a) M S Swaminathan b) N Borlaug c) R Mishra d) P Maheswari

2. Which of the following can be controlled by using biopesticides?
   a) Insects b) Diseases c) Weeds d) All of these
3. Microbes are used in
   I. primary treatment of sewage
   II. secondary treatment of sewage
   III. anaerobic sludge digesters
   IV. production of biogas
   Choose the correct option
   a) I, II and III b) I, III and IV c) II, III and IV d) I, II, III and IV
4. Desired improved varieties of economically useful crops are raised by
   a) Migration b) Biofertilizer c) Hybridization d) Natural selection
5. Neem tree has acquired industrial importance as a source of
   a) Biofertilizer, biopesticide and anti-fertility compound
   b) Anti-fertility compound, biofertilizer and anti-cancer drug
   c) Biopesticide and anti-fertility compound
   d) Anti-cancer drug, biopesticide and biofertilizer
6. Which one of the following is not a nitrogen-fixing organism?
   a) *Anabaena* b) *Nostoc* c) *Azotobacter* d) *Pseudomonas*
7. Which of the following shows maximum genetic diversity in India?
   a) Rice b) Maize c) Mango d) Groundnut
8. Cloves are obtained from
   a) Seed b) Fruit c) Coat d) Flower bud
9. Which of the following herbicides and defoliant were used by the US military in its herbicidal warfare programme during the Vietnam war?
   a) Agent black b) Agent orange c) Super orange d) Both (b) and (c)
10. In crop improvement programme, haploids are of great importance because they
    a) Grow better under adverse condition
    b) Are useful in the study of meiosis
    c) Requires only about half the amount of chemical fertilizers compared to diploids
    d) Give homozygous lines
11. Pollution from animal excreta and organic waste from kitchen can be most profitably minimised by
    a) Storing them in underground storage tanks b) Using them for producing biogas
    c) Vermiculture d) Using them directly as biofertilizers
12. Cellulose fibre is obtained from *Gossypium*
    a) Stem surface b) Seed hair c) Leaf surface d) Root hair
13. Biogas production is carried out by
    a) Thermoacidophils b) Methanogens c) Halophiles d) Luminants
14. Methanogens, growing anaerobically on cellulosic material, produce
    a) Methane b) Methane and carbon dioxide
    c) Methane and hydrogen d) Methane, carbon dioxide and hydrogen
15. Which one is a neem product used as insect repellent?
    a) Azadirachtin b) Rotenone c) Parathione d) Endrin
16. *Triticale,* the first man-made cereal crop, has been obtained by crossing wheat with
    a) Rye b) Pearl millet c) Sugarcane d) Barley
17. Which one of the following is being tried in India as a bio-fuel substitute for fossil fuels?
    a) *Jatropha* b) *Azadirachta* c) *Musa* d) *Aegilops*
18. Mycorrhiza does not help the host plant in
    a) Enhancing its phosphorus uptake capacity
    b) Increasing its tolerance to drought

c) Enhancing its resistance to root pathogens
d) Increasing its resistance to insects

19. Which of the following is a disease resistant, high yielding breed of poultry developed in Karnataka?
a) Aseel b) White leg horn c) Giriraja d) Plymouth rock

20. Which industrial products are synthesized from microbes?
I. Antibiotics II. Fermented beverages
III. Bioactive molecules IV. Enzyme
Choose the correct option
a) I, II, III and IV b) II, III and IV c) I, III and IV d) III and IV

21. A collection of plants and seeds having diverse alleles of all the genes of a crop is called
a) Germplasm b) Gene library c) Genome d) Herbarium

22. Percentage composition of fibroin and sericin in silk is
a) 50 : 40 b) 80 : 20 c) 30 : 70 d) 40 : 60

23. *Simondesia chinensis* is commonly known as
a) Amla b) Poppy c) Teak wood d) Jojoba

24. The quickest method of plant breeding is
a) Introduction b) Selection c) Hybridization d) Mutation breeding

25. The dough used for making bread is fermented by
a) Bacteria b) Virus c) Prions d) Yeast

26. Chicken pox, small pox, etc., can be cure by
a) Neem b) Tulsi c) Shatavari d) None of these

27. Nitrifying bacteria
a) Convert free nitrogen to nitrogen compounds
b) Convert proteins into ammonia
c) Reduce nitrates to free nitrogen
d) Oxidize ammonia to nitrates

28. Consider the following statements
I. Ladybirds and dragonflies are used to get rid of aphids and mosquitoes
II. The bacteria $Bacillusthuringiensis$ (Bt) are used to control butterfly
III. $Trichoderma$ sp. free living fungi, are present in root ecosystems where they act against several plant pathogens
IV. $Rhizobium$ is a symbiotic bacterium that lives in the stem of legumes
Which of the statements given above are correct?
a) I, II and III b) I, III and IV c) II, III and IV d) II and IV

29. Cultivation of Bt cotton has been much in the news. The prefix Bt means
a) 'Barium-treated' cotton seeds
b) 'Bigger thread' variety of cotton with better tensile strength
c) Produced by 'biotechnology' using restriction enzymes and ligases
d) Carrying an endotoxin gene from *Bacillus thuringiensis*

30. Which of the following cyanobacteria can fix atmospheric nitrogen?
I. $Volvox$ II. $Oscillatoria$
III. $Nostoc$ IV. $Anabaena$
Choose the correct option
a) I, II and III b) I, II and IV c) II, III and IV d) III and IV

31. From which one of the following plants, the insecticide pyrethrum is prepared?
a) *Vetivera* b) *Cymbopogon* c) *Chrysanthemum* d) *Tephrosia*

32. Bacterial fertilizer is
a) *Anabaena* b) *Nostoc* c) *Rhizobium* d) *Phycomyces*

33. Which of the following organisms is used in the production of beverages like wine, beer, whisky brandy or rum?
a) *Clostridium butylicum* b) *Aspergillus niger*

c) *Saccharomyces cerevisiae* d) *Penicillium notatum*

34. Recently Govt. of India has allowed mixing of alcohol in petrol. What is the amount of alcohol permitted for mixing in petrol?
    a) 2.5% b) 10-15% c) 10% d) 5%
35. The chemical substances produced by some microbes, which can kill or retard the growth of other microbes are called
    a) Ethanol b) Citric acid c) Antibiotics d) Opiates
36. Which of the following is/are the approache(s) for biological farming?
    I. Familiarity with various life-forms inhabiting the field
    II. Gain knowledge about the life cycles, patterns of feeding and habitat of predators and pests
    Choose the correct option
    a) Only I b) Only II c) I and II d) None of these
37. Which is a useful product of epidermal origin?
    a) Saffron b) Cotton fibres c) Clove d) Jute
38. Today is traditional drink of
    a) South India b) North India c) West India d) East India
39. Process of biogas production is an
    a) Aerobic process b) Anaerobic process c) Active process d) None of these
40. Cork is obtained from
    a) *Quercus suber* b) *Pinus roxburghii* c) *Cedrus deodara* d) *Mangifera indica*
41. *Nosema bombycis*, which causes pebrine in silk worms is a
    a) Fungus b) Virus c) Bacterium d) Protozoan
42. In September 2001, which of the following was used as a bioweapon agent in America?
    a) Botulinum b) Anthrax (Bacillus anathracis)
    c) Polio virus d) AIDS virus
43. *Gambusia* fish is
    a) Cat fish b) Sucker fish c) Mosquito fish d) Flat fish
44. Biogas produced by fermentation of manure, sewage, cattle dung, etc., predominantly comprises
    a) Methane, nitrogen and hydrogen
    b) Methane and carbon dioxide
    c) Methane and carbon monoxide
    d) Methane and nitric oxide
45. Chicory powder, which is mixed with coffee powder is obtained from
    a) Root b) Leaf c) Stem d) Seeds
46. 'Kattha' is obtained from the heart wood of
    a) *Acacia Arabica* b) *Acacia fornesiana* c) *Acacia auriculiformis* d) *Acacia catechu*
47. *Trichoderma* sp. free living fungi has proved a useful microorganism of
    a) Gene transfer in higher plants b) Biological control of soil-borne plant pathogens
    c) Bioremediation of contaminated soils d) Reclamation of wastelands
48. Biogas is pathogen free because
    a) Anaerobic digestion removes pathogens and bacteria
    b) It is toxic to pathogens
    c) During decomposition, it produce antibiotics
    d) Cattle dung is pathogen free
49. What name has been assigned to the genus produced by a cross between cabbage and radish?
    a) *Secale* b) *Bursa pastoris* c) *Lysogenicophyll* d) *Raphanobrassica*
50. Isinglass is a product obtained from air bladder of
    a) Some snakes b) Some fishes c) Some aves d) None of these
51. The water soluble protein associated with silk thread is
    a) Fibroin b) Sericin c) Chitin d) Mucin

52. Most nutritious among the following is
a) Wheat b) Maize c) Bajra d) Rice
53. Which gas is released during the process of fermentation that gives the puffy appearance to dough for making bread
a) CO_2 b) CO c) O_2 d) H_2
54. Real product of apiculture is
a) Honey b) Bee wax c) Both (a) and (b) d) None of these
55. Integrated Pest Management (IPM) discourages the excessive use of
a) Biological pesticides b) Chemical pesticides
c) Mechanical technology d) All of these
56. A pseudocereal is
a) *Fagopyrum esculentum* b) *Triticum aestivum*
c) *Zea mays* d) *Oryza sativa*
57. An organism used as a biofertilizer for raising soyabean crop production is
a) *Azospirillum* b) *Rhizobium* c) *Nostoc* d) *Azotobacter*
58. In maize, hybrid vigour is exploited by
a) Bombarding the seeds with DNA
b) Crossing of two inbred parental lines
c) Harvesting seeds from the most productive plants
d) Inducting mutations
59. Roquefort cheese is formed by ripening with the fungi
a) *Propionibacterium sharmanii* b) *Penicillium roqueforti*
c) *Propionibacterium roqueforti* d) *Penicillium sharmanii*
60. A straight fertilizer is the one, which is
a) Absorbed by roots directly b) Absorbed by the plants from aerial spray
c) Having only one primary nutrient d) Not easily leached
61. Which of the following microbe convert milk into curd?
a) Bacteria b) Virus c) Fungi d) Protozoa
62. Consider the following statements about organic farming
I. Organic farming promotes the use of crop rotations and cover crops and encourages balanced host/predator relationships
II. Integrated pest and weed management and soil conservation systems are valuable tools on an organic farm
II. Organic farming protects the environment, minimize soil degradation and erosion and decrease pollution
Which of the statements given above are correct?
a) I, II and III b) I and II c) I and III d) II and III
63. *Saccharomycescerevisiae* is used for commercial production of
a) Butanol b) Ethanol c) Methanol d) Acetic acid
64. In the sewage treatment bacterial flocs are allowed to sediment in a settling-tank. This sediment is called as
a) Activated sludge b) Primary sludge c) Anaerobic sludge d) Secondary sludge
65. Genetic diversity in agricultural crops is threatened by
a) Introduction of high yielding varieties b) Intensive use of fertilizers
c) Extensive intercropping d) Intensive use of biopesticides
66. Which one of the following is used as biological insecticide?
a) Tiger beetle b) Caterpillar c) Silkmoth d) Mazra poka
67. During the primary treatment of sewage, solid particles that settle down are called
a) Activated sludge b) Secondary sludge c) Primary sludge d) Anaerobic sludge
68. Recently discovered anti-cancer drug is obtained from
a) *Taxus* b) *Tagetes* c) *Tamarix* d) *Thea*

69. *Triticum aestivum,* the common bread wheat is
    a) Triploid with 21 chromosomes b) Hexaploid with 42 chromosomes
    c) Tetraploid with 30 chromosomes d) Diploid with 14 chromosomes
70. In plant A, 2*n* = 12 and in plant B, 2*n* = 16. Then the ploidy number of cross breeding plant is
    a) 7 b) 21 c) 14 d) 28
71. BOD of waste water is estimated by measuring the amount of
    a) Total organic matter b) Biodegradable organic matter
    c) Oxygen evolution d) Oxygen consumption
72. Secondary sewage treatment is mainly a
    a) Chemical process b) Physical process
    c) Mechanical process d) Biological process
73. Producer gas differs from biogas in having
    a) Methane b) Carbon monoxide
    c) Carbon dioxide d) Formed by fermentation
74. Bacillus thuringiensis is used as
    a) Biofungicide b) Biopesticide c) Biocontroller d) Bioweapon
75. The high yielding hybrid crop varieties to exploit hybrid vigour, the farmers to purchase fresh hybrid seed every year because
    a) Hybrid vigour is not long standing due to inbreeding depression
    b) They are not allowed to grow their own seed
    c) It is always associated with increased heterozygosity
    d) Government has accepted Dunkel's proposals
76. The residue left after methane production from cattle dung is
    a) Burnt b) Buried in land fills
    c) Used as manure d) Used in civil construction
77. Morphine obtained from opium is
    a) Latex b) Pome c) Alkaloid d) Tannin
78. Ethanol is commercially produced through a particular species of
    a) *Clostridium* b) *Trichoderma* c) *Aspergillus* d) *Saccharomyces*
79. $Bacillusthuringiensis$ is used to control
    a) Bacterial pathogens b) Viral pathogens c) Protozoans d) Insect pests
80. Which of the following statements regarding baculoviruses as bio-control agents is/are correct?
    I. Baculoviruses are pathogens that attack insects and other arthropods
    II. Most of these biocontrol agents belong to the genus $Nucleopolyhedro$ virus
    III. They do not harm plants mammals, birds, fish and other non-target insects
    IV. Baculoviruses are helpful in Integrated Pest Management (IPM) programme, in which beneficial insects are conserved
    Choose the correct option
    a) I, II and III b) I, II and IV c) II, III and IV d) All of these
81. The timber yielding plant *Shorea robusta* belongs to the which family?
    a) Fabaceae b) Rubiaceae c) Dipterocarpaceae d) Verbenaceae
82. Opium is obtained from which the part of *Papaver somniferum*?
    a) Seed b) Stem and leaf c) Unripe fruits d) Mature fruits
83. Which one of the following genus forms symbiotic association with plants and helps them in their nutrition?
    a) *Glomus* b) *Trichoderma* c) *Azotobacter* d) *Aspergillus*
84. By anaerobic process, the cow dung is used to produce
    a) Methane b) Butane c) Ethane d) Propane
85. India's wheat yield revolution in the 1960s was possible primarily due to
    a) Hybreed seeds b) Increased chlorophyll content
    c) Mutations resulting in plant height reduction d) Quantitative trait mutations

86. Introduced plants in new localities must show adaptations called
a) Selection b) Acclimatization c) Modification d) Propagation
87. The world's highly prized wool yielding 'Pashmina' breed is
a) Sheep b) Goat
c) Goat-sheep cross d) Kashmiri sheep- A fghan sheep cross
88. Which one of the following pesticides is banned now-a-days?
a) DDT b) Eldrin c) Aldrin d) Toxaphene
89. The technology of biogas production from cow dung was developed in India largly by the efforts of
a) Oil and Natural Gas Commission
b) Gas Authority of India
c) Indian Agricultural Research Institute and Khadi and Village Industries Commission
d) Indian Oil Corporation
90. Which of the following is wrongly matched?
a) *Indigofera* – Dye b) *Sesbania* – Fodder c) *Petunia* – Fumigatory d) *Aloe* – Medicine
91. *Rauwolffia* is obtained from which part of the plant?
a) Stem b) Root c) Fruit d) Leaf
92. Which one of the following is the American poultry breed?
a) Australop b) Minorica c) Assel d) Rhod Island Red
93. ...A... released by LAB during growth coagulate and partially digest ...B... . Here A and B refers to
a) A-Acid; B-milk protein b) A-Base; B-harmful bacteria
c) A-Enzyme; B-milk protein d) A-Bacteria; B-other microbes
94. Which of the following is correct?
I. Wine and beer are produced without distillation of fermented broth
II. Whisky, brandy and rum are produced by distillation of the fermented broth
III. Wine and beer are produced by distillation of the fermented broth
IV. Whisky, brandy and rum are produced without distillation of the fermented broth
Choose the correct option
a) I and II b) I and III c) II and III d) III and IV
95. Quarantine regulation is meant for
a) Preventing entry of diseased plants in the country b) Spraying diseased plants with insecticides
c) Promoting dry farming d) Growing fruit trees in all the states
96. Which one of the following is not used in organic farming?
a) Snail b) *Glomus* c) Earthworms d) *Oscillatoria*
97. Which type of endosperm will be formed on hybridization of diploid female plant and tetraploid male plant?
a) Triploid b) Pentaploid c) Tetraploid d) Diploid
98. Protoplasts of two different species are used in
a) Micro-propagation b) Somatic hybridization
c) Clonal propagation d) Organography
99. An important drug is obtained from the bark of
a) *Papaver* b) *Cinchona* c) *Withania* d) *Momordica*
100. Morphine is obtained from
a) *Rauwolffia serpentina* b) *Papaver somniferum*
c) *Cannabis sativa* d) *Cajanus cajan*
101. Which type of honey bees are useful for apiary industries in India?
a) *Apis indica* b) *Apis dorsata* c) *Apis mellifera* d) *Apis florae*
102. The term heterosis was first coined by
a) McClintock b) Boweri c) Swaminathan d) None of these
103. Consider the following statements

I. Yeast used in making bread and beverages is a prokaryotic fungus
II. Streptokinase is produced by *Streptococcus* and modified by genetic engineering is used as a clot buster
III. Lipases are added in detergent for removing only stains from laundry
IV. Pectinases are used in clearing fruit juices
Which of the statement given above are correct?
a) I, II, III and IV b) I, II and III c) II, III and IV d) III and IV

104. A sewage treatment process in which a part of decomposer bacteria present in the wastes is recycled into the starting of the process is called
a) Cyclic treatment b) Activated sludge treatment
c) Primary treatment d) Tertiary treatment

105. The main sources of biofertilisers are
a) Protista b) Cyanobacteria c) Fungi d) All of these

106. Cotyledons and testa are edible parts of
a) Groundnut and pomegranate b) Walnut and tamarind
c) French bean and coconut d) Cashew nut and litchi

107. Cotton fibre is basically a type of
a) Trichome b) Scale c) Dried seed coat d) Non glandular hair

108. Name the group of microbes used in biogas production
a) Lactic acid bacteria b) Yeasts c) Cyanobacteria d) Methanogens

109. Root cells of wheat has $2n = 42$ chromosomes. Which one of the following is the basic chromosome number of wheat?
a) 42 b) 21 c) 7 d) 14

110. An undistillled alcoholic beverage produced from grain-mesh fermentation is
a) Beer b) Rum c) Curd d) Wine

111. Cytosporin-A an immunosuppressive drug is produced by the fungus
a) *Aspergillus niger* b) *Monascus purpureus*
c) *Penicillium notatum* d) *Trichoderma polysporum*

112. Choose the cat fish from the following
a) *Cirrhina mrigala* b) *Wallago attu* c) *Labeo rohita* d) *Catla catla*

113. 'Jaya' and 'Ratna' developed for green revolution in India are the varieties of
a) Rice b) Wheat c) Bajra d) Maize

114. Shakti, Rattan and Protina are three important lysine rich varieties of
a) Rice b) Pulses c) Wheat d) Maize

115. Gobar gas generation technology was developed by the collaboration of ...A... and ...B... . Here A and B refers to
a) A-Rural Bank of India, B-Khadi and Village industries Commission
b) A-Indian Agricultural Research Institute, B-Khadi and Village Industries Commission
c) A-National Bank for Agriculture and Development, B-Indian Agricultural Research Institute
d) A-National Bank for Agriculture and Development, B-Khadi and Village Industries Commission

116. Select the correct statement from the once given below
a) Barbiturates when given to criminals make them tell the truth
b) Morphine is often given to persons, who have undergone surgery as a pain killer
c) Chewing tobacco lowers blood pressure and heart rate
d) Cocaine is given to patients after surgery as it stimulates recovery

117. Pyrethrin is extracted from
a) *Chrysanthemum cinorarifolium* b) *Derris eliptica*
c) *Azadirachta indica* d) *Ryania speciosa*

118. Cod and shark liver oil is a source of
a) Energetic nutrients b) Constructive nutrients

c) Energetic and constructive nutrients d) Protective nutrients

119. Agricultural chemicals include
a) Growth regulators b) Fertilizers c) Pesticides d) All of these

120. Leaves of which plant can sharpen the memory?
a) *Asparagus* b) *Adhatoda* c) *Aloe vera* d) *Ocimum*

121. Which of the following plants is used as biofertilizer?
a) *Nostoc* b) *Funaria* c) *Volvox* d) *Rhizopus*

122. Antibiotics are used to treat diseases like
a) Diphtheria whooping cough b) Plaque
c) Leprosy d) All of the above

123. The scientific name of zebu is
a) *Bos indicus* b) *Bombyx mori* c) *Bubalus bubalus* d) *Gallus domesticus*

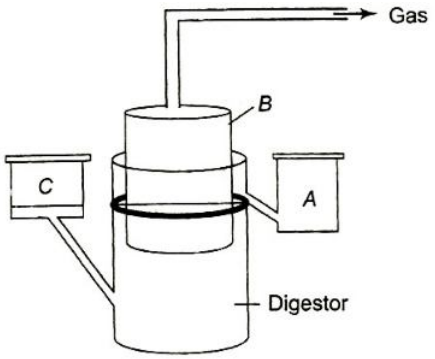
124. Reserpine is obtained from
a) *Asafoetida* b) *Rauwolffia serpentina*
c) *Curcuma longa* d) *Papaver somniferum*

125. The microscopic proteinaceous infectious agents are
a) Viroids b) Prions c) Protozoa d) Bacteria

126. Biochemical Oxygen Demand (BOD) in a river water
a) Has no relationship with concentration of oxygen in the water
b) Gives a measure of *Salmonella* in the water
c) Increases when sewage gets mixed with river water
d) Remains unchanged when algal bloom occurs

127. Autopolyploids (numeric or quantitative polyploids or intraspecific polyploids) like ferns, garden plants, gram, maize, rice, banana, grapes, apple, etc, show
a) Increased gene dosage b) Gigas effect and seedless fruits
c) More yields and better adaptation d) All of the above

128. The below diagram represent a typical biogas plant. Select the correct option for A, B and C refers to



a) A-Sludge, B-Dung + water, C-CH_4 + CO_2
b) A-Dung + water, B-Sludge, C-CH_4 + CO_2
c) A-Sludge, B- CH_4 and CO_2, C-Dung + water
d) A-CH_4 + CO_2, B-Dung + water, C-Sludge

129. For cryopreservation, plant materials are frozen at
a) −196℃ b) −150℃ c) −80℃ d) −40℃

130. Activated sludge have the ability to settle quickly so that it can
a) Be rapidly pumped back from sedimentation to aeration tank
b) Absorb pathogenic bacteria present in waste water, while sinking to the bottom of the settling-tank
c) Be discarded and anaerobically digested
d) Absorb colloidal organic matter

131. Which of the following are the part or example of symbiotic mutualistic association?
I. Yeast

II. *Rhizobium*
III. Mycorrhiza
IV. *Oscillatoria*
a) I and II b) I and III c) II and III d) III and IV

132. *Leucaena leucocephala is*
a) Called subabul
b) A small leguminous tree with edible fruits and seeds
c) A fodder plant as its pods and leaves are consumed by cattle
d) All of the above

133. High content of lysine is present in
a) Wheat b) Apple c) Maize d) Banana

134. Which one of the following is not a biofertilizer?
a) Bacillus thuringiensis b) Azotobacter c) Azolla d) Clostridium

135. Which of the following helps in absorption of phosphorus from soil by plants?
a) *Rhizobium* b) *Frankia* c) *Anabaena* d) *Glomus*

136. Both power and manure are provided by
a) Biogas b) Water gas c) Energy crops d) Nuclear plant

137. Opium is obtained from
a) *Oryza sativa* b) *Selection* c) *Thea sinensis* d) *Papaver somniferum*

138. The part of castor seed that yields oil is
a) Cotyledon b) Caruncle c) Endospherm d) Nucellus

139. Which one of the following is a viral disease of poultry?
a) Salmonellosis b) Coryza c) New castle disease d) Pasteurellosis

140. Which one of the following is a disease of poultry?
a) Foot and mouth disease b) Pebrine disease
c) Anthrax d) Ranikhet disease

141. Baculoviruses do not show harmful effect on
I. plants II. Mammals
III. bird IV. Non-target insects
Choose the correct option
a) I, III and III b) II, III and IV c) I, III and IV d) I, II, III and IV

142. *Atropa* belladonna yields medicine used for
a) Gastric ulcers b) Checking the eyes c) Leprosy d) Constipation

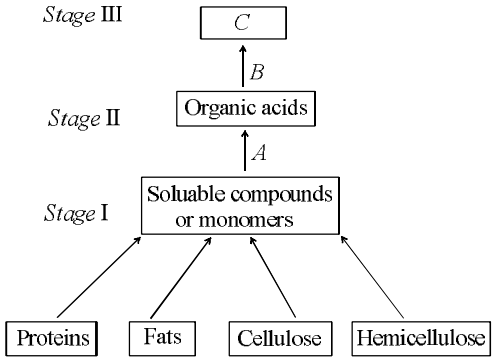
143. The terminator gene technology causes
a) Failure of seed setting after one generation b) Breakage of seed dormancy
c) Early flowering in plants d) None of the above

144. What will your conclude, when a cow is crossed to a bull and the female progeny is yielding more milk than its mother?
a) More number of genes for high yielding milk are inherited, only from the female parent
b) More number of genes for high yielding milk are inherited only from the male parent
c) More number of genes for high yielding milk are inherited from both the parents
d) The progeny through mutation achieved more number of genes for high yielding milk

145. CFCL is situated at
a) Delhi b) Faridabad c) Mumbai d) Amritsar

146. Insecticides usually act upon
a) Digestive system b) Nervous system c) Circulatory system d) Muscular system

147. Study the following flow chart of biogas production and select the correct option for A, B and C



a) A-Methanogenic bacteria, B-Fermentative microbes, C-CO_2 and hydrogen (biogas)
b) A-Anaerobic microorganisms, B-*Methanococcus,* C-CO_2 and nitrogen (biogas)
c) A-Fermentative microbes, B-Methanogenic bacteria, C-CO_2 and methane (biogas)
d) A-Aerobic microorganisms, B-Methanobacter, C-CO_2 and methane (biogas)

148. Which of the following is used as biofertiliser?
I. Cyanobacteria
II. Yeast
III. Symbiotic bacteria
IV. Free living bacteria
Choose the correct option
a) I, II and III b) I, III and IV c) II, III and IV d) I, II and IV

149. A commonly used mastigator called 'supari' is obtained from the plant
a) *Acacia catechu* b) *Areca catechu* c) *Piper betel* d) *None of these*

150. Which of the following is not used as a biopesticide?
a) Bacillus thuringiensis b) Trichoderma harzianum
c) Nuclear Polyhedrosis Virus (NPV) d) Xanthomonas campestris

IMPORTANT PRACTICE QUESTION SERIES FOR NEET EXAM – 1 (ANSWERS)

1)	**a**	**2)**	**d**	**3)**	**c**	**4)**	**c**
5)	**d**	**6)**	**d**	**7)**	**a**	**8)**	**d**
9)	**d**	**10)**	**d**	**11)**	**b**	**12)**	**b**
13)	**b**	**14)**	**d**	**15)**	**a**	**16)**	**a**
17)	**a**	**18)**	**c**	**19)**	**a**	**20)**	**a**
21)	**a**	**22)**	**b**	**23)**	**d**	**24)**	**c**
25)	**d**	**26)**	**c**	**27)**	**d**	**28)**	**a**
29)	**d**	**30)**	**c**	**31)**	**c**	**32)**	**c**
33)	**c**	**34)**	**d**	**35)**	**c**	**36)**	**c**
37)	**b**	**38)**	**a**	**39)**	**b**	**40)**	**a**
41)	**d**	**42)**	**b**	**43)**	**c**	**44)**	**b**
45)	**a**	**46)**	**d**	**47)**	**b**	**48)**	**a**
49)	**d**	**50)**	**b**	**51)**	**b**	**52)**	**c**
53)	**a**	**54)**	**c**	**55)**	**b**	**56)**	**a**
57)	**b**	**58)**	**b**	**59)**	**b**	**60)**	**c**
61)	**a**	**62)**	**a**	**63)**	**b**	**64)**	**a**
65)	**a**	**66)**	**a**	**67)**	**c**	**68)**	**a**
69)	**b**	**70)**	**c**	**71)**	**d**	**72)**	**d**
73)	**b**	**74)**	**b**	**75)**	**c**	**76)**	**c**
77)	**c**	**78)**	**d**	**79)**	**d**	**80)**	**d**
81)	**c**	**82)**	**c**	**83)**	**a**	**84)**	**a**

85)	**c**	**86)**	**b**	**87)**	**b**	**88)**	**a**
89)	**c**	**90)**	**c**	**91)**	**b**	**92)**	**d**
93)	**a**	**94)**	**a**	**95)**	**a**	**96)**	**a**
97)	**c**	**98)**	**b**	**99)**	**b**	**100)**	**b**
101)	**a**	**102)**	**d**	**103)**	**c**	**104)**	**b**
105)	**b**	**106)**	**a**	**107)**	**a**	**108)**	**d**
109)	**c**	**110)**	**a**	**111)**	**d**	**112)**	**b**
113)	**a**	**114)**	**d**	**115)**	**b**	**116)**	**b**
117)	**c**	**118)**	**d**	**119)**	**d**	**120)**	**d**
121)	**a**	**122)**	**d**	**123)**	**a**	**124)**	**b**
125)	**b**	**126)**	**c**	**127)**	**c**	**128)**	**c**
129)	**a**	**130)**	**a**	**131)**	**c**	**132)**	**d**
133)	**a**	**134)**	**a**	**135)**	**a**	**136)**	**a**
137)	**d**	**138)**	**c**	**139)**	**c**	**140)**	**d**
141)	**d**	**142)**	**b**	**143)**	**a**	**144)**	**c**
145)	**b**	**146)**	**b**	**147)**	**c**	**148)**	**b**
149)	**b**	**150)**	**d**				

1 **(a)**

Green revolution is the rapid increase in agricultural production (especially wheat and rice) during 1960-1970. In march 1963, **Dr. N E Borlaug** visited India on the invitation of **Dr. B P Pal** (Director of IARI) and sent a wide range of material in September 1963. Father of green revolution in India is **M S Swaminathan. N Borlaug** is known as father of green revolution in the world.

2 **(d)**

Biopesticides are pesticides of biological origin, which may be of various types depending upon the types of pests killed or controlled by them, e.g., algicides, fungicides bacteriocides, herbicides or weedicides, insecticides, nematicides and rodenticides, etc. These were initially employed to protect crop plants against pests but they are non equally important for destroying or controlling vectors for various animals and human pathogens, thus, can be used for controlling various diseases also.

3 **(c)**

Primary treatment is the physical removal of large and small particals from sewage. Secondary treatment of the liquid effluent from the primary settling-tank is purely a biological treatment involving microbial activity.

In the anaerobic sludge digesters, heterotrophic microbes anaerobically digest bacteria and fungi in sludge producing mixture of gases such as methane, hydrogen sulphide and CO_2, which form the biogas

4 **(c)**

Hybridization is defined as the crossing of two varieties or species with desirable characters and bringing together these characters in their progeny.

5 **(d)**

Azadirachtin, meliantial and salanin obtained from *Azadirachtaindica* (neem) are insect repellent as well as antifeedant. It is perhaps the first natural insecticide used by man. It's fruits are used as biofertilizer.

6 **(d)**

Nitrogen-fixing bacteria, microorganisms capable of transforming atomospheric nitrogen into fixed nitrogen, inorganic compounds usable by plants.

Two kinds of nitrogen fixers are recognized

(i) Free-living (non-symbiotic) bacteria, including the cyanobacteria (blue-green algae) *Anabaena* and *Nostoc* and such genera as *Azotobacter, Azospirillum* and *Clostridium*

(ii) Mutualistic (symbiotic) bacteria such as *Rhizobium,* associated with leguminous plants, and *Spirillum lipoferum,* associated with cereal grasses
Pseudomonas is a common bacterium that can cause disease in animals, including humans

7 **(a)**
There are an estimated 2,00,000 varieties of rice in India alone. The diversity of rice in India is one of the richest in the world. Basmati rice has 27 documented varieties grown in India.

8 **(d)**
Cloves are dried, highly aromatic, unexpanded, flower buds of *Eugenia caryophyllus,* family-Myrtaceae.

9 **(d)**
Agent orange and super orange were used from 1961 to 1971. They released dioxins, which have caused harm to the health of those exposed during the Vietnam war. Agent blue and white were part of the same programme but did not contain dioxins.

11 **(b)**
Pollution from human excreta and organic wastes from kitchen can be most profitably minimised by using them for producing biogas. These wastes release methane and other gases as a result of action of anaerobic microorganisms. Biogas contains methane in bulk and other gases like CO_2, H_2, N_2, and O_2.

12 **(b)**
Cotton is the seed surface fibre of *Gossypium.* Its processing involves ginning, bailing, picking, lapping, carding and twisting. It is used in textile industry.

13 **(b)**
Methanogens.
Biogas is a methane rich fuel gas produced by anaerobic breakdown or digestion of biomass With the help of methanogenic bacteria. Biogas is made up of methane, carbon dioxide with traces of hydrogen

14 **(d)**
Methane, CO_2 Hydrogen.
Biogas is a methane rich fuel gas produced by anaerobic breakdown or digestion of biomass with the help of methanogenic bacteria. Biogas is made up of methane, carbon dioxide with traces of hydrogen

15 **(a)**
Azadirachtin obtained from neem plant is used as insect repellent.

16 **(a)**
Triticale is the first man-made cereal crop. It has been obtained by crossing wheat (*Triticum* sp) with rye (*Secale cerale*).

17 **(a)**
Petroplants are the plants, which can yield large amount of latex having long chained liquid hydrocarbons. e.g., *Jatropha, Euphorbia* (family-Euphorbiaceae) and other members of family-Euphorbiaceae, Asclepiadaceae and Apocyanaceae.

18 **(c)**
Mycorrhiza shows the following benefits
(i) resistance to root borne pathogens
(ii) tolerance to salinity and drought
(iii) overall increase in plant growth and development

19 **(a)**
Aseel is an indigenous breed. Aseel is one of the best table bird but it cannot be raised on commercial purpose because of its poor growth and low fertility. The original Aseel is a medium sized aggressive bird commonly known as the Reza or the Tikra. Pure specimens of this breed are now rare and are available with some fanciers in parts of AP, Karnataka and UP.

20 **(a)**

Microbes are used to synthesise a number of products valuable to human beings. Beverages, antibiotics, bioactive molecules and enzymes are some example

21 **(a)**

A germplasm is a collection of genetic resources for an organism. For plants, the germplasm may be stored as a seed collection. It includes, diverse alleles of all the genes of an organism.

22 **(b)**

Silk is composed of proteins. It consists of an inner part made up of fibroin protein and is covered with an outer envelope made up of sericerin protein. The silk thread contains 75-80% fibroin and 20-25% of sericin.

23 **(d)**

Jojoba is *Simendesia chinensis.* Its seed contain about 50% of liquid wax just like sperm whale oil. It is a drought resistant desert shrub. Now-a-days it is used as lubricant.

24 **(c)**

Hybridization involves simple process of emasculation and transfer of pollens from one flower to the stigma of other flower.

25 **(d)**

The dough used for making bread is fermented by *Saccharomyces cerevisiae* or commonly called baker's yeast. CO_2 released during the process of fermentation gives the puffy appearance to dough. It is used to make foods like idli, dosa, bread, etc.

26 **(c)**

The roots of shatavari (*Asparagus ramosus)* are used extermally to cure chicken pox, small pox, measles etc.

27 **(d)**

Nitrifying bacteria (one of the chemosynthetic bacteria) oxidise ammnonia to nitrites and obtain energy for the preparation of food. This oxidation occurs in two steps. In the first step, ammonia is oxidised to nitrite by nitrite bacteria (e.g., *Nitrosomonas* and *Nitrococcus*). In the second step, nitrite is oxidised to nitrate by nitrate bacteria (e.g., *Nitrocystis* and *Nitrobacter*).

28 **(a)**

The ladybird and dragonflies are useful to get rid of aphids and mosquitoes, respectively.
(i) A bacteria species namely *Bacillus thuringiensis (Bt)* is known to kill a wide range of insects such as butterfly, caterpillars, ant etc., some strains of *Bt* can kill animal and plant parasitic nematodes, protozoans and even cockroaches
(ii) *Trichoderma* is a free-living saprophytic fungi that most commonly lives on dead organic matter in the soil and rhizophere
(iii) The fungus is being developed as an effective biocontrol agent of several plant pathogens
(iv) *Rhizobium* is a symbiotic bacterium that lives in the root nodules of legumes and fixes atmospheric nitrogen into organic compounds

29 **(d)**

In *Bt* cotton, *Bt* means carrying an endotoxin gene from *Bacillus thuringiensis.* Specific *Bt* toxin gene were isolated from *Bacillus thuringiensis* and incorporated into the several crop plants such as cotton, corn. The choice of genes depends upon the crop and the targeted pest as most *Bt* toxins are insect group specific. The toxin is coded by a gene named *cry*

30 **(c)**

Cyanobacteria fix atmospheric nitrogen and increase the organic matter of the soil through photosynthetic activity, *e. g.*,*Nostoc, Anabaena, Oscillatoria,* etc.

31 **(c)**

Insecticide pyrethrum is obtained from the plant *Chrysanthemum.*

32 **(c)**

Rhizobium is found in the roots nodules of leguminous plants. It is a nitrogen fixing symbiotic bacterium which increases the fertility of soil, hence *Rhizobium* is called bacterial fertilizer.

33 **(c)**
Beverages are formed by fermenting malted cereals and fruit juices with *Saccharomyces cerevisiae* or brewer's yeast to produce ethanol

34 **(d)**
According to union petroleum minister, 5% of alcohol (ethanol) will be mixed in petrol for meeting energy needs.

35 **(c)**
The chemical substances produced by some microbes which can kill or retard the growth of other microbes are called antibiotics. The term antibiotic was coined by Waksman (1942). Penicillin was the first antibiotic to be discovered by Alexander Flemming (1928)

36 **(c)**
An important part of the biological farming approach is to become familiar with the various life forms that inhabit the field, predators as well as pests and also their life cycles, patterns of feeding and the habitats that they prefer. This will help to develop appropriate means of biocontrol

37 **(b)**
Cotton is obtained from the epidermal hair present on the surface of seeds of *Gossypium* sp. These are made up of cellulose only and may be of two types, *i.e.,* extractable lint and non-extractable fluffy fuzz. Cotton fibres are mainly used for textiles, celluloid, cellophane, rayon and papet pulp.

38 **(a)**
Toddy is a traditional drink of Southern India. It is made by fermentation of sap from palm tree by bacteria

39 **(b)**
Biogas generation is a three stages anaerobic digestion of animal and other organic wastes by methanogenic bacteria
(i) brackdown of polymers
(ii) conversion of monomers into organic acids by fermentation microbes
(iii) generation of methane by methanogenic bacteria (conversion of organic acids into $CH_4$and CO_2)

40 **(a)**
Cork is obtained from *Quercus suber.*

41 **(d)**
Nosema bombycis is a protozoan, which causes the epidemic disease pebrine in silkworms, attacks all tissues and all developmental stages from embryo to adult. In advanced infections, small brown spots cover the body of the silkworm.

42 **(b)**
Anthrax is a fatal human disease caused by the bacterium *Bacillus anthracis*. This was used as a bioweapon agent in America in September 2009.

43 **(c)**
Gambusia (mosquito fish) feeds on mosquito larvae and is therefore, used as larvicidal.

44 **(b)**
Biogas produced by fermentation of manure, sewage, cattle dung, etc., predominantly comprises methane and carbon dioxide. The major component of biogas is methane (about 50-68%). The other gasess are carbon dioxide (25-35%), hydrogen (1-5%), nitrogen (2-7%) and rarely hydrogen sulphide

45 **(a)**
Chicory is the chief substitute of coffee, which is obtained from the roots of *Cichorium*

intybus, which is a member of family-**Asteraceae.** The dried roots of this plant are roasted, pulverised and mixed with coffee powder.

46 **(d)**

Commercially, kattha is obtained from heart wood of *Acacia catechu* of family-Mimosaceae.

47 **(b)**

Trichoderma sp. has proved a useful microorganism for biological control of soil borne plant pathogens. It inhibits pathogens through release of gliotoxin, viridian, gliovirin and trichodermin like substances

48 **(a)**

Biogas is pathogen free because anaerobic digestion inactivates pathogens and parasites and is quite effective in reducing the incidence of water borne diseases.

49 **(d)**

Raphanobrassica and *Triticale* are intergenic hybrids. *Raphanobrassica* is the result of cross between *Raphanus* (radish) and *Brassica* (cabbage).

51 **(b)**

Silk thread is obtained from the cocoon of *Bombyx mori.* It contains a water soluble protein, **sericin.**

52 **(c)**

Bajra is the most nutritious cereal it has more proteins than other cereals.

53 **(a)**

CO_2 gas is released during the process of fermentation gives the puffy appearance to dough

55 **(b)**

Integrated Pest Management (IPM) discourages the excessive use of chemical pesticides. IPM involves use of different pest control methods, better agricultural practice like crop rotation, sanitation, etc.

56 **(a)**

Fagopyrum esculentum is a pseudocereal.

57 **(b)**

Rhizobiumleguminosarum is a symbiotic bacteria found in root nodules of legume. This bacterium has nitrogen *nif* gene and fixingN_2. Soyabean is a legume. Thus, *Rhizobium* is used as a biofertilizer for raising soyabean crop.

58 **(b)**

Hybrid vigour is the increased vigour or offspring over their both of the parents. Such offsprings (hybrids) are obtained from a cross between two genetically different pureline varieties (parents).

59 **(b)**

Roquefort cheese is formed by ripening with the fungi *Penicillium roqueforti* for a particular flavor

60 **(c)**

A fertilizer, which contains only one nutrient is known as straight fertilizer or simple fertilizer.

61 **(a)**

Inthe process of making curd, bacteria convert milk into curd and milk protein into predigest milk protein. These bacteria then inside the growth of hostile (illness causing) bacteria inside the intestinal tract and promote beneficial bacteria needed for digestion

62 **(a)**

Advantage of using organic farming are, it promotes the use of crop rotation and cover crops, encourages balanced host/predator relationships, helps in soil conservation, minimize soil degradation and erosion and decrease pollution. Integrated pest and weed management and soil conservation systems are valuable tools on an organic farm

63 **(b)**

Saccharomyces cerevisiae is used for commercial production of ethanol. *S. cerevisiae* is a single celled eukaryotic budding yeast belonging to the Ascomycetes (a highly diverse group of fungi)

64 **(a)**

In the sewage treatment when Biochemical Oxygen Demand (BOD) of sewage has reduced, the effluent is passed into settling tank. Here, the bacterial flocs settle and the sediment is called activated sludge

65 **(a)**

Genetic diversity in agricultural crops is threatened by introduction of high yielding varieties.

66 **(a)**

Carbid beetles, an insect group containing ground and tiger beetles, are important biological agents in agroecosystems. Carbid beetles play a major role in agroecosystems by contributing to the mortality of weed seeds, insects and slugs.

67 **(c)**

Primary or physical treatment of sewage is the physical removal of large and small particle from sewage. First, the floating debris is removed by sequential filtration by passing through wire mesh screens. Then, the grit (soil and small pebbles) are removed by sedimentation in settling tank. The sediment is called primary sludge and the supernatant is the effluent

68 **(a)**

Now-a-days, *Taxus,* a gymnosperm, is used as source of a recently discovered anti-cancer drug. It produces taxol, which is used against breast cancer.

69 **(b)**

Triticum aestivum is hexaploid with $2n = 42$.

70 **(c)**

In this case, the ploidy number of cross breeding plant will be 14.

71 **(d)**

Biochemical Oxygen Demand (BOD) measures the amount of organic matter in water by measuring the rate of oxygen uptake by microbes

72 **(d)**

Secondary treatment of the liquid effluent from the primary settling tank is purely a biological treatment involving microbial activity

73 **(b)**

Biogas is methane rich fuel gas produced through anaerobic breakdown and fermentation of biomass. It contains 50-70% CH_4, 30-40% $CO_2$and trace of H_2, H_2S andN_2. Whereas producer gas mainly contains CO, H_2, andN_2.

74 **(b)**

Bacillus thuringiensis (*Bt*) is a Gram positive, soil-dwelling bacterium, commonly used as a biological alternative to a pesticide, alternatively, the cry toxin may be extracted and used as a pesticide.

75 **(c)**

Hybrid vigour or heterosis is a phenomenon where the F_1 generation of a cross between inbreed lines is superior to the parental lines. The farmers need to purchase fresh hybrid seeds every year because hybrid vigour is not long standing due to inbreeding depression.

76 **(c)**

The residue left after methane production from cattle dung is used as fertilizer

77 **(c)**

Opium is the dried latex obtained from unripe capsules of *Papaver somniferum* (poppy). Morphine, codeine are the alkaloids formed from the dried latex and have the pain relieving property.

78 **(d)**
Yeast (*Saccharomyces cerevisiae*) is used for commercial production of ethanol.

79 **(d)**
The bacteria *Bacillus thuringiensis* a wide range of insects such as (*Bt*) are used to controls butterfly caterpillars, ants, moths, etc. Some strains of this bacteria can kill animal and plant parasitic nematodes, snails, protozoans and even cockroaches

80 **(d)**
Baculovirus heliothis (a group of virus) are known to infect the larval stages of many harmful insects beetles, wasps and ants. A number of baculovirus, which are used as biopesticides belongs to the genus *Nucleopohyledro* virus
These biological weapons are not only effective as potential biological control of harmful insects, but are also harmless to non-target organisms insects (plants, birds, mammals, non-targets insects etc). They are important in organic farming because of their specific action on harmful insects without causing any damage to beneficial insects as well as to the environment. Baculoviruses are helpful in Integrated Pest Management (IPM) Programme, in which beneficial insects are conserved

81 **(c)**
The timber yielding plant *Shorea robusta* belongs to the family-Dipterocarpaceae. It is used for construction work and eminently suited for railway sleeper.

82 **(c)**
The latex from unripe fruits of (*Papaver somniferum)* yields opium. It contains alkaloids like morphine, codeine, papaverene, etc. Morphine relieves pain and codeine is mild analgesic.

83 **(a)**
Glomus is a genus of *Arbuscular Mycorrhizal* (AM) fungi and all species form symbiotic relationships (mycorrhizae) with plant roots. Roots infected with *Glomus* may protect the host plant from harmful soil borne pathogens, provided limiting nutrients, and increase overall fitness of the host. The *Glomus* plant symbiosis plays an important role in the economic sectors involving the growth of plants such as agriculture, horticulture and forestry

84 **(a)**
Biogas is the **methane rich** fuel gas produced through anaerobic breakdown and fermentation of animal dung (of biomass).

85 **(c)**
In 1963, ICAR introduced many dwarf selections from CIMMYT, including those developed by **Norman Borlaug** using Norin-10 as the source of dwarfing genes.

86 **(b)**
The process that leads to the adaptation of variety, line or population to a new environment is known as **acclimatization.**

87 **(b)**
Pashmina wool is obtained from Kashmiri goat.

88 **(a)**
DDT is an organochlorine. Now-a-days DDT is banned because it has an affinity for fatty tissues of animals, which lead to biomagnification. Besides, with the repeated use of such pesticides, a kind of accelerated evolution occurs to produce resistant population of pests.

89 **(c)**
Biogas or gobar gas generation has been taken up in India on a large scale. The technology was developed by the collaboration of Khadi and Village Industries Commission (KVIC) and Indian Agricultural Research Institute (IARI)

90 **(c)**
Petunia, family- Solanaceae is an ornamental plant.

91 **(b)**

Rauwolffia is obtained from root of *Rauwolffia serpentina*which belongs to family-Apocynaceae.

92 **(d)**

Plymoth rock, Wyandotte, new Hampshire, Rhod Island Red are some of the American breeds of poultry, Aurtralop and Sussex are British breeds, white leghorn and Minorica are Mediterranean breeds and Assel is a desi or indigenous breed.

93 **(a)**

A-Acid; B-Milk protein.

Lactic Acid Bacteria (LAB) like *Lactobacillus* are added to milk. It converts lactose sugar of milk into lactic acid. Lactic acid causes coagulation and partial conversion of milk protein casein to cal paracaesinate. Milk is changed into curd, yoghurt and cheese

94 **(a)**

Wine and beer are produced without distillation of fermented broth

Whisky, brandy and rum are produced by distillation of the fermented broth

96 **(a)**

Glomus (fungi), earthworm, *Oscillatoria* are used in organic farming.

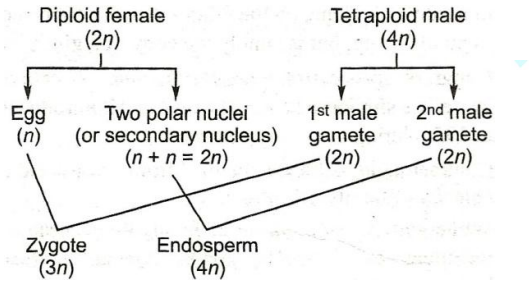
(i) *Glomus* absorb phosphorus from soil and passes it to the plant

(ii) Vermiculture and its application are now recognized as one of the best ways to restore soil health. Earthworms are now synonymus with organic farming.

(iii) *Oscillatoria* fix atmospheric nitrogen and increase the organic matter of the soil

97 **(c)**

Endosperm is formed by the fusion of two polar nuclei or their fusion product (secondary nucleus) with second male gamete. A diploid female plant will produce a haploid egg and two haploid polar nuclei. The chromosome number in the male gamete produced from a tetraploid male plant will be half of its mate parent (tetraploid male) *i.e.,* male gametes will be diploid. Hence, these plants when crossed, produce triploid zygote (fusion product of diploid male gamete with haploid egg) and tetraploid endosperm (fusion product of diploid male gamete and diploid secondary nucleus).



98 **(b)**

Somatic hybridization or parasexual hybridization involves the fusion of isolated protoplasts of two different species.

99 **(b)**

Quinine is obtained from bark of Cinchona officinale. Opium is obtained from fruits of Papaver somniferum. Ashwagandha is obtained from root of *Withania somnifera*.

100 **(b)**

Morphine is obtained from *Papaver somniferum.*

101 **(a)**

Apiary is the place where bees are cultured and breed to get commercial products. *Apis indica* is the small Indian bee (about 15mm long) that inhabits forests and plain regions throughout India. It can be easily domesticated because of gentle nature. *Apis indica* is the best, used in India for apiculture industries.

102 **(d)**

Heterosis is also known as hybrid vigour. It is the presence of superior qualities in the hybrid than either of the parents. The term 'hybrid vigour' was given by **G H Shull.**

103 **(c)**

Yeast used in baking and the alcohol in alcoholic beverages is a type of **eukaryotic fungus**. Streptokinase is an enzyme obtained from the cultures of some haemolytic bacterium *Streptococcus* and modified genetically to function as clot busters. Lipases are lipid dissolving enzymes that are obtained from *Candida lipolytica* and *Geotrichum candidum.* They are added in detergents for removing oily stains from laundry. Pectinases are obtained commercially from *Byssochlamys fulva.* Along with proteases, they are used in clearing of fruit juices

104 **(b)**

A sewage treatment process in which a part of decomposer bacteria present in the wastes is recycled into the starting of the process is called activated sludge treatment

105 **(b)**

Cyanobacteria.

The most suitable source of biofertiliser is achieved by the use of blue-green algae (cyanobacteria), particularly in rice fields. These organisms grow well in symbiotic association with other plants or as free living individuals on the surface of moist soil or under water logged conditions

106 **(a)**

Cotyledons and testa are edible parts of groundnut and pomegranate respectively. The edible part of walnut is cotyledon; tamarind-mesocarp; french bean-seeds, coconut-endosperm, testa, cotyledons and embryo, cashewnut-cotyledons and fleshy pedicels and of litchi is fleshy aril.

107 **(a)**

Cotton fibres are basically trichomes.

108 **(d)**

Methanogens.

Biogas is a methane rich fuel gas produced by anaerobic breakdown or digestion of biomass with the help of methanogenic bacteria. Biogas is made up of methane, carbon dioxide with traces of hydrogen

109 **(c)**

Wheat is hexaploid. Thus, basic chromosome number of wheat will be 7(42/6 = 7).

110 **(a)**

An undistilled alcoholic beverage produced from grain-mesh fermentation is beer. Beer has an alcoholic content of 3-6%

111 **(d)**

Cyclosporine-A is an eleven membered cyclic oligopeptide obtained through fermentative activity of fungus *Trichoderma polysporum.* It inhibits activation of T-cells and therefore, prevents rejection reactions in organ transplantation

112 **(b)**

Wallago attu (Mullhe), *Rita rita* (Tikanda), *Mystus singhara* (Singhara) and *Clarius batrachus* (Indian cat fish or magur) are some freshwater cat fishes of India.

113 **(a)**

'Jaya' and 'Ratna' are better-yielding semi-dwarf varieties of rice developed in India.

114 **(d)**

Shakti, Rattan and Protina are recently developed composite (germplasm complex) varieties of maize, which have a higher lysine and tryptophan content than traditional maize varieties.

115 **(b)**

A-Indian Agricultural Research Institute, B-Khadi and Village Industries Commission

116 **(b)**
In clinical settings, morphine exerts its principal pharmacological effect on the central nervous system and gastrointestinal tract. Its primary actions of therapeutic value are analgesic and sedation.

117 **(c)**
'Pyrethrin' a chemical is produced by grinding of flowers of the plant *Chrysanthemum cinerarifolium.* Pyrethroids are synthetic derivatives of pyrethrin and are quick-acting broad spectrum, toxic **insecticides**. They are quite expensive, not used on a large scale in India at present.

119 **(d)**
As growth regulators control the growth of plants, pesticides control the pests and fertilizers enhance productivity of the soil, hence all of these are regarded as agricultural chemicals.

120 **(d)**
Leaves of *Ocimum* (tulsi) can sharpen the memory and are also used as nerve tonic.

121 **(a)**
Nostoc is nitrogen fixing cyanobacteria. It contains a special cell called heterocyst, which has the capacity to fix the atmospheric nitrogen.

122 **(d)**
Antibiotics are used as medicines for the treatment of a number of pathogenic or infections diseases. It is because of antibiotics and their newer more potent forms a number formidable diseases are now curable, *e. g.*,plaque, typhoid, tuberculosis, whooping cough, diphtheria, leprosy, etc.

123 **(a)**
The scientific name of zebu cattle is *Bos indicus,* buffalo is *Bubalus bubalus,* silk worm is *Bombyx mori* and domestic fowl is *Gallus domesticus.*

124 **(b)**
Reserpine is obtained from root's bark o plant *Rauwolffia serpentine* (sarpagandha) which belongs to family-Apocynaceae.

125 **(b)**
Prion is a microscopic protein particle similar to a virus but lacking nucleic acid, thought to be the infectious agent responsible for **scraple** and certain other degenerative disease of the nervous system

126 **(c)**
Biochemical Oxygen Demand (BOD) in a river water increases when sewage gets mixed with river water
'Whanever untreated sewage are disposed into natural waters such as streams, ponds, lakes, etc., the normal amount of dissolved oxygen, present in water, gets quickly utilized by microorganisms. The oxygen demand for oxidation of organic matter present in swage is increased'. This, high value of BOD means the water is highly polluted by organic matter

127 **(c)**
Autopolyploids are those polyploids, which have the same basic set of chromosome, multiplied like autotriploid (AAA), autotetraploid (AAAA), etc. They show more yield and better adaptation.

129 **(a)**
In cryopreservation, plants materials are frozen at-196°C.

130 **(a)**
Activated sludge should have the ability to settle quickly so that it can be rapidly pumped back from sedimentation to aeration tank

131 **(c)**
Mycorrhiza and *Rhizobium* both are shows symbiotic association.

In the Mycorrhizal association fungi surround the root hairs of plants. This increases the surface area of the root hairs and allows it to better absorb nutrients in the soil. It also provides the plant roots with protection. In exchange the fungi attached to the root hairs gets glucose from the plant

The other type of root symbiosis is *Rhizobium* symbiosis. This type of symbiosis occurs in legumes. Here, nodules containing the bacteria *Rhizobium* attach themselves to root hairs of The legume. The *Rhizobium* absorbs and converts unusable nitrogen in the soil, to biologically usable nitrogen, which is then used by the legume. The root of the legume supplies the *Rhizobium* with glucose obtained photosynthetic parts of the plant

132 **(d)**

Leucaena leucocephala (subabul) is a fast growing leguminous tree, native to Central America. The tree produces nutritive forage and is used for revegetating deforested tropical lands.

133 **(a)**

Lysine is an essential amino acid found in wheat.

134 **(a)**

Bacillus thuringiensis is a bacterium used to produce genetically engineered *Bt* cotton.

135 **(a)**

Glomus is a genus of Arbuscular Mycorrhiza (AM) fungi. It helps in nutrient uptake mainly the absorption of phosphorus.

136 **(a)**

Biogas is used as fuel for heating cooking and lighting Slurry remained after the production of biogas can be used as fertilisers

137 **(d)**

Opium (apheem) is obtained from latex of unripe capsules of *Papaver somniferum.*

138 **(c)**

The seeds of *(Ricinus communis)Cocos nucifera , Zea mays* and other cereals are albuminous or endospermic (seeds with endosperm), where endosperm acts as the food storage tissue of a seed.

So, the part of castor *(Ricinus communis)* seed that yields oil (food material) is endosperm.

139 **(c)**

New castle diseaseor **Ranikhet disease** is a very dangerous viral disease of poultry which is caused by a filter passing virus.

140 **(d)**

Ranikhet disease is a common viral disease in poultry. Foot and mouth disease is a common viral disease in cattles. Anthrax is also found in cattles. Pebrine is a protozoan disease of **silkworm.**

141 **(d)**

All of these.

Baculovirus heliothis (a group of virus) are known to infect the larval stages of many harmful insects beetles, wasps and ants. A number of baculovirus, which are used as biopesticides belongs to the genus *Nucleopohyledro* virus

These biological weapons are not only effective as potential biological control of harmful insects, but are also harmless to non-target organisms insects (plants, birds, mammals, non-targets insects etc). They are important in organic farming because of their specific action on harmful insects without causing any damage to beneficial insects as well as to the environment. Baculoviruses are helpful in Integrated Pest Management (IPM) Programme, in which beneficial insects are conserved

142 **(b)**

Atropa belladona (Solanaceae) is the source of drug atropine. Atropine is an alkaloid obtained from leaves and is used in eye testing by dilating pupil of eye.

143 **(a)**

In terminator gene technology, the plants are introduced a gene, called terminator gene, which causes failure of seed setting after one generation. It will give the seed producer a monopoly over a particular variety.

144 **(c)**

In this case, more number of genes for high yielding milk are inherited from both the parents.

145 **(b)**

CFCL is situated at Faridabad (Haryana).

146 **(b)**

The chemical, which kills or inhibits the growth of insects is called **insecticide.** These chemicals control insects by acting upon the respiratory system or nervous system.

148 **(b)**

Cyanobacteria or blue-green algae is the most suitable source of biofertiliser, particularly in rice fields, *e. g.*,*Nostoc, Anabaena*

Rhizobium is a symbiotic bacterium that lives in the root nodules of legumes and fixes atmospheric nitrogen into organic compound

Azospirillum and *Azotobacter* are free-living bacteria which absorb free nitrogen from soil, air and convert it into salts of nitrogen like amino acids and enrich soil nutrients

149 **(b)**

Supari is obtained from the plant *Areca catechu.*

150 **(d)**

The bacterium *Xanthomonas campestris* is the causative agent of plant disease, black rot of cabbage.

Bacillus thuringiensis, T. harzianum and NPV are biopesticides.