B.Sc. BIOTECHNOLOGY
SIXTH SEMESTER
ENVIRONMENTAL BIOTECHNOLOGY
BBT – 603

(Use Separate Answer Scripts for Objective & Descriptive)

Duration: 3 hrs. **Full Marks: 70**

(PART-A: Objective)

Time: 20 min. **Marks: 20**

Choose the correct answer from the following: ***1X20=20***

1. *Natronobacterium* are growing in the
   a. pH 8-10 b. pH 9-11
   c. pH 4-6 d. None of these

2. Serine protease are derived from
   a. Alkaliphiles b. Acidophiles
   c. Extremophiles d. None of these

3. Cellulases are used in
   a. Waste water treatment b. Food additives
   c. both a&b d. all of these

4. Optimum temperature of thermophiles
   a. 55-65° C b. 40-50° C
   c. 65-75° C d. 80° C

5. Which is **NOT** methanogenic microorganisms
   a. Methanobacterium b. Methanomonas
   c. Methanobacillus d. Methanosarcina

6. Which is **NOT** acid forming microorganisms
   a. *Lactospirillum* sp. b. *Lactobacillus* sp.
   c. *Staphylococcus* sp. d. None of these

7. Which is **NOT** an Aerobic attached growth systems of sewage treatment
   a. Trickling filter b. Roughing filter
   c. Oxidation ditch d. None of these

8. Conversion of ammonia to nitrate is known as
   a. Natrofication b. Nitrification
   c. Nitrofication d. Nitrifraction

9. Which are **NOT** involve in trickling filter
   a. *Flavobacterium* b. *Stigeoclonium*
   c. *Chlorella* d. *Escherichia coli*

10. Which is caused for Gastroenteritis
    a. *Salmonella typhi*
    b. *Vibrio cholerae*
    c. *Escherichia coli*
    d. *Shigella sp.*

11. Which is responsible for Amoebic dysentery
    a. *Entamoeba histolytica*
    b. *Giardia lamblia*
    c. *Balantidium coli*
    d. *None of these*

12. Which compound is used for colilert technique
    a. *ONPG*
    b. *MLFG*
    c. *Both a & b*
    d. *None of these*

13. Which is following involve in coliform test
    a. *Enterobacter aerogenes*
    b. *Aerobacter aerogenes*
    c. *Escherichia coli*
    d. *All of these*

14. Which of the following is used as coagulant aid
    a. Activated silica
    b. Soda ash
    c. Iron salts
    d. None of these

15. Bioremediation
    a. usage of microbes to create new organisms
    b. usage of anaerobic bacteria to create new antibiotics
    c. usage of microbes to destroy environmental pollutants
    d. usage of aerobic bacteria to create new vaccines

16. A process using microbes to convert toxic industrial wastes to less toxic or non-toxic compounds is
    a. Precipitation
    b. Complement fixation
    c. Bioconversion
    d. Bioremediation

17. This cleanup approach includes removal of groundwater or soil from its natural setting to permit for bioremediation
    a. Bioaugmentation
    b. *in situ* bioremediation
    c. *ex situ* bioremediation
    d. Phytoremediation

18. Bioaugmentation involves
    a. eliminating sludge
    b. plants usage for bioremediation
    c. addition of microbes to a cleanup site
    d. bioventing

19. _____ bacterium can withstand the dosage of radiation, which are several times higher than what human cells can tolerate
    a. *Escherichia coli*
    b. *Deinococcus radiodurans*
    c. *Conus magus*
    d. *Staphylococcus aureus*

20. Composition of Denaturing gradient gel in DGGE
    a. acrylamide
    b. urea
    c. formamide
    c. All of these

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PART-B : Descriptive

Time : 2 hrs. 40 min. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. What is Biosensor? Give details mechanisms and its applications in environmental monitoring (with appropriate pictorial representation)? **2+4+4 =10**

2. Give details on the composting method of solid waste management? (with appropriate pictorial representation) **10**

3. Give details on the classification of sewage treatment process? Briefs on preliminary treatment? **3+7=10**

4. What is aerobic suspended growth treatment? Give details on the activated sludge process? **3+7=10**

5. Write short notes **5+5=10**
   a. BOD
   b. Multiple tube fermentation technique

6. Write short notes **5+5=10**
   a. Acidophiles
   b. Thermophiles

7. What is bioremeadiation and types? Give details on the Phytoremediation and its different applications? **3+7=10**

8. Write short notes **5+5=10**
   a. DGGE
   b. FAME analysis

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