (A) Growth of fish
 - (B) Death of hydrophytes
 - (C) Eutrophication
 - (D) Silt
55. Which of the following water sources will have least BOD ?
- (A) Pure water
 - (B) Agricultural discharge
 - (C) Waste water from battery industry
 - (D) Waste water from drug industry
56. Which of the following is produced in acetogenesis ?
- (A) Ethanol
 - (B) Acetate
 - (C) Acetone
 - (D) Ketone
57. What are the two main products of anaerobic digestion ?
- (A) Carbon monoxide and hydrogen
 - (B) Methane and carbon dioxide
 - (C) Methane and carbon monoxide
 - (D) Hydrogen and carbon dioxide
58. The commercial sources of energy are :
- (A) Solar, wind and biomass
 - (B) Fossil fuels, hydropower and nuclear energy
 - (C) Wood, animal wastes and agriculture wastes
 - (D) None of the above
59. Brine treatment of waste water is :
- (A) Removing dissolved salt ions from the wastewater stream
 - (B) Removing organic pollutant
 - (C) Removing oil content
 - (D) Removing grease from waste water
60. Bioindicators are used :
- (A) To assess the quality of the environment
 - (B) To know how environment changes over time
 - (C) It includes biological processes, species or communities.
 - (D) All are correct.

(Only for Rough Work)

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।