Roll. No. .....

O.M.R. Serial No. | | | | | | | | |

Question Booklet Number

10

B.Sc. (PART-III) EXAMINATION, 2021

BIOTECHNOLOGY

[PAPER : Fourth (BBT-304)]

(Environmental and Industrial Biotechnology)

Paper ID		
6	0	4

Question Booklet Series
B

Time : 1 : 30 Hours **Max. Marks : 150**

Instructions to the Examinee :

1. Do not open this Booklet untill you are told to do so.

2. Candidates should fill their roll number, subject and series of question booklet details correctly, otherwise, in case of any discrepancy in the evaluation, it will be the responsibility of the examinee himself.

3. There are 100 questions in the booklet. Examinee is required to answer only 75 questions in the OMR Answer Sheet provided. Four alternative answer to each question are given below the question, out of these four only one answer is correct. The answer which you think is correct or most appropriate, completely fill in the circle containing its letter in your answer sheet (O.M.R. Answer Sheet) with black or blue ball point pen.

परीक्षार्थियों के लिए निर्देश :

1. जब तक कहा न जाये, इस प्रश्नपुस्तिका को न खोलें।

2. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सिरीज का विवरण यथास्थान सही-सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।

3. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को केवल 75 प्रश्नों का उत्तर दी गई OMR उत्तर-पत्रक में देना है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर-पत्रक (O.M.R. Answer Sheet) में उसके अक्षर वाले वृत्त को काले या नीले बॉल प्वाइंट पेन से पूरा भर दें।

(Remaining instructions on last page) *(शेष निर्देश अन्तिम पृष्ठ पर)*

ROUGH WORK

1. Temperature in a fermenter :
   1. Rises due to exothermic metabolic activities
   2. Temperature rise is controlled by cooling water jackets
   (A) Statement (2) follows statement (1)
   (B) Statement (2) precedes statement (1)
   (C) No relation between statement (1) and (2)
   (D) None of the above

2. The aim of sewage treatment is control of :
   (A) Pest
   (B) Pollution
   (C) Bioprocess
   (D) Effluent production

3. Primary Treatment of sewage involves :
   (A) Biological processes
   (B) Chemical processes
   (C) Physical processes
   (D) All of the above

4. Which of the following is not true for vermicomposting ?
   (A) Improves soil aeration
   (B) Improves water holding capacity
   (C) Helps in root and plant growth
   (D) Improves greenhouse gas mission

5. The only similarity in composting and vermicomposting is :
   (A) Species of organisms involved
   (B) Type of substrate
   (C) Conditions of composting
   (D) Speed of composting

6. Major contributor to climate change is :
   (A) Fossil fuel combustion
   (B) Biogas combustion
   (C) Nuclear energy
   (D) Solar energy

7. Sewage treatment leads to :
   (A) Increase of BOD
   (B) Decrease of BOD
   (C) No effect on BOD
   (D) None of the above

8. Petroleum includes :
   (A) Only crude oil
   (B) Only solid hydrocarbons
   (C) Only liquid and gaseous hydrocarbons
   (D) All of the above

9. In-situ bioremediation ensures :
   (A) Quick degradation of pollutant
   (B) Control of degradation process
   (C) Maximum exposure to public
   (D) Minimum disruption of polluted site

10. Common bioassessment process includes :
   (A) Only planning, analysis and synthesis
   (B) Only problem resolution
   (C) Only initiation, decision and synthesis
   (D) All of the above

11. The process of coal formation is :

(A) Carbonization

(B) Esterification

(C) Hydrogenation

(D) Methenogenesis

12. An ecofriendly substitute to coal as energy source is :

(A) Petroleum

(B) Hydroelectricity

(C) Solar energy

(D) Only (B) and (C)

13. Match the following :

	Source		Energy
1 .	Sun	(i)	Nuclear
2 .	Water	(ii)	Thermal
3 .	Uranium	(iii)	Solar
4 .	Coal	(iv)	Hydroelectricity

(1) (2) (3) (4)

(A) (iii) (iv) (ii) (i)

(B) (iv) (ii) (i) (iii)

(C) (iii) (iv) (i) (ii)

(D) (ii) (i) (iii) (iv)

14. Which of the following causes air pollution ?

(A) Coal combustion

(B) Solar energy

(C) Nuclear energy

(D) Wind energy

15. Match the following :

1 .	Insecticides	(i)	Nematodes
2 .	Fungicides	(ii)	Rodents
3 .	Nematicides	(iii)	Insects
4 .	Rodenticides	(iv)	Fungus

(1) (2) (3) (4)

(A) (iii) (iv) (i) (ii)

(B) (iv) (i) (iii) (ii)

(C) (i) (ii) (iii) (iv)

(D) (iii) (iv) (ii) (i)

16. Biogas is a mixture of :

(A) Methane + Carbon dioxide

(B) Methane + Carbon monoxide

(C) Hydrogen sulphide + Carbon monoxide

(D) Carbon dioxide + Carbon monoxide

17. Which is not an effect of coal combustion ?

(A) Greenhouse gas emission

(B) Acid rain

(C) Ozone depletion

(D) Deforestation

18. Protein engineering allows :

(A) Substitution of amino acids

(B) Deletion of amino acids

(C) Insertion of unnatural amino acids

(D) All of the above

19. Production of transgenics can be done by :

(A) Protoplast fusion

(B) Micropropagation

(C) Cloning

(D) Recombinant DNA technology

20. Which of the following is not a biofuel ?

(A) Hydrogen

(B) Biodiesel

(C) Biogas

(D) Petrol

21. Biomass can be converted to biogas by :

(A) Fermentation

(B) Anaerobic digestion

(C) Pyrolysis

(D) Partial oxidation

22. Pesticide biodegradation transforms a pesticide into :

(A) Cancer causing substance

(B) Environment friendly substance

(C) Highly toxic substance

(D) Highly reactive substance

23. Let P=Physical process, B=Biological process and C=Chemical process, then correct order of sewage treatment strategy is :

(A) PBC

(B) BCP

(C) PCB

(D) BPC

24. Bioassessment measures and evaluates impact of :

(A) Plants on environment

(B) Human activities on environment

(C) Landslides on human beings

(D) Earthquakes on human beings

25. Environmental Monitoring is consequence of :

(A) Planning

(B) Public Litigation

(C) Government policies

(D) All of the above

26. On a 10-point scale, from poor to exceptional, a site is graded as 'impaired'. What does this imply ?

(A) Site can be partially restored

(B) Site is well preserved

(C) Site has been restored to natural state

(D) Site cannot be restored

27. Petroleum crops are used as :

(A) Biopesticide

(B) Food crops

(C) Raw material for fuel production

(D) Biofertilizer

28. *Bacillus thuringiensis* is a :

(A) Natural microbe

(B) Recombinant clone

(C) A transgenic

(D) A mutant

29. Chimeras are hybrids produced between :

(A) Closely related species

(B) Distantly related species

(C) Closely unrelated species

(D) Distantly unrelated species

30. Argument(s) in favour of transgenic plants is :

(A) Changes evolutionary pattern

(B) Increased crop productivity

(C) Development of highly resistant super weeds

(D) Transfer of genes from transgenic to natural plants

31. The correct order of stages of coal formation is :

(A) Peat $\rightarrow$ lignite $\rightarrow$ bituminous $\rightarrow$ anthracite

(B) Peat $\rightarrow$ bituminous $\rightarrow$ lignite $\rightarrow$ anthracite

(C) Peat $\rightarrow$ anthracite $\rightarrow$ lignite $\rightarrow$ bituminous

(D) Anthracite $\rightarrow$ bituminous $\rightarrow$ lignite $\rightarrow$ peat

32. Phosphate solubilizing bacteria convert non-available phosphate to available :

(A) Inorganic phosphate

(B) Organic phosphate

(C) Both (A) and (B)

(D) Phosphorus

33. _____ is not a biofertilizer.

(A) *Nostoc*

(B) *Azospirillum*

(C) *Azolla-Anabena*

(D) *Bacillus thuringiensis*

34. Which of the following is not plant derived biopesticide ?

(A) Alkaloids

(B) Terpenoids

(C) Phenolics

(D) Pheromones

35. BOD is a measure of :

(A) Dissolved CO_2

(B) Dissolved CO

(C) Dissolved O_2

(D) Dissolved H_2

36. Secondary treatment of waste water substantially reduces :

(A) Large objects and trash

(B) Dissolved organic content

(C) Fat and grease

(D) Dissolved inorganic solid

37. Number of metrics in stream condition Index are :

(A) Six

(B) Fifteen

(C) Ten

(D) Eight

38. Which of the following is correctly matched :

(A) Earthworm – Metals

(B) Lichens – Air pollution

(C) Honeybees – TNT

(D) Mosses – AMD

39. Which of the following is ex-situ bioremediation ?

(A) Bioventing

(B) Biosparging

(C) Composting

(D) Stimulation

40. Bioassessment :

(A) Characterizes overall condition of watersheds

(B) Identifies potential pollutants

(C) Evaluates effect of management programs

(D) All of the above

41. Pretreatment of waste water is essential if :

(A) Large solid objects are present

(B) Mostly dissolved solids are present

(C) Small solid objects are present

(D) Solids do not damage treatment machinery

42. Mycorrhizae is an association between :

(A) Plant roots and fungi

(B) Algae and fungi

(C) Bacteria and fungi

(D) Algae and bacteria

43. Domestic sewage can be treated on small scale in :

(A) Septic tank

(B) Cesspool

(C) Both (A) and (B)

(D) None of the above

44. Which of the following is correctly matched ?

(A) Phytoremediation – Uses plants

(B) Bioventing – Anaerobic biodegradation

(C) Biostimulation – Depleting nutrients for indigenous microbes

(D) Land farming – Bioremediation of heavy metal polluted site

45. Cheddar Cheese is an example of :

(A) Natural food

(B) Fermented food

(C) Synthetic food

(D) Non-fermented food

46. Transgenics can be developed :

(A) by genetic manipulation within same species

(B) by gene transfer from one species to the other

(C) naturally without genetic manipulation

(D) None of the above

47. The toughest energy source to tap is :

(A) Tidal Energy

(B) Geothermal Energy

(C) Wind Energy

(D) Coal Energy

48. Fossil Fuels are :

(A) Non-renewable

(B) Derived from fossils

(C) Easily tapped

(D) All of the above

49. Most expensive constituent of animal cell culture medium is :

(A) NaCl

(B) Water

(C) Serum

(D) $FeCl_3$

50. Methanogens are so called because they produce :

(A) Ethane

(B) Methane

(C) Propane

(D) Hexane

51. In Bt cotton, "Bt" indicates :

(A) An antibiotic

(B) A growth factor

(C) Extracellular growth

(D) Bacterial toxin

52. Generation of wind energy is opposed by people because :

(A) windmills create noise pollution

(B) of land use conflict

(C) it is expensive

(D) only (A) and (B) are correct

53. _____ is not a methanogen.

(A) *Methanococcus burtonii*

(B) *Methanobacterium bryanti*

(C) *Ficus religiosa*

(D) *Methanosarcina barkeri*

54. Which one of the following is not a petroleum crop ?

(A) *Hevea brasiliensis*

(B) *Parthenium argentatum*

(C) *Oryza sativa*

(D) *Botryococcus braunii*

55. Which among the following is fool's gold ?

(A) Iron Sulphate

(B) Iron Sulphide

(C) Copper Sulphate

(D) Copper Sulphide

56. Exxon Valdez oil spill occurred in :

(A) 1990

(B) 1989

(C) 1985

(D) 1986

57. Coal miners are affected by :

(A) Crohn's Disease

(B) Silicosis

(C) Both (A) and (B)

(D) None of the above

58. Which one of the following is not a greenhouse gas ?

(A) Methane

(B) Nitrous oxide

(C) Ozone

(D) Hydrogen

59. CFC stands for :

(A) Chlorofluorine Carbide

(B) Carbon fluorocarbide

(C) Chlorofluoro carbons

(D) None of the above

60. Which is not a demerit of Green Revolution ?

(A) Not suitable for poor farmer

(B) Decreased soil fertility

(C) Higher yield crops

(D) Reduces water level

61. Growth kinetics in Batch Culture shows :

(A) Only lag and stationary phase

(B) Only log and lag phase

(C) Only stationary phase

(D) Log, lag and stationary phase

62. Match the following :

1 .	Gas Biosensor	(i)	Pesticide detection
2 .	Immunoassay Biosensor	(ii)	SO_2 detection
3 .	BOD biosensor	(iii)	Glucose
4 .	Blood glucose biosensor	(iv)	Organic Pollution

(1) (2) (3) (4)

(A) (i) (ii) (iii) (iv)

(B) (ii) (iii) (iv) (i)

(C) (ii) (i) (iv) (iii)

(D) (ii) (i) (iii) (iv)

63. Which of the following is correctly matched ?

(A) Beer – Grapes

(B) Tempe – Groundnut

(C) Yoghurt – Milk

(D) Wine – Barley

64. GMO stands for :

(A) Genetically mobilized organisms

(B) Genetically modified organisms

(C) Genetically motivated organisms

(D) Genetically matched organisms

65. Which is not true about solar energy ?

(A) Abundant

(B) Free of cost

(C) Renewable energy

(D) Cannot be stored

66. Nuclear Energy can be obtained by :

(A) Nuclear fission only

(B) Nuclear fusion only

(C) None of the above

(D) By nuclear fission and fusion

67. Solid Substrate Fermentation takes place in presence of :

(A) 100% moisture

(B) 50-100% moisture

(C) 0-10% moisture

(D) 20-50% moisture

68. Which of the following is a biopesticide ?

(A) *Rhizobium*

(B) *Azotobactor*

(C) *Spirillum*

(D) *Trichoderma*

69. Attributes of a good industrial strain is/are :

(1) High yielding

(2) Genetically stable

(3) Produces undesirable products

(A) Only (1) and (2)

(B) Only (1) and (3)

(C) Only (2) and (3)

(D) None of the above

70. Algal biomass cannot be achieved in :

(A) Open ponds

(B) Anaerobic digesters

(C) Photobioreactor

(D) Both open pond and photobioreactor

71. Methanogens are :

(A) Algae

(B) Bacteria

(C) Fungi

(D) Insect

72. Gasohol is a mixture of :

(A) Petrol and ethanol

(B) Petrol and methanol

(C) Diesel and ethanol

(D) Diesel and methanol

73. Critical factor for algal biomass production is :

(A) Large space

(B) Sunlight

(C) Specialized production vessel

(D) Presence of other microbes

73. Which of these is not fermented dairy product ?

(A) Yoghurt

(B) Kefir

(C) Tofu

(D) Cheese

75. Biomineralisation is formation of :

(A) Carbonates, phosphates and nitrates

(B) Carbonates, phosphates and silicates

(C) Only phosphates and nitrates

(D) Only silicates and nitrates

76. Bioaccumulation is different from bio-magnification in :

(A) Transfer from lower trophic level to higher level

(B) Transfer from higher to lower trophic level

(C) Accumulation in an individual

(D) Accumulation in community

77. Biological Components of a biosensor include :

(A) Enzyme

(B) Antibody

(C) Cell

(D) Anyone of (A) (B) or (C)

78. Xenobiotic is a :

(A) Component of atmosphere

(B) Component of human body

(C) Foreign component of atmosphere

(D) Component of plants

79. In-situ bio-remediation occurs :

(A) in a bioreactor

(B) at the site of contamination

(C) away from the site of contamination

(D) in a microbial cell

80. Which of the following is odd ?

(A) Composting

(B) Aerated Lagoons

(C) Low-Shear air-lift reactor

(D) Fluidized – bed soil reactor

81. Lignocellulosic biomass contains :

(A) Cellulose

(B) Hemicellulose

(C) Lignin

(D) All of the above

82. Which of the following is a disadvantage of biofuels ?

(A) Environment friendly

(B) Cost effective

(C) Encroachment upon natural habitat of plants and animals

(D) Less dependence on fossil fuels

83. Continuous culture can be established as :

(A) Turbidostat

(B) Chemostat

(C) Biostat

(D) All of the above

84. Which of the following is correctly matched ?

(A) Phosphate Solubilizing bacteria – *Thiobacillus*

(B) Symbiotic Nitrogen fixer – *Azotobacter*

(C) Asymbiotic Nitrogen fixer – *Rhizobium*

(D) Symbiotic Nitrogen fixer – *Azolla* bacteria

85. An ideal microbe to be used as biofertilizer should be :

(A) Free living

(B) Symbiotic

(C) Parasitic

(D) Either (A) or (B)

86. Solar energy can be trapped by using :

(A) Solar panel

(B) Windmills

(C) Energy plantations

(D) Both (A) and (C)

87. Coal mining causes :

(A) Acid mine drainage

(B) Seam fires

(C) Destruction of landscape

(D) All of the above

88. Cellulosic Biomass can be converted into energy by :

(A) Saccharification $\rightarrow$ Hydrolysis $\rightarrow$ Acidogenesis $\rightarrow$ Methanogenesis

(B) Hydrolysis $\rightarrow$ Acidogenesis $\rightarrow$ Methanogenesis

(C) Saccharification $\rightarrow$ Acidogenesis $\rightarrow$ Methanogenesis

(D) Saccharification $\rightarrow$ Acidogenesis $\rightarrow$ Hydrolysis

89. Biogas is produced from organic matter in :

(A) Absence of oxygen

(B) Presence of oxygen

(C) Presence of argon

(D) Presence of xenon

90. Enzymes responsible for H_2 production are :

(A) Hydrogenase and Esterase

(B) Nitrogenase and Aldolase

(C) Hydrogenase and Nitrogenase

(D) Esterase and Aldolase

91. Biofuels lead to :

(A) Air pollution

(B) Less carbon emission

(C) Soil pollution

(D) Water pollution

92. Continuous fermentation is different from Batch fermentation in :

(A) Nutrients are added continuously

(B) Nutrient are added as and when needed

(C) Nutrient are added only initially

(D) Nutrients are never added

93. What are the two forms of alcohol included in biofuels ?

(A) Methanol and Propanol

(B) Ethanol and Propanol

(C) Ethanol and Methanol

(D) None of the above

94. Which is the largest source of biomass energy ?

(A) Animal waste

(B) Industrial waste

(C) Fibrous waste of paper industry

(D) Fibrous waste of sugar industry

95. Which of the following does not contribute to success of industrial fermentation ?

(A) Strain improvement

(B) Characterization of strains

(C) Mass production of chemicals

(D) Uncontrolled bioprocess

96. Optimum growth of acidophilic producer strains occur at :

(A) High pH

(B) Low pH

(C) Neutral pH

(D) pH is not important

97. World Environment Day is celebrated on :

(A) June 10

(B) June 5

(C) July 5

(D) October 20

98. A bioreactor converts :

(A) Substrate to product in specific time

(B) Product to substrate in specific time

(C) Substrate to product in no specific time

(D) Product to substrate in no specific time

99. Which is not essential for growth of industrial microbes ?

(A) Carbohydrates

(B) Glycerol

(C) Sulphuric acid

(D) Fats

100. Match the following :

	Source		Nutrient
1 .	Glucose	(i)	Nitrogen
2 .	Vitamins	(ii)	Trace elements
3 .	Nitrate	(iii)	Carbohydrate
4 .	Mineral salts	(iv)	Growth factors

(1) (2) (3) (4)

(A) (iv) (iii) (ii) (i)

(B) (iv) (ii) (i) (iii)

(C) (ii) (iv) (iii) (i)

(D) (iii) (iv) (i) (ii)

ROUGH WORK

Example :

Question :

Q.1 Ⓐ ● Ⓒ Ⓓ
Q.2 Ⓐ Ⓑ ● Ⓓ
Q.3 Ⓐ ● Ⓒ Ⓓ

If more than 75 questions are attempted by candidate, then the first attempted 75 questions will be considered for evaluation.

4. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
5. 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.
6. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
7. After the completion of the examination, candidates should leave the examination hall only after providing their question booklet and OMR Answer Sheet separately to the invigilator.
8. There will be no negative marking.
9. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
10. To bring and use of log-book, calculator, pager & cellular phone in examination hall is prohibited.
11. 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.

उदाहरण :

प्रश्न :

प्रश्न 1 Ⓐ ● Ⓒ Ⓓ
प्रश्न 2 Ⓐ Ⓑ ● Ⓓ
प्रश्न 3 Ⓐ ● Ⓒ Ⓓ

यदि परीक्षार्थी द्वारा 75 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 75 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा।

4. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
5. सभी उत्तर केवल ओ०एम०आर० 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।
6. ओ०एम०आर० उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
7. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक-पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
8. निगेटिव मार्किंग नहीं है।
9. कोई भी रफ कार्य, प्रश्न-पुस्तिका में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
10. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
11. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

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