TELANGANA UNIVERSITY
S.S.R. DEGREE COLLEGE, NIZAMABAD (C.C:5029)
II SEMESTER INTERNAL ASSESSMENT-II EXAMINATIONS
DEPARTMENT OF BIO TECHNOLOGY
(INDUSTRIAL BIOTECHNOLOGY) QUESTION BANK

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1. In World War II, the fermentation was used for the production of _____
a) Alcohol
b) Antibiotics
c) Wine
d) Beer

Answer: b
Explanation: In World War Two, the bioreactor was used in the production of antibiotics. The development of fermentation came after the 1940s onwards, till then it was used in the production of potable alcohol.

2. The small-scale bioreactors have volume of _____
a) 5-10 litres
b) 10-20 litres
c) 1-10 litres
d) 1-20 litres

Answer: d
Explanation: The small-scale bioreactors normally have a volume of 1-20 litres. The bioreactor is used for a number of purposes, scale-up and scale-down studies, clone selection, medium development, process development, etc.

3. The bioreactor is not capable of _____
a) Producing aseptic conditions
b) Meeting containment regulations
c) Controlling pH
d) Produce electricity

Answer: d
Explanation: The bioreactor is not capable of producing electricity. However, it is capable of producing aseptic conditions for longer periods of time, meeting containment regulations, monitoring or controlling pH, temperature, DO, etc.

4. Which of the following fermenters are characterized by height to diameter ratio?
a) Tower fermenter
b) Airlift fermenter
c) Hollow fibre
d) Perfusion bioreactor

Answer: a
Explanation: Tower fermenters are the vessels which are characterized by a high height-to-diameter ratio anywhere around 6:1 to 15:1. Aeration is provided by gas sparging via a sample sparger near the fermenter base.

5. In which of the following fermenters the impellers are replaced by the constant flow of gas?
a) Airlift fermenter
b) Tower fermenter
c) Hollow fibre
d) Perfusion bioreactor

Answer: a
Explanation: In airlift fermenters, the impellers, motors, the driveshaft is replaced by a constant flow of gas introduced into a riser tube. It may also be provided with baffles for improving the mixing efficiency.

6. Which of the following is used to grow anchorage-dependent cells?
a) Airlift fermenter
b) Tower fermenter
c) Hollow fibre chamber
d) Perfusion bioreactor

Answer: c
Explanation: Hollow fibre chambers are used to grow anchorage-dependent cells. It consists of a bundle of fibres and the cells grow with extra capillary spaces within a cartridge.

7. Which of the following bioreactor consists of a vessel replaced by a multilayered bag?
a) Single Use bioreactors
b) Perfusion bioreactors
c) Airlift bioreactor
d) Tower bioreactor

Answer: a
Explanation: A single-use bioreactor consists of a vessel replaced by a multi-layered bag. It meets all the criteria for a product in contact with a biological process like leaching or chelating.

8. What is the function of carbon in stainless steel?
a) Improves resistance to corrosion
b) Improves ductility
c) Reduces sensitization
d) Improves halogen resistance

Answer: c
Explanation: The carbon reduces the sensitization when present in stainless steel. It is a maximum of 0.03 % which prevents the precipitation of carbon during welding.

9. The Borosilicate glass does not contain _____
a) SiO_2

b) B_2O_3
c) Al_2O_3
d) KH_2PO_4

Answer: d
Explanation: Borosilicate glass is chemically inert, easy to clean and robust. The glass is made up of SiO_2 81 %, B_2O_3 13 % ,NaO_2 + K_2O 4 % and Al_2O_3 2 %. It has to meet the criteria for the thickness of the glass, the number of air bubbles within the glass and the number of bubbles on the surface.

10. Which of the following class consists of microorganisms which are not causative agents?
a) EFB Class 1
b) EFB Class 2
c) EFB Class 3
d) EFB Class 4

Answer: a
Explanation: Microorganisms that have never been identified as causative agents of disease in man are termed as harmless microorganisms and belong to EFB Class 1 and do not offer a threat to the environment.

11. Which of the following class consists of microorganisms which are causing disease in man and are hazardous to workers?
a) EFB Class 3
b) EFB Class 1
c) EFB Class 2
d) EFB Class 4

Answer: c
Explanation: Microorganisms that may cause disease in man and are, therefore, hazardous to laboratory workers. They do not spread in the environment. Prophylactics are used for the treatment. They are called low-risk microorganisms.

12. EFB Class 4 consists of _____
a) Low-risk microorganisms
b) High-risk microorganisms
c) Medium-risk microorganisms
d) Environmental-risk microorganisms

Answer: b
Explanation: EFB Class 4 consists of High-risk microorganisms. These are microorganisms that cause severe illness to the microorganisms and are very hazardous to people at work. No effective treatment is available for this class.

13. Which of the following class of microorganisms causes less threat to a man?
a) Low-risk microorganisms
b) High-risk microorganisms
c) Medium-risk microorganisms

d) Environmental-risk microorganisms

Answer: d
Explanation: Microorganisms cause less threat to man and are very hazardous to the environment. They are also called as environmental-risk microorganisms and are responsible for high economic losses.

14. In a bubble column reactor, the mass transfer depends on the size of the bubble.
a) True
b) False

Answer: a
Explanation: In a bubble column reactor, the hydrodynamics and mass transfer depends on the size of the bubbles and their release from the sparger. It is used in the production of Bakers' yeast, Beer, and Vinegar. It is also used in aeration and treatment of wastewater.

15. Bubble column reactor provides better mixing than airlift reactors.
a) True
b) False

Answer: b
Explanation: The airlift bioreactors provide better mixing than bubble column reactors. The airlift bioreactors provide a configuration of a greater degree of stability to liquid flow compared with bubble columns. Therefore, higher gas flow rates can be used without incurring operating problems like spray formation.

16. Who first isolated citric acid?
a) Thomas Edison
b) Carl Wilhelm
c) Charles Darwin
d) Francis Crick

Answer: b
Explanation: Carl Wilhelm Scheele in 1784 first isolated citric acid from lemon juice. He crystallized citric acid from lemon juice and this method became the primary method for the production of citric acid.

17. Citric acid is a _____ acid.
a) Monobasic
b) Tribasic
c) Monoprotic
d) Tribasic

Answer: d
Explanation: Citric acid (2-Hydroxy-1,2,3-propane tricarboxylic acid) is a tribasic acid which can yield three hydrogen ions (free) upon ionization of each molecule of acid. It is also called as triprotic acid. Phosphoric acid is another example of tribasic or troprotic acid.

18. Who observed citric acid as a by-product of calcium oxalate produced by Penicillium glaucum?
a) Thomas Edison
b) Carl Wilhelm
c) Wehmer
d) Adam

Answer: c
Explanation: Wehmer in 1893 observed citric acid as a by-product of calcium oxalate produced by *Penicillium glaucum*. This resulted in the encouragement of the production of citric acid.

19. Which of the following is used in the manufacturing of cheese?
a) Sulphuric acid
b) Amylase
c) Kinase
d) Sodium citrate

Answer: d
Explanation: Sodium citrate has been used in the manufacturing of cheese. It is also used in the transfusion of blood and bacteriology for the prevention of bacteriology. It can also serve as a source of energy.

20. Which of the following is the most common method for citric acid production?
a) Solid-state fermentation
b) Submerged fermentation
c) Surface fermentation
d) Surface adhesion fermentation

Answer: b
Explanation: Submerged fermentation is the most common method for the production of citric acid. It is the most commonly employed technique and it is estimated that about 80 % of the world production of citric acid is obtained by submerged fermentation.

21. Which of the following organisms is not used for the production of citric acid?
a) *Aspergillus wentii*
b) *Bacillus licheniformis*
c) *Candida oleophila*
d) *Saccharomyces cerevisiae*

Answer: d
Explanation: *Saccharomyces cerevisiae* is not used for the production of citric acid. It is mainly used in the production of beer as it is a brewers' yeast. *Aspergillus niger*, *Aspergillus wentii*, *Bacillus licheniformis*, *Candida oleophila*, etc. are used in the production of citric acid.

22. The first product of TCA cycle is _____
a) Fumaric acid
b) Oxalic acid
c) Malic acid

d) Citric acid

Answer: d
Explanation: The first product of TriCarboxylic Acid cycle is citric acid. Therefore, it is also called a citric acid cycle or Krebs cycle. The cycle is primarily regulated by the concentration of ATP, NADH and is controlled by the key enzymes like isocitrate dehydrogenase, α-ketoglutarate dehydrogenase, etc.

23. Which of the following fruit contain more amount of citric acid?
a) Mango
b) Tomato
c) Orange
d) Coconut

Answer: c
Explanation: Oranges contain more amount of citric acid including lemon, lime, grapefruit, etc. are high in citrus whereas tomatoes contain a low amount of citric acid and coconut and mango do not contain citric acid at all.

24. Citrate is the feedback inhibitor of _____
a) Hexokinase
b) Phosphofructokinase
c) Pyruvate dehydrogenase
d) Malate dehydrogenase
View Answer

Answer: b
Explanation: Citrate is the feedback inhibitor of phosphofructokinase (PFK). The reduction or inhibition of Phosphofructokinase is required for the good accumulation of citric acid.

25. Acute vitamin poisoning, also known as short-term vitamin poisoning, is caused by

(a)Eating the liver of a polar bear.

(b)Eating the liver of the Buffalo.

(c)Eating the liver of the ostrich.

(d)Eating the liver of mule deer

Answer:(a)

Explanation:Polar bears are apex carnivores that bioaccumulate vitamin A from lower-level marine algae in the food web, which is produced by higher-level marine algae. The fact that vitamin A is not water-soluble means that it is unable to be flushed from the body and is instead stored in the liver. The recommended daily allowance (RDA) for vitamin A in humans is 0.9mg, which can be obtained by consuming one-tenth of a gramme of well-fed polar bear liver (about one gramme). Approximately 52 people could be killed by the amount of vitamin A present in the entire liver.

26. Which of the following is the most important nutrient for a woman during her initial stages of pregnancy in order to prevent birth defects?

(a) Thiamin.

b) Vitamin.

(c) Folic acid.

(d) Vitamin.

Answer:(c)

Explanation:Folic acid is a vitamin that can be found in a variety of foods, as well as multivitamin supplements, and is essential for pregnancy and lactation. It is especially important for women who are planning a pregnancy to take folic acid because it has been shown to reduce the risk of birth defects.

27. Which of the following foods contains the highest concentrations of vitamin C?

(a) Parsley.

(b) Broccoli.

c) Orange juice.

(d) Black currants.

Answer:(d)

Explanation:Blackcurrant is known by the botanical name Ribes nigrum (blackcurrant berry). Blackcurrants contain more than three times the amount of vitamin C found in an orange, making them a particularly nutritious fruit.

28. Which of the following vitamins is important in the process of blood clotting?

(a)Vitamin K.

b) Vitamin C.

(c) Vitamin D.

(d) Vitamin A.

Answer:(a)

Explanation:It has been shown that vitamin K is involved in the modification of several blood clotting components after they have been translated. It is a fat-soluble vitamin that is necessary for the proper coagulation of blood and the synthesis of protein.

29Which one of the following is the most common cause of blindness in children all over the world?

(a) Glaucoma.

(b) Vitamin A.

(c) Color blindness.

(d) Cataracts.

Answer:(b)

Explanation:Vitamin A deficiency is the most common cause of preventable blindness in children under the age of five. Dietary intake of vitamin A is necessary for a variety of functions in human

eyes, including the nourishment and protection of the cornea, a clear covering that protects the front of the eye and serves as its front lens. The cornea is susceptible to injury and scarring, both of which can result in permanent vision loss.

30.It is caused by a lack of-the following nutrients:

(a) Vitamin B12.

(b) Vitamin B2.

(c)Vitamin B6.

(d) Vitamin B1.

Answer:(d)

Example:Beri-Beri is a condition caused by a lack of thiamine (Vitamin B1). In most cases, it can be found in areas where polished rice is a staple part of the diet.

31. *Monascuspurpureus* is utilized in the production of

(a) citric acid

(b) ethanol

(c) statins

(d) streptokinase

Answer: (c)

32. The type of fermentation observed in yeasts is

(a) acrylic fermentation

(b) lactic acid fermentation

(c) pyruvic fermentation

(d) alcoholic fermentation

Answer: (d)

***3*3. In lactic acid fermentation, the final electron acceptor is:**

(a) Lactic acid

(b) Pyruvate

(c) Oxygen

(d) NAD

Answer: (b)

34. Which of these is not a product of fermentation?

(a) Lactate

(b) Oxygen

(c) Carbon dioxide

(d) Ethanol

Answer: (b)

35. Which of the following is not a vegetable or fruit-based fermented product?

(a) Wine

(b) Sauerkraut

(c) Beer

(d) Vinegar

Answer: (d)

36. One of the most commonly used fermented cereal amongst these is

(a) Wheat

(b) Bread

(c) Rice

(d) Yoghurt

Answer: (b)

37. Glucose molecule during the process of glycolysis is broken down into

(a) Four pyruvic acid

(b) Three pyruvic acid

(c) Two pyruvic acid

(d) One pyruvic acid

Answer: (c)

38. Fermentation occurs in the

(a) presence of oxygen

(b) absence of oxygen

(c) presence of nitrogen

(d) presence of carbon

Answer: (b)

39. The least yield of ATP is observed in

(a) aerobic respiration

(b) anaerobic respiration

(c) fermentation

(d) same in (a), (b), and (c)

Answer: (c)

40. Anaerobic respiration by yeast produces

(a) CO_2

(b) Wine and Beer

(c) Alcohol

(d) All of the above

Answer: (d)

41. The yield of the antibiotic depends upon _____.

(a) Age of the inoculum

(b) Only the pH of the medium

(c) Composition of the medium

(d) All of the above

Sol. (d) All of the above.

42. In *Penicillium chrysogenum*, the maximum antibiotic production occurs during the _____.

(a) The second phase

(b) The third phase

(c) First phase

(d) In all three phases

Sol. (a) The second phase.

43. Antibiotics are used to treat infections by

(a) Virus

(b) Bacteria

(c) All the microorganisms

(d) None of the above

Sol. (b) Bacteria.

44. Which of the following fermentation processes is used in the production of penicillin?

(a) Aerobic fermentation followed by anaerobic fermentation

(b) Anaerobic fermentation

(c) Aerobic fermentation

(d) Anaerobic fermentation followed by aerobic fermentation

Sol. (c) Aerobic fermentation.

45. After the fermentation process, penicillin is recovered as

(a) Penicillin

(b) Sodium penicillin

(c) Calcium penicillin

(d) Potassium penicillin

Sol. (d) Potassium penicillin.

46. Which of the following species is used for producing streptomycin?

(a) *S. ramosus*

(b) *S. griseus*

(c) *S. aureofaciens*

(d) *S. griseoflavus*

Sol. (b) *S. griseus.*

47. The high yield of chlortetracycline requires _____.

(a) No aeration

(b) Controlled aeration

(c) Continuous aeration

(d) Aeration which does not affect the yield

Sol. (c) Continuous aeration.

48. What is meant by antibiotic resistance?

(a) It means our body has become resistant to the antibiotic

(b) It means the bacteria have developed antibiotic resistance

(c) Both (a) and (b)

(d) None of the above

Sol. (b) It means the bacteria have developed antibiotic resistance.

49. Which of the following seeds are used for the inoculum preparation for the fermentation medium for penicillin?

(a) Rice seeds

(b) Corn seeds

(c) Wheat seeds

(d) Barley seeds

Sol. (d) Barley seeds.

50. Which of the following species is used for producing tetracycline?

(a) *S. venezuelae*

(b) *S. griseus*

(c) *S. aureofaciens*

(d) *S. griseoflavus*

Sol. (c) *S. aureofaciens*.