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**BRAINWARE UNIVERSITY**

**Term End Examination 2023**

**Programme – B.Sc.(BT)-Hons-2018/B.Sc.(BT)-Hons-2020**

**Course Name – Bioprocess Technology**

**Course Code - BBT501/BBTC501**

**( Semester V )**

**Full Marks : 60**

**Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

**Group-A**

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Indicate the fundamental functionality of a fermenter
  - a) To sterilize the medium
  - b) To recover the product
  - c) To provide optimum growth conditions to organisms and obtain the desired product
  - d) To purify the product
- (ii) Explain Idiophase
  - a) Production of waste materials
  - b) Production of topical products
  - c) Production of primary metabolites
  - d) Production of secondary metabolites
- (iii) Select the one that is not present in fermentation media?
  - a) Carbon
  - b) Nitrogen
  - c) Agar
  - d) Water
- (iv) Name the raw material that is best for alcohol production
  - a) Waste liquor
  - b) Molasses
  - c) Starch
  - d) Alkanes
- (v) Choose the following one with Volumetric mass transfer coefficient
  - a) Shaking parameters
  - b) Cell harvesting
  - c) Media sterilization
  - d) foam controlling
- (vi) Identify the yeast that is involved in alcohol fermentation \_\_\_\_\_
  - a) Lactobacillus
  - b) Saccharomyces cerevisiae
  - c) Escherichia coli
  - d) Bacillus
- (vii) Relate the fundamental of Industrial Microbiology with \_\_\_\_\_
  - a) To provide optimum growth conditions
  - b) To provide aseptic conditions
  - c) To produce a pure product
  - d) To create a pure form of media
- (viii) Employ the operational condition of a biochemical plant \_\_\_\_\_
  - a) Metallic catalyst
  - b) Chemical catalyst
  - c) Elevated temperature
  - d) Non-pathologic state of the organism
- (ix) Choose the correct statement about enzyme \_\_\_\_\_

- a) An Enzyme is a protein and is used as a catalyst to accelerate the reaction.      b) Life would not exist without the presence of enzymes.
- c) Enzymes participate in cellular metabolic processes.      d) All of these
- (x) Relate from the following, medium used for culturing should not \_\_\_\_\_
- a) Be sterilized      b) Be cheap and readily available
- c) Contain desired products      d) Allow high yield of undesired products
- (xi) Select the nature of an enzyme
- a) Vitamin      b) Lipid
- c) Carbohydrate      d) Protein
- (xii) Select the impeller diameter in CSTR \_\_\_\_
- a) is usually 1/2 of the vessel diameter.      b) usually 1/3 of the vessel diameter.
- c) is usually 1/3 of the vessel diameter.      d) equal to the vessel diameter
- (xiii) Which sparger are considered as single open or partially-closed pipe that provide air bubble stream?
- a) Perforated sparger      b) Orifice sparger
- c) Nozzle sparger      d) Porous sparger
- (xiv) Justify the function of draft tube
- a) Decrease the pressure      b) Increase the velocity
- c) Maximize kinetic energy      d) Minimize kinetic energy
- (xv) Write the full form of PBR \_\_\_\_\_
- a) Photobioreactor      b) Photobioreaction
- c) Physicalbioreactor      d) Packedbioreactor

#### Group-B

(Short Answer Type Questions)

3 x 5=15

2. 3. Employ what happens to the value of  $K_La$  when there is an increase in temperature (3)
3. Interpret the term DOE and mass transfer coefficient in bioprocess (3)
4. Plan how industrial byproducts and wastes can be used. (3)
5. Explain the factors that affect the value of  $K_La$  (3)
- OR
- Explain the lyophilization and vacuum drying technique (3)
6. Illustrate the effects of scale up (3)
- OR
- Illustrate the term "effluent treatment plant" and the sequence of treatment process in ETP (3)

#### Group-C

(Long Answer Type Questions)

5 x 6=30

7. Describe preservation techniques of microbes (5)
8. Discuss the structure of immobilized enzyme reactors (5)
9. Explain the advantages and disadvantages of airlift bioreactor (5)
10. Write detailed description of activated sludge techniques with diagram. (5)
11. Dissect the mechanism of entrapment and write the examples of at least three commonly used matrixes for entrapment (5)
- OR
- Explain the purposes of the following fermenter parts: Impellor, Baffles, Sparger, Cooling jacket, Foam probe (5)
12. Write the advantages of photobioreactor and provide a diagram of photobioreactor (5)
- OR
- Write about synchronous culture and diauxic growth curve (5)