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Biology Grade 10 — Chapter 10

Biotechnology

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Independent practice MCQs from the supplied Class 10 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. What is the use of living organisms or their processes and products for the welfare of mankind called?

(A) Biotechnology
(B) Technology
(C) Genetic engineering
(D) Microbiology

Correct Answer: A

Explanation: Biotechnology is defined as the "use of living organisms or their processes and products for the welfare of mankind.".

2. Which microorganism is used to raise bread dough?

(A) Bacteria
(B) Yeast
(C) Virus
(D) Algae

Correct Answer: B

Explanation: Yeast is used to raise bread dough and to prepare alcoholic drinks by alcoholic fermentation.

3. Which of the following is a traditional biotechnology product?

(A) Insulin
(B) GM crops
(C) Yogurt
(D) Gene therapy

Correct Answer: C

Explanation: Yogurt is a traditional biotechnology product made by lactic acid fermentation.

4. What is the term for the use of living organisms to clean up pollution?

(A) Fermentation
(B) Genetic engineering
(C) Aquaculture
(D) Bioremediation

Correct Answer: D

Explanation: Bioremediation is the process of using living organisms to clean up the environment contaminated with pollutants.

5. Which century has been termed as the "Century of Biology"?

(A) 21st century
(B) 19th century
(C) 20th century
(D) 18th century

Correct Answer: A

Explanation: Modern biotechnology is one of the fastest growing areas of science; hence this century has rightly been termed as Century of Biology.

6. Which of the following is a GM crop grown in Pakistan?

(A) Bt cotton

(B) All of the above
(C) GM wheat
(D) GM sugarcane

Correct Answer: B

Explanation: Bt cotton, GM wheat, and GM sugarcane are all GM crops developed and grown in Pakistan.

7. What is the gene responsible for pest resistance in Bt cotton?

(A) AVP1 gene
(B) CP4-epsps gene
(C) cry gene
(D) myostatin gene

Correct Answer: C

Explanation: The 'cry' gene responsible for pest resistance is obtained from Bacillus thuringiensis and transferred to cotton plant.

8. Which of the following is an example of medical biotechnology?

(A) Bt cotton
(B) Bio-fertilizer
(C) Bioremediation
(D) Insulin production

Correct Answer: D

Explanation: Medical biotechnology is used for the production of insulin, vaccines, and other biological drugs.

9. Which hormone is used to treat diabetes?

(A) Insulin
(B) Thyroxin
(C) Adrenaline
(D) Glucagon

Correct Answer: A

Explanation: Insulin is used for the treatment of diabetes.

10. What is the process of using marine organisms for human welfare called?

(A) Green biotechnology
(B) Blue biotechnology
(C) Red biotechnology
(D) White biotechnology

Correct Answer: B

Explanation: Marine biotechnology is also known as blue biotechnology.

11. Which of the following is a marine biotechnology product?

(A) Insulin
(B) Bt cotton
(C) Ziconotide
(D) Bio-fertilizer

Correct Answer: C

Explanation: Ziconotide is a drug derived from the venom of cone snail, used for chronic severe pain.

12. What is the process of using microorganisms to produce useful products called?

(A) Bioremediation
(B) Genetic engineering
(C) Aquaculture
(D) Fermentation

Correct Answer: D

Explanation: Fermentation is the use of microorganisms to produce useful products like yogurt, cheese, and alcohol.

13. Which of the following is a type of genetic editing technique?

(A) All of the above
(B) CRISPR-Cas9
(C) TALENs
(D) ZFNs

Correct Answer: A

Explanation: CRISPR-Cas9, TALENs, and ZFNs are all genetic editing techniques.

14. What is the application of biotechnology to agriculture called?

(A) Red biotechnology
(B) Green biotechnology
(C) Blue biotechnology
(D) White biotechnology

Correct Answer: B

Explanation: Agricultural biotechnology is also known as green biotechnology.

15. What is the application of biotechnology to medicine called?

(A) Green biotechnology
(B) Blue biotechnology
(C) Red biotechnology
(D) White biotechnology

Correct Answer: C

Explanation: Medical biotechnology is also known as red biotechnology.

16. Which of the following is a benefit of GM crops?

(A) Pest resistance
(B) Drought tolerance
(C) Higher yield
(D) All of the above

Correct Answer: D

Explanation: GM crops are developed for pest resistance, drought tolerance, and higher yield.

17. Which of the following is a bio-fortified crop developed in Pakistan?

(A) Zinc wheat
(B) Bt cotton
(C) GM sugarcane
(D) GM tomato

Correct Answer: A

Explanation: Zinc wheat — this correctly answers the question.

18. Which of the following is a benefit of bio-fortification?

(A) Increased vitamin content
(B) All of the above
(C) Increased mineral content
(D) Improved nutrition

Correct Answer: B

Explanation: All of the above — this correctly answers the question.

19. What is the advantage of using biopesticides?

(A) Increased crop yield
(B) Reduced pest resistance
(C) Reduced environmental pollution
(D) All of the above

Correct Answer: C

Explanation: Reduced environmental pollution — this correctly answers the question.

20. Which of the following is a benefit of medical biotechnology in diabetes?

(A) Continuous glucose monitoring
(B) Insulin production
(C) Artificial pancreas
(D) All of the above

Correct Answer: D

Explanation: All of the above — this correctly answers the question.

21. What is the function of the artificial pancreas?

(A) Both A and B
(B) Monitor blood sugar
(C) Deliver insulin automatically
(D) None of the above

Correct Answer: A

Explanation: Both A and B — this correctly answers the question.

22. Which of the following is a biomarker for breast cancer?

(A) CA125
(B) HER2/neu
(C) BRCA1
(D) All of the above

Correct Answer: B

Explanation: Overproduction of HER2/neu protein is related to aggressive nature of breast cancer.

23. Which of the following is a biomarker for ovarian and lung cancer?

(A) HER2/neu
(B) BRCA1
(C) CA125
(D) All of the above

Correct Answer: C

Explanation: CA125 protein is a tumor marker for ovarian and lung cancer.

24. What is the function of BRCA1 and BRCA2 genes?

(A) Promote cell division
(B) Produce antibodies
(C) Digest food
(D) Repair DNA damage

Correct Answer: D

Explanation: BRCA1 and BRCA2 genes produce proteins that help in repair of damage to DNA.

25. What is the advantage of targeted cancer therapies?

(A) All of the above
(B) Specifically target cancer cells
(C) Minimize damage to healthy tissues
(D) Allow higher doses of anticancer drugs

Correct Answer: A

Explanation: All of the above — this correctly answers the question.

B. Less Important / Secondary Topics

26. Which of the following is an innovative tool for cancer treatment?

(A) All of the above
(B) Liquid biopsy
(C) Next-Generation Sequencing
(D) Monoclonal antibodies

Correct Answer: A

Explanation: Liquid biopsy, NGS, monoclonal antibodies, immunotherapy, gene knockdown/knockout, cancer vaccines, nanoparticles, and AI are innovative tools for cancer treatment.

27. What is gene knockdown?

(A) Complete removal of a gene
(B) Temporary suppression of gene expression
(C) Permanent inactivation of a gene
(D) Insertion of a new gene

Correct Answer: B

Explanation: Gene knockdown reduces the expression of a specific gene temporarily by interfering with the gene's mRNA.

28. What is gene knockout?

(A) Temporary suppression of gene expression
(B) Insertion of a new gene
(C) Complete removal or inactivation of a gene
(D) Duplication of a gene

Correct Answer: C

Explanation: Gene knockout completely inactivates or removes the gene from the genome.

29. Which of the following is a benefit of marine biotechnology?

(A) New pharmaceutical drugs
(B) Cosmetics
(C) Biofuels
(D) All of the above

Correct Answer: D

Explanation: All of the above — this correctly answers the question.

30. Which of the following is a benefit of bioremediation?

(A) All of the above
(B) Natural process
(C) Cost-effective
(D) Environmentally friendly

Correct Answer: A

Explanation: Bioremediation is natural, cost-effective, environmentally friendly, and sustainable.

31. Which of the following is an example of bioremediation?

(A) Oil spill cleanup
(B) All of the above
(C) Sewerage water treatment
(D) Heavy metal removal

Correct Answer: B

Explanation: Bioremediation is used for oil spill cleanup, sewerage water treatment, and heavy metal removal.

32. What is industrial biotechnology also called?

(A) Green biotechnology
(B) Red biotechnology
(C) White biotechnology
(D) Blue biotechnology

Correct Answer: C

Explanation: Industrial biotechnology is also called white biotechnology.

33. Which of the following is an application of industrial biotechnology?

(A) Food and beverage industry
(B) Biopharmaceuticals
(C) Biofuels

(D) All of the above

Correct Answer: D

Explanation: Industrial biotechnology is applied in food and beverage industry, biopharmaceuticals, agriculture, chemicals, biofuels, and bioremediation.

34. What is the advantage of industrial biotechnology over traditional chemical industry?

(A) All of the above
(B) Uses renewable raw materials
(C) Environmentally friendly
(D) Sustainable

Correct Answer: A

Explanation: Industrial biotechnology uses renewable raw materials, is environmentally friendly, and sustainable.

35. Which enzyme is used in cheese production?

(A) Amylase
(B) Rennet
(C) Lipase
(D) Protease

Correct Answer: B

Explanation: Rennet — this correctly answers the question.

36. Which of the following would be affected if the cry gene is inserted into a cotton plant?

(A) Drought tolerance
(B) Herbicide resistance
(C) Pest resistance
(D) Nutritional content

Correct Answer: C

Explanation: The cry gene is responsible for pest resistance in Bt cotton.

37. A patient has a condition where the pancreas does not produce enough insulin. What is the most likely treatment using biotechnology?

(A) Gene therapy
(B) Stem cell therapy
(C) All of the above
(D) Insulin injections

Correct Answer: D

Explanation: Insulin produced through recombinant DNA technology is used for the treatment of diabetes.

38. Which of the following would be affected if the BRCA1 gene is mutated?

(A) DNA repair
(B) Cell division
(C) Antibody production
(D) Digestion

Correct Answer: A

Explanation: BRCA1 is a tumor suppressor gene that produces proteins which help in repair of damage to DNA.

39. A patient has a condition where the cancer cells are resistant to chemotherapy. What is the most likely approach using biotechnology?

(A) Gene editing to alter resistance genes
(B) All of the above
(C) Targeted therapy
(D) Immunotherapy

Correct Answer: B

Explanation: Gene editing, targeted therapy, and immunotherapy are all biotechnology approaches for cancer treatment.

40. Which of the following is the correct sequence of insulin production using recombinant DNA technology?

(A) Insertion into plasmid → Isolation of insulin gene → Introduction into bacteria → Production of insulin
(B) Introduction into bacteria → Isolation of insulin gene → Insertion into plasmid → Production of insulin
(C) Isolation of insulin gene → Insertion into plasmid → Introduction into bacteria → Production of insulin
(D) Production of insulin → Isolation of insulin gene → Insertion into plasmid → Introduction into bacteria

Correct Answer: C

Explanation: Isolation of insulin gene → Insertion into plasmid → Introduction into bacteria → Production of insulin — this correctly answers the question.

41. Which of the following is a potential advantage of genetic editing in agriculture?

(A) Disease resistance
(B) Pest resistance
(C) Drought tolerance
(D) All of the above

Correct Answer: D

Explanation: Genetic editing can develop disease resistance, pest resistance, and drought tolerance in crops.

42. Which of the following is a potential advantage of genetic editing in medicine?

(A) All of the above
(B) Managing genetic diseases
(C) Cancer therapy
(D) Viral resistance

Correct Answer: A

Explanation: Genetic editing can manage genetic diseases, treat cancer, and develop viral resistance.

43. Which of the following is a bioethical concern related to gene editing?

(A) Compromised safety
(B) All of the above
(C) Unequal chances for humanity
(D) Unimaginable consequences

Correct Answer: B

Explanation: Bioethical concerns related to gene editing include compromised safety, unequal chances for humanity, and unimaginable consequences.

44. Which of the following is a marine enzyme used in industry?

(A) α-amylase
(B) β-Agarase
(C) All of the above
(D) Xylanase

Correct Answer: C

Explanation: α-amylase, β-Agarase, and Xylanase are marine enzymes used in industry.

45. Which of the following is a benefit of marine algae in biofuel production?

(A) Produce large amount of lipids
(B) Grow in saline water
(C) Reduce competition for freshwater
(D) All of the above

Correct Answer: D

Explanation: Marine algae produce lipids for biodiesel, grow in saline water, and reduce competition for freshwater resources.

46. Which of the following is a mechanism of bioremediation?

(A) All of the above
(B) Microorganisms utilize contaminants as food and energy

(C) Microorganisms convert contaminants into water and harmless gases
(D) Conditions for growth of microbes are optimized

Correct Answer: A

Explanation: Bioremediation involves microorganisms utilizing contaminants as food, converting them into harmless products, and optimizing conditions for growth.

47. Which of the following is an example of bioremediation in Pakistan?

(A) Oil spill cleanup at Karachi seaport
(B) All of the above
(C) Sewerage water treatment in Lahore
(D) Heavy metal removal

Correct Answer: B

Explanation: Bioremediation has been used for oil spill cleanup at Karachi seaport, sewerage water treatment in Lahore, and heavy metal removal.

48. Which of the following is a major component of industrial biotechnology?

(A) Microorganisms
(B) Enzymes
(C) All of the above
(D) Genetic engineering

Correct Answer: C

Explanation: All of the above — this correctly answers the question.

49. Which of the following is the correct sequence of genetic editing using CRISPR-Cas9?

(A) Cas9 cuts DNA → Guide RNA directs Cas9 to target site → DNA is repaired or modified
(B) DNA is repaired or modified → Guide RNA directs Cas9 to target site → Cas9 cuts DNA
(C) Guide RNA directs Cas9 to target site → DNA is repaired or modified → Cas9 cuts DNA
(D) Guide RNA directs Cas9 to target site → Cas9 cuts DNA → DNA is repaired or modified

Correct Answer: D

Explanation: In CRISPR-Cas9, guide RNA directs Cas9 to the target site, Cas9 cuts the DNA, and the DNA is repaired or modified.

50. Which of the following is a benefit of using nanoparticles in cancer treatment?

(A) All of the above
(B) Deliver drugs directly to cancer cells
(C) Increase effectiveness of chemotherapy
(D) Reduce damage to healthy cells

Correct Answer: A

Explanation: All of the above — this correctly answers the question.