



BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Master of Science in Biotechnology

Course Name – Bioprocess Engineering & Technology

Course Code - MBT301

Semester / Year - Semester III

Time allotted : 75 Minutes

Full Marks : 60

[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 60=60

1. (Answer any Sixty)

(i) The Batch culture is a/an _____ culture system.

- | | |
|--------------|----------------|
| a) .Open | b) Closed |
| c) .Isolated | d) semi-closed |

(ii) A period during which the growth rate of cells gradually increases is known as _____

- | | |
|---------------------|-----------------------|
| a) Lag phase | b) Log phase |
| c) Stationary phase | d) Deceleration phase |

(iii) 4. The exponential phase may be described by the equation _____

- | | |
|--------------------|----------------------|
| a) $dx/dt = \mu x$ | b) $dt/dx = \mu$ |
| c) $dx/dt = \mu t$ | d) $dx^2/dt^2 = \mu$ |

(iv) During batch fermentation, in which phase the microbes in the fermenter are adapting to the new environment?

- | | |
|---------------------|-----------------------------|
| a) Lag phase | b) Log or exponential phase |
| c) Stationary phase | d) Death phase |

(v) Who first suggested that filamentous fungi have a 'growth unit' which is replicated at a constant rate?

- | | |
|-----------|-------------|
| a) Trinci | b) Petersen |
|-----------|-------------|

c) Plomley

d) Griffiths

(vi) Which of the following organisms represent the highest specific growth rate, μ_{max} ?

a) *Vibrio natriegens*

b) *Methylomonas methanolytica*

c) *Aspergillus nidulans*

d) *Penicillium chrysogenum*

(vii) The Yield factor (Y) is the measure of the efficiency of _____

a) Conversion of anyone substrate into biomass

b) Conversion of all the substrates into biomass

c) The Affinity of an enzyme to the substrate

d) Number of microbes which produced the biomass

(viii) Borrow et al. investigated the biosynthesis of Gibberellic acid by *Gibberella fujikuroi* and divided growth of organisms into balanced, storage and maintenance phase. What do you mean by storage phase?

a) The phase equivalent to the early to middle exponential phase

b) The phase equivalent to the late exponential phase

c) The phase equivalent to the stationary phase

d) The phase equivalent to the lag phase

(ix) The batch culture or fermentation can be used to produce _____

a) Organic acids

b) Amino acids

c) Single Cell Protein

d) Antibiotics

(x) Which of the following is absent in fermentation media?

a) Carbon

b) Nitrogen

c) Agar

d) Water

(xi) The Maillard reaction is a chemical reaction between _____ and _____

a) amino acid and carboxylic acid

b) amino acid and reducing sugars

c) carboxylic acid and reducing sugar

d) carboxylic acid and carbonyl groups

(xii) Which of the following is the raw material for lactic acid and SCP production?

- a) Fruit juices
- b) Beet molasses
- c) Cheese Whey
- d) Hydrocarbons

(xiii) Sulphite waste liquor is obtained from _____.

- a) Paper pulp industry
- b) Wood industry
- c) Liquor industry
- d) Sulphur production

(xiv) Which of the following is used in Silage production?

- a) Cheese Whey
- b) Rice straw
- c) Wood molasses
- d) Cellulose

(xv) Which of the following is a by-product after starch extraction from maize?

- a) Blackstrap molasses
- b) Hydrol molasses
- c) Corn steep liquor
- d) Beet molasses

(xvi) Which of the following is used for glutamic acid production?

- a) Sucrose
- b) Hydrolyzed cassava starch
- c) Oleic acid
- d) Corn steep

(xvii) Grapes are used in the production of

- a) .beer
- b) wine
- c) .votka
- d) None

(xviii) Which of the following institute grades the steel?

- a) TATA
- b) AISI
- c) JSW
- d) SAIL

(xix) Which of the metal is used to make stainless steel?

- a) Cr
- b) Pb

c) Mn

d) Fe

(xx) Which of the following is not the property of Chromium film?

a) Non-porous

b) Soluble

c) Self-healing

d) Continuous

(xxi) Which of the following is a 'defined media'?

a) Synthetic media

b) Crude media

c) Simple media

d) Complex media

(xxii) What is the basic principle of Industrial Microbiology?

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

(xxiii) Which of the following is a raw material for the production of riboflavin?

a) Ammonium salt

b) Pharmamedia

c) Pancreatic digest of gelatin

d) Dried beef blood

(xxiv) Which one of the following media is undefined media?

a) MS

b) WPM

c) Locks Media

d) Crude media

(xxv) Which of the following is a raw material for butirosin production?

a) Ammonium salt

b) Pharmamedia

c) Pancreatic digest of gelatin

d) Dried beef blood

(xxvi) What are secondary metabolites?

a) Synthesized during primary phase of cell growth

b) Synthesized during secondary phase of cell growth

c) Synthesized during the stationary phase

d) Synthesized during growth phase of cell

(xxvii) Which of the following process is not employed to distinguish between contaminants and the product based on physiochemical features?

- a) Filtration
- b) Batch adsorption
- c) Isoatachoporesis
- d) Crystallization

(xxviii) What is the overall percentage yield for penicillin manufacturing?

- a) 0.2
- b) 0.3
- c) 0.4
- d) 0.5

(xxix) Which of the following is also a process for penicillin recovery?

- a) Adsorption on activated carbon
- b) Direct crystallization
- c) Degumming
- d) Distillation

(xxx) What is the use of batch electrophoresis in procedure of purification of bioproduct?

- a) It gives high resolution carbohydrates
- b) It purifies completely
- c) It gives high resolution protein content
- d) The targeted product is concentrated by batch electrophoresis

(xxxii) If only 5% of Ethylene is converted to Ethylene glycol, why is there a need of separation process?

- a) To feed more reactant to the reacting mixture
- b) To remove the ethylene glycol formed
- c) To recover the unreacted Ethylene Glycol
- d) To start an intermediate reaction

(xxxiii) How is the Diethyl Ether removed in the manufacturing of ethanol from ethylene?

- a) Directly removed
- b) Crude distillation column
- c) Low pressure flash drum
- d) Light-ends tower

(xxxiiii) Chemical reactions require feed mixtures from non-renewable

resources like coal, petroleum. What is used in place of non-renewable sources?

- a) Sunlight
- b) Biomass
- c) Biodiesel
- d) Microorganisms

(xxxiv) Which of the following is a condition of operation for biochemical plant?

- a) Metallic catalyst
- b) Chemical catalyst
- c) Elevated temperature
- d) Non-pathologic state of the organism

(xxxv) How can be citric acid produced other than from lemons?

- a) Aerobic fermentation of starch
- b) Anaerobic fermentation of starch
- c) Aerobic fermentation of glucose
- d) Anaerobic fermentation of glucose

(xxxvi) Which of the following separation techniques is NOT used in the process of manufacturing of citric acid ?

- a) Ultrafiltration
- b) Ion-exchange
- c) Crystallization
- d) Distillation

(xxxvii) Name an enzyme that is derived from the stomachs of young ruminant animals and also used in dairy industry to produce cheese?

- a) Trypsin
- b) Pepsin
- c) Liginase
- d) Rennin

(xxxviii) Name an enzyme that digests fat?

- a) Lipase
- b) Sucrase
- c) Maltase
- d) Fructose

(xxxix) Who coined the word enzyme?

- a) Wilhelm Kuhne
- b) Alfred Russel
- c) Robert Koch
- d) Rosalind Franklin

(xl) Name an enzyme which is not proteinaceous in nature?

- a) Cellulases
- b) Xylanases
- c) Ribozyme
- d) Peptidase

(xli) Which enzyme is used by the biscuit manufacturers to lower the protein level of flour?

- a) Amylase
- b) Protease
- c) Cellulase
- d) Xylanase

(xlii) Inactive enzymes which are not bound to their cofactors are called

- a) Apoenzymes
- b) Coenzymes
- c) Enzyme inhibitors
- d) Holoenzymes

(xliii) The immobilization technique which may be done without the solid matrix, is

- a) Cross linkage
- b) Matrix entrapment
- c) Covalent binding
- d) Adsorption

(xliv) The binding between solid matrix and enzyme is comparatively less in case of

- a) Ionic
- b) Covalant
- c) Cross-linking
- d) Adsorption

(xlv) What is an apoenzyme?

- a) It is a protein portion of an enzyme
- b) It is a non-protein group
- c) It is a complete, biologically active conjugated enzyme
- d) It is a prosthetic group

(xlvi) Name the enzyme which catalyzes the oxidation-reduction reaction?

- a) Transaminase
- b) Glutamine synthetase
- c) Phosphofructokinase
- d) Oxidoreductase

(xlvii) Which of the following products have higher acidity and lacks aroma?

- a) Cultured buttermilk
- b) Cultured sour cream
- c) Bulgarian milk
- d) Acidophilus milk

(xlviii) Shredded cabbage is the starting product for which of the following fermented food?

- a) Sauerkraut
- b) Pickles
- c) Green olives
- d) Sausage

(xlix) Which of these processes does not give off CO₂?

- a) Lactate fermentation.
- b) Aerobic respiration.
- c) .Alcoholic fermentation.
- d) None of these

(l) Which of the following microbes are used for the commercial production of citric acid?

- a) Xanthomonas citri.
- b) Asparagine.
- c) Asparagus.
- d) Aspergillus.

(li) Saccharomyces cerevisiae is used primarily for

- a) Baking.
- b) Bleaching.
- c) Biofuel.
- d) None of these

(lii) Ethanol can be produced using _____

- a) Saccharomyces cerevisiae.
- b) Escherichia coli.
- c) Pseudomonas syringae
- d) None of these

(liii) Bacillus thuringiensis is used for

- a) Fermentation of beer.
- b) Biopesticide.
- c) Antibiotic.
- d) None of these

(liv) Before antibiotics, the first commercial antibacterial available was _____

- a) Penicillin.
- b) Prontosil.
- c) Azithromycin.
- d) None of these

(lv) Example of a natural insect repellent

- a) Citronella oil.
- b) Coconut oil.
- c) Linseed oil.
- d) None of these

(lvi) Which of the following is used as a substrate for alcohol fermentation?

- a) Maize.
- b) Barley.
- c) Sucrose.
- d) None of these

(lvii) Antibiotics are the most effective on

- a) Bacteria.
- b) Virus.
- c) Fungi.
- d) None of these

(lviii) Which of the following is true about Michaelis-Menten kinetics?

- a) K_m , the Michaelis constant, is defined as that concentration of substrate at which enzyme is working at maximum velocity
- b) It describes single substrate enzymes
- c) K_m , the Michaelis constant is defined as the dissociation constant of the enzyme-substrate complex
- d) It assumes covalent binding occurs between enzyme and substrate

(lix) The active site of chymotrypsin consists of a catalytic triad of which of the following amino acid residues?

- a) Serine, histidine and aspartate.
- b) Serine, histidine and glutamate.
- c) Threonine, histidine and aspartate
- d) Methionine, histidine and aspartate

(lx) Which of the following is true about the structure of hexokinase?

- a) U-shaped
- b) T-shaped
- c) E-shaped
- d) G-shaped

