Environment Biotechnology

Answer Key

27/06/2021

Gujarat Biotechnology Research Centre

Environmental Biotechnology (Scientist B)

This question booklet contains 28 pages

Application No: _____

Time: 2 Hours

Total Marks: 200

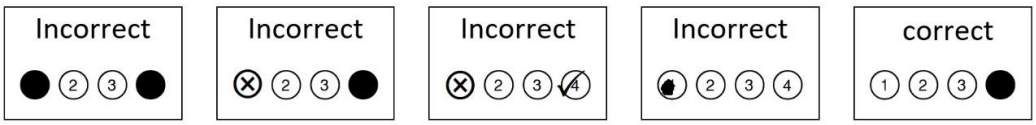
Total Questions: 200

Candidate Signature : .....

Invigilator Signature : .....

Instructions for Candidate

1. This question booklet contains 200 questions.
2. Each correct answer carries 1 mark.
3. Use only Black Ball Point Pen to darken the appropriate circle in OMR.
4. Please darken the complete circle.
5. Darken ONLY ONE CIRCLE for each Question as shown below:



6. Answer once marked cannot be changed.
7. Please do not make any stray marks on the Question Booklet.
8. Rough works must be done on the blank page of Question Booklet.
9. Mark your answer in the appropriate space in the Answer Sheet against the Number corresponding to the question.
10. The Candidate is NOT allowed to carry Question booklet and OMR response sheet with him/her on conclusion of examination.

1 According to Indian standards, tolerance limits of BOD for inland surface water is ----ppm

(A) 3
(B) 30
(C) 300
(D) 3000

2 In waste water treatment, HRT stand for

(A) High rate treatment
(B) Hydraulic retention time
(C) High retention time
(D) Hydraulic reaction time

3 The two main constituents of biogas are

(A) Methane and Carbon dioxide
(B) Methane and Nitrogen
(C) Methane and Hydrogen
(D) Methane and Carbon monoxide

4 Which one of the following fuel has highest % thermal efficiency?

(A) Biogas
(B) Fire wood
(C) Cow dung cake
(D) Charcoal

5 The desired C/N ratio for microbial digestion of waste is

(A) 3
(B) 5
(C) 30
(D) 50

6 In anaerobic digestion, the correct sequence of the group of organisms involved is

(A) Methanogenic→ Acetogenic→Hydrolytic
(B) Methanogenic→Hydrolytic→Acetogenic
(C) Hydrolytic → Methanogenic → Acetogenic
(D) Hydrolytic → Acetogenic → Methanogenic

7 Desired growth substrate for the methanogenic bacteria is

(A) $H_2 + CO_2$
(B) $CO_2 + H_2S$
(C) $H_2 + CO$
(D) $CO + H_2O$

8 To determine the total solids of the waste the sample is heated to a temperature

(A) 550^0C for 1 hour
(B) 550^0C for 5 hour
(C) 105^0C for 1 hour
(D) 105^0C for 5 hour

9 Treatment of 1 hour heating in boiling water with ----------is required to convert non-reducing soluble sugar into reducing sugar

(A) 10% HCl
(B) 20% HCl
(C) 40% HCl
(D) 80% HCl

10 For COD estimation, most organic matters are oxidized by a boiling mixture of

(A) Hydrochloric and Nitric acid
(B) Chromic and sulfuric acid
(C) Chromic and hydrochloric acid
(D) Hydrochloric and sulfuric acid

11 The death of a river by environmental pollutants ultimately results from

(A) the buildup of sediment on the river bottom
(B) the depletion of oxygen
(C) the overabundance of toxic proteins
(D) the overpopulation of algae

12 In a reactor, normally the ratio of MLVSS / MLSS is

(A) 0.1 -0.2
(B) 0.8-0.9
(C) 1.0-2.0
(D) 8.0-9.0

13 A ratio of ----- of faecal coliform / faecal streptococci (FC/FS) indicate contamination of human origin

(A) one or less
(B) One
(C) Less than four
(D) Four or more

14 Which of the following should not be the property of trickling filter media?

(A) High surface area to volume ratio
(B) Low surface area to volume ratio
(C) Does not clog easily
(D) High strength and reliability

15 From the following reactors which one allow highest COD loading rate

(A) UASB
(B) FBR
(C) Down flow reactor
(D) Contact process

16 Which of the following organic compound has lowest solubility in water?

(A) Biphenyl
(B) p-Dichlorobenzene
(C) Hexachlorobenzene
(D) Tetrachloroethylene

17 The largest bacterium Epulospicium fishelsoni is --------m in length

(A) 0.6
(B) 6.0
(C) 60.0
(D) 600.0

18 Optimum condition for the separation of bacterial cells from the medium is

(A) 10g for 15 min
(B) 100g for 15 min
(C) 1000g for 15 min
(D) 10000g for 15 min

19 What is the ideal diluting fluid for the dilution of living microbial cells?

(A) Sterile distilled water
(B) Sterile 0.8-0.95% saline
(C) Sterile N broth
(D) Sterile 8.0 to 9.0 % saline

20 In a typical MPN test, when 5 tubes of each dilution show positive results the probable counts per 100ml is

(A) <16
(B) > 160
(C) < 1600
(D) >1600

21 Thermophiles grow optimally between ----------to ---------- ^{0}C temperature

(A) 0-15
(B) 15-30
(C) 30-45
(D) 45-60

22 Which of the following organism use both reduced sulphur compound and ferrous iron as electron donor?

(A) Sulfolobus sp.
(B) Acidianus sp.
(C) Acidithiobacillus ferrooxidans
(D) Leptospirillum ferrooxidans

23 Mainly which contaminants are responsible for Eutrophication?

(A) Carbon and lipid
(B) Nitrogen and lipid
(C) Nitrogen and phosphate
(D) Phosphate and sulfate

24 Lichens represent which type of Association?

(A) Commensalism
(B) Mutualism
(C) Parasitism
(D) Predation

25 The phase following the lag phase is

(A) Stationary phase
(B) Decline phase
(C) Exponential phase
(D) Death phase

26 The organisms which use organic compounds as both energy and carbon sources are known as

(A) Chemoautotroph
(B) Photoheterotroph
(C) Chemoheterotroph
(D) Photolithotroph

27 Sulfide mines industry is main source of ----------

(A) Organic pollutants
(B) Metallic pollutants
(C) Flammable pollutants
(D) Phenolic pollutants

28 Amongst below mentioned inorganic pollutants which one has lowest permissible level

(A) Arsenic
(B) Barium
(C) Mercury
(D) Selenium

29 Cattle waste has nearly 10 fold higher COD compare to BOD due to the presence of _____

(A) High amount of Toxic metals
(B) Absence of organic matter
(C) High amount of lignin and fiber
(D) Low pH

30 Chlorella vulgaris is representing --------tropical level

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

31 High rate ponds used for the treatment of waste water is having depth of -------m

(A) 0.1 to 0.2
(B) 0.2 to 0.5
(C) 1.0 to 2.0
(D) 2.0 to 5.0

32 Strong wastes with a BOD5 more than 500mg/l are first treated in

(A) High rate ponds
(B) Facultative ponds
(C) Anaerobic ponds
(D) Maturation ponds

33 In the conventional activated sludge system the biomass at the highest level and the substrate at the low level is achieved by ------

(A) Decreasing HRT
(B) Increase influent flow rate
(C) Recycling some of the sludge
(D) Removing the sludge

34 A society is producing 20000 L 0f waste water daily, what size of treatment plant is required if HRT is 6h

(A) 120000L
(B) 20000 L
(C) 5000 L
(D) 2000 L

35 Sludge disposed for some agricultural uses need to be treated to reduce the levels of pathogens by

(A) Heating at 40^0C for 15 min
(B) Heating at 70^0C for 15 min
(C) Heating at 70^0C for 30 min
(D) Heating at 40^0C for 30 min

36 The organic compounds released into the environment but not normally found in the environment are known as

(A) Inert
(B) Persistant
(C) Xenobiotic
(D) Recalcitant

37 The increase in a pollutant concentration in tissue of successive organisms of a food chain is known as

(A) Bioaccumulation
(B) Biosorption
(C) Biomagnification
(D) Bioadsorption

38 In case of polyaromatic hydrocarbons(PAHs) the solubility is normally found to decrease with

(A) Decrease in number of rings
(B) Decrease in boiling points
(C) Decrease in molecular weight
(D) Increase in complexity

39 Benzopyrene has ----------benzene rings

(A) 2
(B) 3
(C) 4
(D) 5

40 Which one of the following is a polyaromatic hydrocarbons (PAHs)

(A) Cyclopentane
(B) Naphthalene
(C) Toluene
(D) Benzene

41 Which source is responsible for highest amount of oil release into the Ocean?

(A) Big spills
(B) Drains
(C) Maintenance
(D) Off shore drilling

42 Microbial breakdown of a compound which is not used as a source of carbon or energy is known as

(A) Detoxification
(B) Biodegradation
(C) Co-metabolism
(D) Metabolism

43 Biosurfactants help in remediation of hydrocarbon contaminants in soil by

(A) Degrading
(B) Changing the structure
(C) Improving the bioavailability
(D) Changing composition

44 Transposon Tn4651 is responsible for degradation of

(A) Parathion
(B) 3-chloroanaline
(C) Dieldrin
(D) Toluene

45 The process used by the plant for the transformation of one species of molecules into a less toxic species or the reduction of mobility is known as

(A) Phytoaccumulation
(B) Phytoextraction
(C) Phytovolatilization
(D) Phytostabilization

46 For the removal of hydrogen sulfide which organisms is used?

(A) Desulfovibrio
(B) Desulfotomaculum
(C) Acidithiobacillus
(D) Arthrobacter

47 Which of the below mentioned product is primary microbial product?

(A) Antibiotics
(B) Pigments
(C) Polymers
(D) Lactic acid

48 Organism used for the microbial production of Butanol is

(A) Saccharomyces cerevisiae
(B) Acetobacter butylicum.
(C) Candida albicans
(D) Clostridium acetobutylicum

49 The process used to recover the mineral from the ore without removing the ore where it is in the ground (from the mine) is known as

(A) Heap leaching
(B) Dump leaching
(C) In situ leaching
(D) Vat leaching

50 ---------- is one of the world's 18 "biodiversity hotspots" located in India

(A) Mount Abu
(B) Western Ghats
(C) Costal line of Gujarat
(D) Chilka lake

51 The two most commonly used organisms for the leaching of sulfide ore are

(A) Acidithiobacillus ferrooxidans + Thiobacillus thioparus
(B) Acidithiobacillus thiooxidans + Thiobacillus thioparus
(C) Acidithiobacillus ferrooxidans + Acidithiobacillus thiooxidans
(D) Thiobacillus thioparus + Sulfolobus sp.

52 The most significant oxidizing agent produced by microorganisms for extraction of metals is

(A) Potassium dichromate
(B) Ferric sulfate
(C) Ferrous sulfate
(D) Sulfuric acid

53 Extraction of metals from e-waste can be carried out by the use of

(A) Biogenerated Ferrous sulfate
(B) Biogenerated hydrogen
(C) Biogenerated H_2S
(D) Biogenerated ferric sulfate

54 Biosorption is the process of removal of pollutants from

(A) Sludge
(B) Waste water
(C) Vegetables
(D) Food products

55 A solution contains 11.1 g of $CaCl_2$ in a total volume of 200 ml. This can be expressed as ____ solution.
(MW of $CaCl_2$ = 110.994)

(A) 5.0M
(B) 0.5M
(C) 0.05M
(D) 0.005M

56 A bacterium having doubling time of 10 minutes, fills a cylindrical vessel completely in 180 min. How much time will it take to fill half of the vessel?

(A) 45 min
(B) 90 min
(C) 135 min
(D) 170 min

57 The group of organisms which uses light as the energy source and CO_2 as the principal carbon source is called

(A) Photoheterotrophs
(B) Chemoautotrophs
(C) Chemoheterotrophs
(D) Photoautotrophs

58 Which of the following is not a distinguishing characteristic of prokaryotic cells?

(A) they lack membrane-enclosed organelles
(B) they have cell walls containing peptidoglycan
(C) their DNA is not associated with histones
(D) they lack a plasma membrane

59 The most efficient microorganism for synthetic fuels production is

(A) Zymomonas mobilis
(B) Saccharomyces carisbergensis
(C) Methylotrophicus methylotrophus
(D) Clostridium acetobutylicum

60 "Superbug" was a name coined for organisms engineered for

(A) antibiotic production.
(B) probiotic production.
(C) hydrocarbon degradation.
(D) enzyme production.

61 Which of the following statements is most correct about the differential Gram stain?

(A) Crystal violet differentially stains Gram positive cells
(B) Gram's iodine differentially destains Gram positive cells
(C) Acetone differentially destains Gram negative cells
(D) Gram's iodine differentially stains Gram negative cells

62 Production of laccase and non specific lignin modifying enzymes by ----------is reported for dye degradation

(A) Bacillus subtillis
(B) Actinomycetes
(C) Phanerochaete chrysosporium
(D) Enterococcus faecalis

63 Which are the only microorganisms able to degrade the whole wood components

(A) Gram's positive bacteria
(B) Gram's negative bacteria
(C) Methanoganic organisms
(D) White rot fungi

64 The organism reported to decolorize acid dyes even in the presence of 15% NaCl is

(A) Bacillus sp.
(B) Halomonas sp.
(C) Pseudomonas sp.
(D) Shewanella sp.

65 For high BOD containing waste, anaerobic process is preferred because it

(A) Leads to complete degradation
(B) Is faster than aerobic process
(C) Produce less sludge or biomass compare to aerobic process
(D) does not require mixing

66 During waste water treatment, sludge is recycled to increase

(A) HRT
(B) Available oxygen
(C) Available food
(D) SRT

67 Microorganisms capable of withstanding temperature above 45°C but do not grow at this higher temperature are known as

(A) Thermotolerant
(B) Thermophiles
(C) Hyper thermophiles
(D) Psycrophiles

68 A membrane filter with about _____ pore size is used for removal of most of the cellular organisms.

(A) 0.045 µm
(B) 0.45 µm
(C) 0.45 mm
(D) 0.045 cm

69 The Petroff-Hauser chamber is commonly used for

(A) Staining the bacterial cells
(B) Counting the bacterial cells
(C) Growing the bacterial cells
(D) Diluting the bacterial cells

70 Pseudo murein is present in the cell wall of which of the following microbes?

(A) streptococci
(B) staplyococci
(C) methanococci
(D) micrococci

71 A flow-cytometer is used to measure which of the following?

(A) Cells
(B) DNA
(C) RNA
(D) Proteins

72 Penicillin resistant bacteria produces beta-lactamase that inactivates penicillin by which mode of action?

(A) esterifying the carboxyl group
(B) oxidizing S atom
(C) hydrolyzing the side chain
(D) hydrolyzing the C-N bond

73 Which is the most preferred carbon source for E.coli?

(A) Glucose
(B) Glycerol
(C) Galactose
(D) Sucrose

74 Which antibiotic attaches to 50S ribosome and inhibits peptidyl transferase activity?

(A) Chlroamphenicol
(B) Penicillin
(C) Trimethoprim
(D) Amphotericin

75 Co-transformation between two genes is likely to occur in which of the following circumstances?

(A) Close to one another
(B) Far apart from one another
(C) Both next to F-factor
(D) Both oriented in the same direction

76 The smallest biological unit capable of evolving over time is?

(A) a cell
(B) an individual organism
(C) a population
(D) a species

77 Which technique uses restriction enzyme digestion followed by agarose gel electrophoresis to generate a banding pattern for comparison to another sample processed in the same way?

(A) qPCR
(B) RT-PCR
(C) RFLP
(D) 454 sequencing

78 The science of studying the entire collection of mRNA molecules produced by cells, allowing scientists to monitor differences in gene expression patterns between cells, is called as?

(A) genomics
(B) transcriptomics
(C) proteomics
(D) pharmacogenomics

79 Which of the following antimicrobial drugs is synthetic?

(A) sulfonamide
(B) penicillin
(C) actinomycin
(D) neomycin

80 Which of the following combinations would most likely contribute to the development of a superinfection?

(A) long-term use of narrow-spectrum antimicrobials
(B) long-term use of broad-spectrum antimicrobials
(C) short-term use of narrow-spectrum antimicrobials
(D) short-term use of broad-spectrum antimicrobials

81 Which of the following resistance mechanisms is commonly effective against a wide range of antimicrobials in multiple classes?

(A) efflux pump
(B) target mimicry
(C) target modification
(D) target overproduction

82 Which of the following types of drug-resistant bacteria do not typically persist in individuals as a member of their intestinal microbiota?

(A) MRSA
(B) VRE
(C) CRE
(D) ESBL-producing bacteria

83 An antibiotic that resembles the 3'end of a charged tRNA molecule is?

(A) streptomycin
(B) sparsomycin
(C) puromycin
(D) tetracycline

84 A culture medium contains two carbon sources, one is preferred carbon source (glucose) and other is a non-preferred carbon source (lactose). Which one below is correct regarding the nature of growth curve of E.coli cultured in this medium?

(A) growth curve will be the same as when grown in presence of only glucose
(B) growth curve will be same as when grown in presence of only lactose
(C) a lag phase will be observed between the two exponential phases
(D) two lag phase will be observed between the two exponential phases

85 Which of the following regarding the Ames test is true?

(A) It is used to identify newly formed auxotrophic mutants.
(B) It is used to identify mutants with restored biosynthetic activity.
(C) It is used to identify spontaneous mutants.
(D) It is used to identify mutants lacking photoreactivation activity.

86 What types of microbes live in the intestines?

(A) Diverse species of bacteria, archaea, and fungi, especially Bacteroides and Firmicutes bacteria
(B) A narrow range of bacteria, especially Firmicutes
(C) A narrow range of bacteria and fungi, especially Bacteroides
(D) Archaea and fungi only

87 Which of the following yeild compounds with the most antimicrobial activity?

(A) Water
(B) Air
(C) Volcanoes
(D) Wastewater

88 Which of the following bacterial species divides by fragmentation?

(A) Bacillus subtilis
(B) Streptococcus faecalis
(C) Rhodopseudomonas acidophila
(D) Nocardia sp.

89 Rhodopseudomonas acidophila reproduces by which of the following methods?

(A) Binary fission
(B) Budding
(C) Fragmentation
(D) Sporulation

90 Equatorial ridge formation in the cell wall takes place in which of the following bacteria?

(A) Streptomyces sp
(B) Bacillus subtilis
(C) Streptococcus faecalis
(D) Escherichia coli

91 Which of the following does not occur during binary fission in bacteria?

(A) Cell elongation
(B) Cytokinesis
(C) DNA duplication
(D) Spindle formation

92 Cell-wall biosynthesis is inhibited by antibiotics by inhibiting the biosynthesis of which of the following?

(A) lipopolysaccharide
(B) cellulose
(C) peptidoglycan
(D) proteins

93 Streptomyces orientalis produces which of the following antibiotics?

(A) Cephalosporins
(B) Cycloserine
(C) Bacitracin
(D) Vancomycin

94 Polymyxins inhibits the growth of the microbes by carrying out which of the following actions?

(A) inhibition of cell-wall synthesis
(B) damage to cytoplasmic membrane
(C) inhibition of nucleic acid and protein synthesis
(D) inhibition of specific enzyme systems

95 Antibiotic produced by Streptomyces rimosus is known as?

(A) chlortetracycline
(B) oxytetracycline
(C) tetracycline
(D) doxycycline

96 Tyrocidines are more effective against which organisms?

(A) Gram-positive organisms
(B) Gram-negative organisms
(C) Mycoplasmas
(D) Spirochetes

97 Pigs respond dramatically to the addition of which of the following antibiotics to their diet?

(A) aureomycin
(B) terramycin
(C) penicillin
(D) oxytetracycline

98 Which of the following antibiotic have a sparing effect on the B12 in the diet?

(A) Streptomycin
(B) Tetracycline
(C) Anthramycin
(D) Chloramphenicol

99 Which type of earthworms is the choice for vermin composting?

(A) Endogeic
(B) Mesogeic
(C) Epigeic
(D) Phytogeic

100 Which of the following is effective in the control of tuberculosis in humans?

(A) Nitrofurans
(B) Nalidixic Acid
(C) Sibromycin
(D) Isoniazid

101 9K medium used for cultivation of Iron oxidizing organisms, where 9k refer the concentration of

(A) Ammonium sulfate
(B) Potassium chloride
(C) Ferrous sulfate
(D) Di-potassium hydrogen phosphate

102 What is the shape of DNA in the male cells of E.coli?

(A) linear
(B) supercoiled
(C) circular
(D) relaxed

103 What is the frequency of formation of recombinants in a F+ X F- cross?

(A) 100
(B) 40
(C) 10
(D) 1

104 Which of the following is true for an Hfr X F- cross?

(A) frequency of recombination high, transfer of F factor low
(B) frequency of recombination high, transfer of F factor high
(C) frequency of recombination low, transfer of F factor high
(D) frequency of recombination low, transfer of F factor low

105 Which of the enzymes is used to cut the recipient DNA?

(A) endonuclease
(B) exonuclease
(C) ligases
(D) polymerase

106 The replacement of a purine by a pyrimidine or vice versa is known as?

(A) transversion
(B) transition
(C) base-pair substitution
(D) missense mutation

107 Redox reaction facilitated by microbes results in metal?

(A) Reduction
(B) Oxidation
(C) Mobilization
(D) Immobilization

108 The fatty acid can not be used for biofuel if it consists which of the following?

(A) Hydrophobic nature
(B) high degree of saturation
(C) Ionic nature of carbonyl groups
(D) Variation of length

109 Which method can be used to separate phosphates from insoluble precipitates?

(A) Temperature
(B) pH
(C) Volume
(D) Sedimentation

110 Which of the following serve as a growth substrate for co-metabolic process?

(A) Sugars by hydrolases
(B) Sugars by oxidases
(C) Sugars by carboxylase
(D) Sugars by methane

111 Which of the following is not an intervention of environment biotechnology?

(A) Waste management
(B) Pollution control
(C) Antibiotic development
(D) Manufacturing process

112 Which of the following is not caused as a result of the altered primary productivity of water bodies?

(A) Algal blooms
(B) Adverse health effects
(C) Reduction in water quality
(D) Increase in water quality

113 The rate of degradability of pollutants is determined by its stability along with which of the following aspects?

(A) residence time
(B) fermentation time
(C) instability
(D) growth

114 The bacteria in the gut, which contribute to immune functioning, are collectively called:

(A) Microbiota
(B) Probiotics
(C) Prebiotics
(D) Bacteroides

115 In order to remediate $SeO4^{2-}$ contamination of water, which of the folllowing will not be included?

(A) Remediation would be catalyzed by anaerobic bacteria and archaea
(B) Remediation would involve oxidation reactions
(C) Remediation would be an anaerobic process
(D) Remediation would convert the soluble toxic form to the insoluble metal form

116 A reaction mixture for PCR consists of ?

(A) heat unstable polymerase
(B) primers in a limited amount
(C) deoxynucleoside triphosphate (dNTPs)
(D) a region complementary to the sequence to be amplified

117 Which of the following is an undesirable microbe in endogenic silage microorganism with simple sugar as the substrate?

(A) Homolactic
(B) Propionic acid bacteria
(C) Heterolactic
(D) Yeast

118 Which of the following methods cannot be used for removing heavy metals from waste water?

(A) Activated carbon adsorption
(B) Denitrification
(C) Chemical precipitation
(D) Ion exchange

119 Which of the following doesn't lead to toxicity of waste water?

(A) Magnesium
(B) Arsenic
(C) Lead
(D) Chromium

120 Which of the following enzyme aids in the first step in methane oxidation?

(A) Methanol
(B) Formaldehyde
(C) Methane mono oxygenase
(D) Carbon dioxide

121 Gut microbiome dysbiosis, resulting in production of

(A) uremic toxins
(B) cadmium damage
(C) osteoporosis
(D) CKD

122 Main group of microbiota comprises of?

(A) Firmicutes & bacteroidetes
(B) Firmicutes
(C) Fungus
(D) Falvobacteria

123 Inflammatory bowel diseases causes due to?

(A) Functional Dysbiosis of gut microbiome
(B) Compositional dysbiosis of gut microbiota
(C) aberrant immune response to gut microbes
(D) Manupulation in gut microbiota

124 Multi- and pan-resistant bacteria are also known as?

(A) Hyper bugs
(B) Super bugs
(C) Antibiotic resistant bacteria
(D) Antimicrobial bugs

125 Ciprofloxacin commonly provides resistance to which bacteria?

(A) Pseudomonas & E.coli
(B) E.coli & Klebsiella
(C) Klebsiella & pseudomonas
(D) E.coli & Streptomyces

126 Name any one tool used to find AMR genes?

(A) DeepARG-LS
(B) WebFinder
(C) ResFinder
(D) ARG-ANNOT

127 Role of Mobile genetic elements MGEs in AMR

(A) MGM are carrier of AMRs
(B) MGMs reduces AMR genes
(C) Prevent movement of AMRs
(D) MGMs breaks AMR genes

128 Principal of consortium

(A) production of multiple proteins
(B) promoting growth of each bacteria
(C) division of labor
(D) fast utilization of substrate

129 Metagenome in consortium designing provides which of the following?

(A) provide information of structure of all members
(B) provide information of all proteins
(C) provide information of all functions
(D) provide information of all set of RNAs

130 Which of the following parameters of the water is not altered after its use?

(A) Physical
(B) Chemical
(C) pH
(D) Volume

131 Which of the following technique is used to re-mediate contamination at the boundary level of water table?

(A) Biosparging
(B) Bio-accumulation
(C) Bio-degradation
(D) Bio-magnification

132 Biosensors can be defined as?

(A) Electronic device without biological sensors
(B) Electronic device with biological element
(C) Bacteria
(D) Fungi

133 BATNEEC stands for?

(A) Best adaptable techniques not entailing excessive cost
(B) Best available techniques not entailing excessive cost
(C) Best available techniques not entailing environmental cost
(D) Best practicable environmental option

134 Which of the following bacterium is called as the super bug that could clean up oil spills?

(A) Bacillus subtilis
(B) Pseudomonas putida
(C) Pseudomonas denitrificans
(D) Bacillus denitrificans

135 Upon which of the following factors the accumulation kinetics depend?

(A) Toxicant concentration
(B) Steady-state
(C) Elimination phase
(D) Accumulation phase

136 Ex situ bioremediation involves which of the following removal methods?

(A) degradation of pollutants by microbes directly
(B) removal of pollutants
(C) degradation of pollutants
(D) Bioaugmentation

137 Which of the following microbe is widely used in the removal of industrial wastes?

(A) Trichoderma sp
(B) Aspergillus niger
(C) Pseudomonas putida
(D) Bacillus denitrificans

138 Chlorella sp. are widely used in the removal of?

(A) organic wastes
(B) hydrocarbons
(C) heavy metals
(D) pesticides

139 Which of the following accumulates from factory waste?

(A) Pseudomonas aeruginosa
(B) Thiobacillus
(C) Pseudomonas putida
(D) Zoogloea ramigera

140 Which of the following is the most effective for the rice sheath blight pathogen, Pellicularia sasaki?

(A) Polyoxin D
(B) Polyoxin B
(C) Polyoxin L
(D) Polyoxin C

141 Which of the following is known to control Colorado potato beetle?

(A) Beaveria bassiana
(B) Metarhizium anisopliae
(C) Verticillium lecauii
(D) Nomuraea rileyi

142 Which of the following have been used to oxidize ammonia and to prevent algal growth?

(A) A growth of hypomicrobium in presence of added methanol
(B) Micrococcus denitrificans cells encapsulated in liquid membranes
(C) E. coli
(D) Nitrosomonas europaen

143 Inundation involves use of a large number of organism over short period for?

(A) time to suppress/destroy a population
(B) organism over a short time to " suppress/destroy a population
(C) large number of organisms over a long time to suppress/destroy a population
(D) organism over a long time to suppress/destroy a population

144 The heavily polluted zone of water reservoir is known as?

(A) Pleosaprophytic Zone
(B) Mesosaprophytic Zone
(C) Oligosaprophytic Zone
(D) Endoprophytic Zone

145 Which of the following is not an after effect of soil salinization?

(A) reduction in soil quality
(B) limited growth of crop
(C) constraints agricultural productivity
(D) increases the soil fertility

146 Which of the following substance can be used for soil reclamation?

(A) Citric Acid
(B) Gypsum
(C) Phosphoric Acid
(D) Oxalic Acid

147 Where would you expect to find chemosynthetic microbes

(A) Deep sea thermal vents
(B) Hypersaline lakes
(C) Streams polluted with domestic sewage
(D) Polar ice caps

148 The antibiotic that resembles the charged 3' end of a tRNA is

(A) Sparsomycin
(B) Streptomycin
(C) Puromycin
(D) Tetracycline

149 Which of the following compounds are required for the growth of saprophytic bacteria and fungi

(A) Organic compounds
(B) Nitrates
(C) Phosphates
(D) Mercury

150 Large spiraling surface currents in the ocean that tend to aggregate and retain nutrients are known as

(A) Benthic region
(B) Upwelling
(C) Geothermal vents
(D) Gyres

151 Which of the following techniques is used for identification and enumeration of algae, bacteria, protozoa

(A) Microscopic examination
(B) Submerged-slide technique
(C) Membrane-filter technique
(D) Enrichment-culture technique

152 In regions of the estuary that are nutritionally poor, it is more likely to find which of the following organisms

(A) Coliforms
(B) Appendaged bacteria
(C) Viruses
(D) Fecal streptococci

153 Which of the following genus of bacteria is not found in fresh waters

(A) Pseudomonas
(B) Flavobacterium
(C) Aeromonas
(D) Vibrio

154 In which of the following organism does iron secreted to form stalks or ribbons attached to the cell

(A) Gallionella
(B) Thiobacillus
(C) Sphaerotilus
(D) Streptococcus

155 The upper region of the trickling filter is favorable for the growth of

(A) Fungi
(B) Protozoa
(C) Algae
(D) Bacteria

156 Which among the following is a gas producer organism

(A) Streptococcus lactis
(B) Lactobacillus fermentum
(C) Micrococcus luteus
(D) Clostridium butyricum

157 In which of the following biochemical types of microorganisms a slime layer or capsule is formed on the cells

(A) Acid producers
(B) Gas producers
(C) Ropy or stringy fermentation
(D) Proteolytic

158 The thermophilic anaerobe spoilage of low and medium acid canned products are caused by

(A) Bacilllus stearothemophilus
(B) Clostridium thermosaccharolyticum
(C) Bacillus thermoacidurans
(D) Clostridium sporogenes

159 The international unit of penicillin is defined by how much amount of International Standard

(A) 1 mg
(B) 0.262 µg
(C) 0.5988 µg
(D) 0.5 mg

160 Acycloguanosine is a nucleoside analog which is active against _____

(A) Influenza A virus
(B) HIV virus
(C) Herpes virus
(D) Influenza B virus

161 Spoilage of bread is caused by which of the following microorganism(s)

(A) Saccharomyces
(B) Rhizopus
(C) Leuconostoc
(D) Pseudomonas

162 Which of the following microorganism survive at -9 to -17 degree C

(A) Salmonella
(B) Staphylococci
(C) Bacilli
(D) Clostridium

163 Which of the following microbe is used in the production of blue cheese

(A) Streptococcus thermophilus
(B) Lactobacillus bulgaricus
(C) Rhizopus stolonifer
(D) Penicillium roqueforti

164 The principal microorganism for yogurt is _____

(A) Streptococcus thermophilus
(B) Leuconostoc citrovorum
(C) Lactobacillus acidophilus
(D) Streptococcus lactis

165 Which of the following enzymes cut the DNA molecule at a particular nucleotide sequence

(A) Restriction endonuclease
(B) Exonuclease
(C) Ligase
(D) Polymerase

166 Diaminopimelic acid (DAP) is produced by which of the following microorganism

(A) E. coli
(B) Enterobacter aerogenes
(C) Bacillus subtilis
(D) Streptococcus equisimilis

167 What is the pH required for the production of baker's yeast

(A) 1 to 2
(B) 4 to 5
(C) 7 to 8
(D) 10 to 12

168 Fermentation of rice is carried out by which of the following microorganisms

(A) Bacteria
(B) Yeasts
(C) Molds
(D) Protozoa

169 Bacterial chromosome has the capacity to code for _____ different proteins.

(A) 900
(B) 300
(C) 1500
(D) 3500

170 Bacterial recombination causes transformation of the recipient cell to _____

(A) Donor cell
(B) Merozygote
(C) Zygote
(D) Recipient cell

171 The first demonstration of recombination in bacteria was achieved by _____

(A) Lederberg and Tatum
(B) Luria and Delbruck
(C) Joshua and Lederberg
(D) Luria and Tatum

172 What are the characteristics of rough pneumococci strain

(A) Noncapsulated and pathogenic
(B) Noncapsulated and nonpathogenic
(C) Capsulated and pathogenic
(D) Capsulated and nonpathogenic

173 Which of the following bacteria can generate electricity, thereby reducing the environmental toxic pollutants?

(A) Mycobacterium tuberculosis
(B) Shewanella
(C) Bacillus thuringenesis
(D) Thermus aquaticus

174 The release of untreated water into the surface water causes deterioration of water quality and its _____

(A) lipophilicity
(B) biological characteristics
(C) volume
(D) temperature

175 Which of the following helps to hydrolyze the macromolecules?

(A) Exo enzymes
(B) Sodium
(C) Endo enzymes
(D) Potassium

176 The conserved energy in the phosphoanhydride bond of ATP is partially used for cell multiplication and _____

(A) mashing with Fibers
(B) maintenance metabolism
(C) mashing with Adhesives
(D) mashing with Alkali and acids

177 What should be the amount of BOD in the drinking water?

(A) More than 1 ppm
(B) 5 ppm
(C) Less than 1 ppm
(D) 10 ppm

178 Which of the following processes uses hydroponics to remove water contaminants?

(A) Pollution control
(B) Manufacturing process
(C) Antibiotic development
(D) Rhizofiltration

179 What does Δt depicts in the given formula: $C = Cmax\ \Delta t/B + \Delta t$?

(A) C0-C
(B) C-C0
(C) t0-t
(D) t-t0

180 The time to reach half of the concentration of the toxicant is a function of environmental concentration and _____

(A) Rate of active transport
(B) Rate of passive transport
(C) Partial coefficient
(D) Membrane permeability rate

181 Which of the following require lower temperature and pressure?

(A) Physical method
(B) Chemical method
(C) Physico-chemical method
(D) Biological method

182 Which of the following uses high temperature to fuse contaminants?

(A) Dissolved Oxygen method
(B) Vitrification
(C) Most probable number method
(D) Chemical Testing method

183 20-30°C is the ideal range for bioremediation as it optimizes _____

(A) Temperature
(B) Pressure
(C) Enzyme activity
(D) pH

184 Sea water intrusions consists of a lot of Geo-chemical process, which of the following is not included in the same?

(A) Anthropogenic contamination
(B) Inter-aquifer mixing
(C) Mobilization of brines
(D) Increasing dissolved oxygen

185 Which of the following product is not used to reduce the soil alkalinity?

(A) Organic mulches
(B) Sphagnum peat
(C) Baking powder
(D) Elemental sulfur

186 Aerobic bio degradation has a minimum oxygen requirement of _____

(A) 0.5 mg/litre
(B) 1 mg/litre
(C) 1.5 mg/litre
(D) 2 mg/litre

187 Arrange these soluble cations (Na, Ca, K, Mg) in ascending order of abundance of soluble cations found in saline costal soils.

(A) Mg>Na>Ca>K
(B) K>Mg>Ca>Na
(C) Na>Mg>Ca>K
(D) Na>Mg>K>Ca

188 Which of the following ions is not found in excess in acidic soils?

(A) Mg
(B) Fe
(C) Cu
(D) Al

189 Bio filters are fed with effluent only after _____

(A) Initial settlement
(B) Bio-accumulation
(C) Bio-degradation
(D) Bio-magnification

190 Which of the following bacteria is involved in nitrification of ammonia?

(A) Denitrifying bacteria
(B) Nitrite oxidizing bacteria
(C) Pathogenic bacteria
(D) Fat stabilizing bacteria

191 Which of the following genera the nitrifying bacteria doesn't belong to?

(A) Nitrosospira
(B) Pseudomonas
(C) Nitrosococcus
(D) Nitrosomonas

192 Stripping of carbon dioxide is necessary to prevent a drop in pH and _____

(A) remove heat energy
(B) distillation
(C) fermentation
(D) exhaust vapor condensate

193 Which of the following biocatalyst in lignin degradation is responsible of unspecific attacks?

(A) Peroxidases
(B) Laccase
(C) Methane
(D) Manganese Peroxidases

194 Which of the following is the most common bacteria used for bioleaching?

(A) Spirillum
(B) Bacillus
(C) Streptococcus
(D) Coccus

195 Which one of the following is not included in the mechanism of bioleaching?

(A) Hydrolysis
(B) Acidolysis
(C) Redoxolysis
(D) Complexolysis

196 Which of the following method can be used to treat crude sewage and nitrify secondary effluent?

(A) Duck weed ponds
(B) Algal fish ponds
(C) Water hyacinth pond
(D) Reed beds

197 Which of these is not a strategy for the application of biosurfactants in oil recovery?

(A) Injecting microorganisms along with nutrients producing biomass
(B) Injecting selected nutrients into the reservoir
(C) Production of biosurfactants ex-situ while the same is injected into the reservoir
(D) Injection of biosurfactants into reservoir through well that produce microorganisms and multiply their growth in-situ

198 Which microbe is used as a solvent and applied in microbial oil recovery?

(A) Brevibacterium
(B) Klebsiella
(C) Leuconostoc
(D) Xanthomonas

199 Treatment of municipal water supplies is based upon

(A) chlorination, filtration, coagulation
(B) coagulation, filtration, chlorination
(C) coagulation, chlorination, filtration
(D) filtration, coagulation, chlorination

200 Which of the following is used to isolate the processes taking place in lined earthworks?

(A) High density lipoprotein
(B) Low density lipoprotein
(C) High density polyethylene (HDPE) liner
(D) Low density polyethylene liner

Q.No	Option		Q.No	Option		Q.No	Option		Q.No	Option
1	B		51	C		101	C		151	A
2	B		52	B		102	C		152	B
3	A		53	D		103	D		153	D
4	A		54	B		104	A		154	A
5	C		55	B		105	A		155	C
6	D		56	D		106	A		156	D
7	A		57	D		107	C		157	C
8	C		58	D		108	C		158	B
9	A		59	A		109	D		159	C
10	B		60	C		110	A		160	C
11	B		61	C		111	C		161	B
12	B		62	C		112	D		162	A
13	D		63	D		113	A		163	D
14	B		64	B		114	A		164	A
15	A		65	C		115	B		165	A
16	C		66	D		116	C		166	A
17	D		67	A		117	D		167	B
18	D		68	B		118	B		168	C
19	B		69	B		119	A		169	D
20	D		70	C		120	C		170	B
21	D		71	A		121	A		171	A
22	C		72	D		122	A		172	B
23	C		73	A		123	C		173	B
24	B		74	A		124	B		174	B
25	C		75	A		125	B		175	A
26	C		76	C		126	D		176	B
27	B		77	C		127	A		177	C
28	C		78	B		128	C		178	D
29	C		79	A		129	A		179	D
30	A		80	B		130	D		180	C
31	B		81	A		131	A		181	D
32	C		82	A		132	B		182	B
33	C		83	C		133	B		183	C
34	C		84	C		134	B		184	D
35	C		85	B		135	A		185	C
36	C		86	A		136	B		186	D
37	C		87	D		137	B		187	C
38	D		88	D		138	C		188	A
39	D		89	B		139	D		189	A
40	B		90	C		140	A		190	B
41	B		91	D		141	A		191	B
42	C		92	C		142	D		192	A
43	C		93	D		143	A		193	C
44	D		94	B		144	A		194	B
45	D		95	B		145	D		195	A
46	C		96	A		146	B		196	D
47	D		97	D		147	A		197	A
48	D		98	A		148	C		198	B
49	C		99	C		149	A		199	B
50	B		100	D		150	D		200	C