BIOLOGY

BOOKS - MTG BIOLOGY (HINGLISH)

BIOTECHNOLOGY AND ITS APPLICATION

Biotechnology And Its Application

1. All are the biotechnological applications in order to increase food production except

A. apiculture

B. agro-chemical based agriculture

C. organic farming

D. genetically engineered crop-based agriculture

Answer: A

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2. Agrochemical based agriculture includes

A. fertilisers and pesticides

B. genetically modified crops

C. RNA interference

D. all of these

Answer: A

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3. Though Green Revolution has been a resounding success in terms of agricultural production, yet it has failed in its overall social objectives because

A. it has not succeeded in making India totally and permanently self-sufficient in food

B. use of agrochemicals becomes very expensive for indian farmers as well as these have harmful effects on envionment

C. in regional terms, only Punjab and Haryana states, and the eastern plains of rivers Ganges in West Bengal state, showed reasonably good results, but results were less impressive in other parts of india

D. all of these

Answer: D

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4. Study statement a-d (about organic farming) and find out the correct ones.

(a) Utilises genetically modified crops like Bt cotton

(b) Uses only naturally produced input like compost

(c) Does not use pesticide and urea

(d) Produces vegetables rich in vitamins and minerals

A. (i) and (ii)

B. (iii) and (iv)

C. (ii) and (iii)

D. (ii),(iii) and (iv)

Answer: D

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5. Which of the following statements is not correct regarding the genetic modification of crops ?

A. It makes crops more tolerant to abiotic stresses

B. It results in decreased efficiency of mineral usage by plants

C. It helps to reduce post harvest losses

D. It enhances the nutritional value of food

Answer: B

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6. Golden rice developed through transgene approach is enriched with

A. high lysine content

B. high methionine content

C. high glutenin content

D. high vitamin A content

Answer: D

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7. Select the correct statement regarding an improved variety of transgenic basmati rice e.g., golden rice.

A. It does not require the use of chemical fertilisers

B. It is completely resistant to all insect pests and diseases

C. It gives high yield but no characteristic aroma

D. It gives high yeild and is rich in vitamin A

Answer: D

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8. Golden rice is yellow in colour due to the presence of

A. riboflavins

B. $\beta -$ carotene

C. vitamin B_1

D. complex genetic material

Answer: B

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9. A transgenic food crop which may help in solving the problem of night blindness in developing countries is

A. Bt cotton

B. golden rice

C. Flavr

D. Bt corn

Answer: B

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10. Bt toxin gene has been cloned from the bacteria and expressed in plants to provide resistance to insects without the need for insecticides. Examples of such plants are

A. cotton and corn

B. rice and potato

C. tomato and soybean

D. all of these

Answer: D

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11. Which of the following risks are associated with genetically modified foods ?

A. Toxicity in human beings

B. Allergic reactions in human beings

C. Antibiotic resistance in microorganisms present in alimentary canal

D. all of these

Answer: D

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12. Read the given statements and select the correct option

Statement 1 : Foods derived from transgenic crops are called

as GM foods

Statement 2 : Health and food safety concerns have been raised to ensure the safety of GM foods.

A. Both statements 1 and 2 are correct

B. Statement 1 is correct but Statement 2 is incorrect

C. Statement 1 is incorrect but Statement 2 is correct

D. Both Statements 1 and 2 are incorrect

Answer: A

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13. First genetically modified plant commercially released in India is

A. golden rice

B. Flavr savr

C. Bt brinjal

D. Bt cotton

Answer: D

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14. Which of the following statements is/are correct with regard to the disadvantages of GM crops ?

A. GM crops can affect human health by causing allergic reactions

B. Transgenes in commercial crops can endanger native species e.g., the Bt toxin gene expressed in pollen might endanger pollinators like honeybees

C. Production of GM crops causes damage to the natural environment and its always costly

D. all of these

Answer: D

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15. Read the given statements and select the correct option

Statement 1 : The transgenic food may cause toxicity and produce allergy in human beings

Statement 2 : The bacteria present in alimentary canal of

human beings may become resistant to the antibiotics by taking up the antibiotic resistant gene that is present in the GM food.

A. Both statements 1 and 2 are correct

B. Statement 1 is correct but Statement 2 is incorrect

C. Statement 1 is incorrect but Statement 2 is correct

D. Both Statements 1 and 2 are incorrect

Answer: A

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16. Which one of the following is not used as biofertiliser ?

A. Bacillus thuringiensis

B. Anabaena

C. Nostoc

D. Rhizobium

Answer: A

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17. Which of the following argricultural challenges cannot be solved with transgenic techniques ?

A. Crops are damaged by frost or drought

B. Crops are damaged by insect pests

C. Public concern about safety of synthetic pesticides

D. Public preference for organic vegetables

Answer: D

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18. Main objective of production of herbicide resistant GM crops is to

A. encourage eco-friendly herbicides

B. reduce herbicide accumulation in food products for health safety

C. eliminate weeds from the field without the use of manual labour

D. eliminate weeds from the field without the use of herbicides

Answer: B

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19. Study the following statements regarding Bt toxins produced by bacterium Bacillus thuringiensis and select the correct one

A. Most strains of Bacilus thuringiensis produce proteins that kill certain insects such as lepidopterans, coleopterans and dipterans

B. Bt toxin proteins do not kill the bacteria themselves because the toxin proteins occur in an inactive from called protoxins

C. When an insect ingests the inactive Bt toxin, it is converted to an active form of toxin due to alkaline pH of the gut which solubilises the protein crystals

D. all of these

Answer: D

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20. Bt toxin genes have been expressed in plants in order to provide resistance against

(i) lepidopterans and fungi

(ii) animals and bacteria

(iii) bacteria and fungi

(iv) coleopterans and dipterans

(v) lepidopterans

A. (ii) and (iii)

B. (i),(ii) and (iv)

C. (iii) and (v)

D. (iv) and (v)

Answer: D

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21. Bacillus thuringiensis forms protein crystals which contain insectidical protein. This protein

A. binds with epithelial cells of midgut of the insect pest ultimately killing it

B. is activated by acidic pH of the gut of the insect pest

C. does not kill the carrier bacterium which is itself resistant to this toxin

D. all of these

Answer: D

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22. Bt toxins are

A. intracellular lipids

B. intracellular crystalline proteins

C. extracellular crystalline proteins

D. intracellular polysaccharides

Answer: B

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23. Bt toxin protein crystals present in bacterium Bacillus thuringiensis, do not kill the bacteria themselves because

A. bacteria are resistant to the toxin

B. toxins occur as inactive protoxins in bacteria

C. bacteria enclose toxins in a special sac

D. none of these

Answer: B

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24. What causes the inactive form of Bt toxin i.e., protoxin to get converted into its active form in the body of an insect ?

A. Temperature of the gut

B. Enzymes present in the saliva

C. Alkaline pH of the gut

D. There is no specific reason

Answer: C

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25. Bt toxin kills insects by

A. inhibiting protein synthesis

B. generating excessive heat

C. creating pores in the midgut epithelial cells, leading to cell swelling and lysis

D. obstructing a biosynthetic pathway

Answer: C

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26. The Bt toxin is not human beings because

A. the pro Bt toxin activation requires temperature above human body temperature

B. the Bt toxin recognises only insect-specific targets

C. the pro Bt toxin activation requires pH lower than that present in human stomach

D. conversion of pro Bt toxin to Bt toxin takes place in highly alkaline conditions.

Answer: D

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27. Which of the following genes were introduced in cotton to protect it from cotton bollworms ?

A. CryAc and CryAb

B. BtAc and BtAb

C. CrylAc and CryllAb

D. Nif genes

Answer: C

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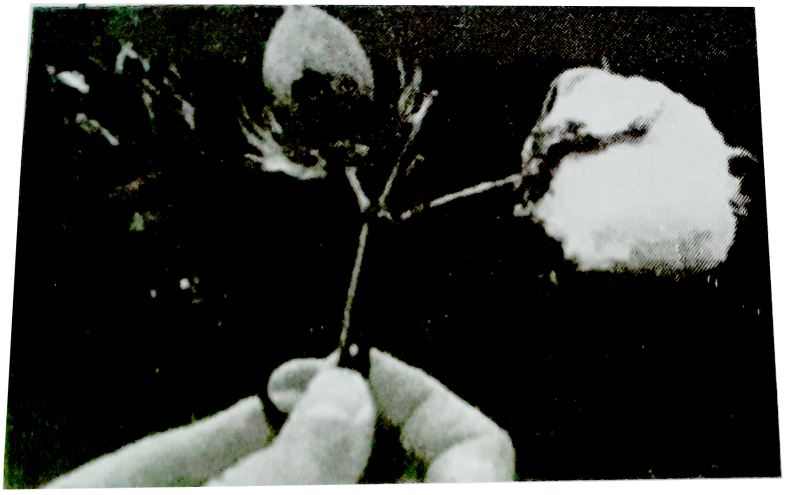
28. CryllAb and crylAb produce toxins that control



A. cotton bollworms and corn borer respectively

B. corn borer and cotton bollworms respectively

C. tabacco budworms and nematodes respectively

D. nematodes and tobacco budworms respectively

Answer: A

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29. Bt corn been made resistant from corn borer disease by intoduction of the gene

A. crylAb

B. cryllAb

C. amp^R

D. Trp

Answer: A

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30. Some of the characteristics of Bt cotton are

A. long fibre and resistance to aphids

B. medium-yield, long fibre and resistance to beetle pests

C. high yield and production of toxic protein crystals which kill dipteran pests

D. high yields and resistance to bollworms

Answer: D

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31. The process of RNA interference has been used to make tobacco plant resistant to

A. Bacillus thuringiensis

B. Meloidegyne incognitia

C. flies and mosquites

D. both (a) and (b)

Answer: B

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32. Which of the following is the nematode that attacks the roots of tobacco plants ?

A. Agrobacterium tumefaciens

B. Rhizobium leguminosarum

C. Meloidogyne incognita

D. Taenia solium

Answer: C

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33. RNA interference involves

A. synthesis of cDNA and RNA using reverse transcriptase

B. silencing of specific mRNA due to complementary RNA

C. interference of RNA in synthesis of DNA

D. synthesis of mRNA from DNA

Answer: B

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34. Which of the following statements are correct regarding the process of RNA interference ?

(i) This is used to prevent the infestation of protozoans

(ii) It takes place in some eukaryotic and all prokaryotic organism as a method of cellular defense

(iii) The method involves silencing of a specific mRNA due to a complementary dsRNA molecule

(v)It is a novel strategy to produce pest-resistant plants.

A. (iii) and (iv)

B. (i) and (iii)

C. (i) and (ii)

D. (ii),(iii) and (iv)

Answer: A

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35. The transgenic plant 'Flavr Savr' tomato carries an artificial for

A. delayed ripening process

B. longer shelf life

C. enhanced flavour

D. all of these

Answer: D

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36. Flavr Savr' variety of tomato which remains fresh for a longer period than normal tomato variety

A. has high amount of enzyme polygalacturonase

B. has reduced amount of enzyme polygalacturonase

C. is a pest resistant variety

D. is rich in vitamin A and prevent night blindness

Answer: B

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37. Read the given statements and select the correct option

Statement 1 : GMO tomato 'Flavr Savr' has increased shelf life and better nutrient quality

Statement 2 : This is achieved by reducing the amount of cell wall degrading enzyme 'polygalacturonase' responsible for fruit softening.

A. Both statements 1 and 2 are correct

B. Statement 1 is correct but Statement 2 is incorrect

C. Statement 1 is incorrect but Statement 2 is correct

D. Both statements 1 and 2 are incorrect

Answer: A

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38. Hirudin is

A. a protein produced by Hordeum vulgare, which is rich in lysine

B. a toxic molecule isolated from Gossypium hirsutum, which reduces humn fertility

C. a protein produced from transgenic Brassica napus which prevents blood clotting

D. an antibiotic produced by a genetically engineered bacterium Escherichia coli

Answer: C

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39. Study the following statements and select the incorrect ones.

(i) 'Bt' in 'Bt cotton' indicates that it is a genetically modified crop produced through biotechnology

(ii) The anticoagulant 'hirudin' is being produced from transgenic Brassica napus seeds

(iii) 'Flavr Savr' transgenic tomatoes remain fresh for a longer period than the normal tomato variety

(iv) Golden rice is a transgenic variety of Oryza sativa, which is rich in β-carotene and helps to prevent night blindness.

A. (i) only

B. (i) and (iv)

C. (ii) and (iii)

D. (i),(ii),(iii) and (iv)

Answer: A

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40. Nif' gene for nitrogen fixation in cereal crops like wheat jowar etc., is introduced by cloning

A. Rhizobium meliloti

B. Bacillus thuringiensis

C. Rhizopus stolonifer

D. Agrobacterium tumefaciens

Answer: A

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41. How many recombinant therapeutics worldwide have been approved for human use ?

A. 13

B. 25

C. 30

D. 40

Answer: C

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42. How many recombinant therapeutics are being marketed in India ?

A. 8

B. 12

C. 15

D. 30

Answer: B

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43. Which of the following statements is not correct ?

A. Most Bt toxins are insect group specific

B. RNAi takes place in all eukaryotic as well as prokaryotic organisms as a method of cellular defense

C. The recombinant therapeutics do not induce unwanted immunological responses in humans

D. Adult-onset diabetes can be controlled by taking insulin at regular time intervals

Answer: B

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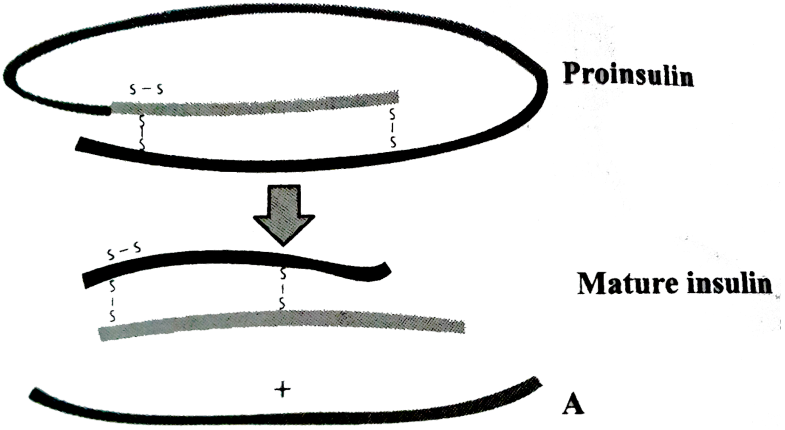
44. Given figure represent the maturtion of pro-insulin into insulin. Identify the product A



A. Polypeptide chain A

B. Polypeptide chain B

C. Polypeptide chain C

D. none of these

Answer: C

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45. During the processing of proinsulin into the mature unsulin

A. C-peptide is added to proinsulin

B. C -peptide is removed from proinsulin

C. B-peptide is added to proinsulin

D. B-peptide is removed from proinsulin

Answer: B

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46. Which of the following companies started selling humulin in the year 1983 ?

A. Eli Lilly

B. Genetech

C. GEAC

D. none of these

Answer: A

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47. Human insulin is being commercially produced from a transgenic species of

A. Mycobacterium

B. Rhizobium

C. Saccharomyces

D. Escherichia

Answer: D

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48. Which of the following statements regarding the structure of proinsulin and mature insulin are not correct ?

(i) Proinsulin is made up of three polypeptide chains -A,B and

C

(ii) c- polypeptide chain with 33 amino acids is removed prior to insulin formation

(iii) Mature insulin is made up of 51 amino acids arranged in two polypeptide chain -A and B

(iv) Polypeptide chain A has 30 amino acids and polypeptide chain B has 21 amino acids

(v) Polypeptide chains A and B are interconnected by only one S-S linkage.

A. (i) and (ii)

B. (iii) and (iv)

C. (iv) and (v)

D. (iii),(iv) and (v)

Answer: A

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49. Some of the step involved in the production of humulin are given below. Arrange them in the correct sequence and select the correct option

(i) Synthesis of gene (DNA) for human insulin artifically

(ii) Culturing recombinant E.coli in bioreactors

(iii) Purification of humulin

(iv) Insertion of human insulin gene into plasmid

(vi) Etraction of recombinant gene product from E.coli.

A. (ii),(i),(iv),(iii),(v),(vi)

B. (i),(iii),(v),(vi),(ii),(iv)

C. (i),(iv),(v),(ii),(vi),(iii)

D. (iii),(v),(ii),(i),(vi),(iv)

Answer: C

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50. A genetic disorder can be cured through

A. rDNA technology

B. embryo transfer

C. gene therapy

D. all of these

Answer: C

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51. Gene therapy can be referred to as

A. pre-clinical testing for inherited diseases in newborns

B. treatment of diseases caused by genetic defect

C. genetic engineering using rDNA technology

D. cancer treatment using in vitro cultured stem cells

Answer: B

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52. An example of gene therapy is

A. production of injectible hepatities B vaccine

B. production of vaccines in food crops like potatoes which can be eaten

C. introduction of gene for adenosine deaminase in persons suffering from SCID

D. production of test tube babies by artificial insemination and implantation of fertilised eggs

Answer: C

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53. Which of the following statements is incorrect about gene therapy in ADA deficiency ?

A. Lymphocytes from patient's blood are taken out and cultured

B. A functional ADA-cDNA is introduced into these lymphocytes

C. Lymphocytes are then introduced in the body of patient

D. Patient does not require periodic infustion of genetically engineered lymphocytes

Answer: D

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54. Adenosine deaminase deficiency can be permanently cured by which of the following methods ?

A. Bone marrow transplantation

B. Enzyme replacement therapy

C. Gene therapy at early embryonic stages

D. All of these

Answer: C

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55. What is the permanent cure of adenosine deaminase (ADA) deficiency in children ?

A. Bone marrow transplantation

B. Enzyme replacement therapy in which functional ADA is given to patient by injection

C. Infusion of genetically engineered lymphocytes (in which functional ADA-cDNA is introduced) into the patient's blood

D. Introduction of gene isolated from the bone marrow cells which produce ADA, into the cells of the patient at early embryonic stages

Answer: D

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56. Which of the following statements regarding gene therapy is/are correct ?

A. It is an application of biotechnology, in which a defective gene is manipulated by introduction of a normal, healthy and functional gene

B. The genetic disorders that are being investigated for gene therap, range from sickle-cell anaemia to severe combined immuno-deficiency (SCID)

C. The first clinical gene therapy was given in 1990 to a 4-year old girl with adenosine deaminase (ADA) deficiency

D. all of these

Answer: D

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57. What might be an advantage of beginning gene therapy prior to birth ?

A. This would give the body plenty of time to utilise the new genes

B. The body would not reject it as it has not yet recognised self

C. The cells being extremely young, are mor receptive of gene therapy

D. There probably is not any advantage

Answer: B

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58. Study the following step which are followed during the process of gene therapy while treating a patient of SCID

(i) Retrovirus infects lymphocytes extracted from bone marrow of the patient and cultured

(ii) Engineered cells are injected into patient's bone marrow

(iii) Normal allele is inserted into a retrovirus

(iv) Retrovirus makes a DNA copy of its RNA. This DNA carrying the normal allele gets inserted into the chromosome of the host cell

Arrangement the above given steps in correct sequence and select the correct option

A. (iii),(i),(ii),(iv)

B. (iii),(i),(iv),(ii)

C. (iv),(ii),(iii),(i)

D. (iv),(iii),(i),(ii)

Answer: B

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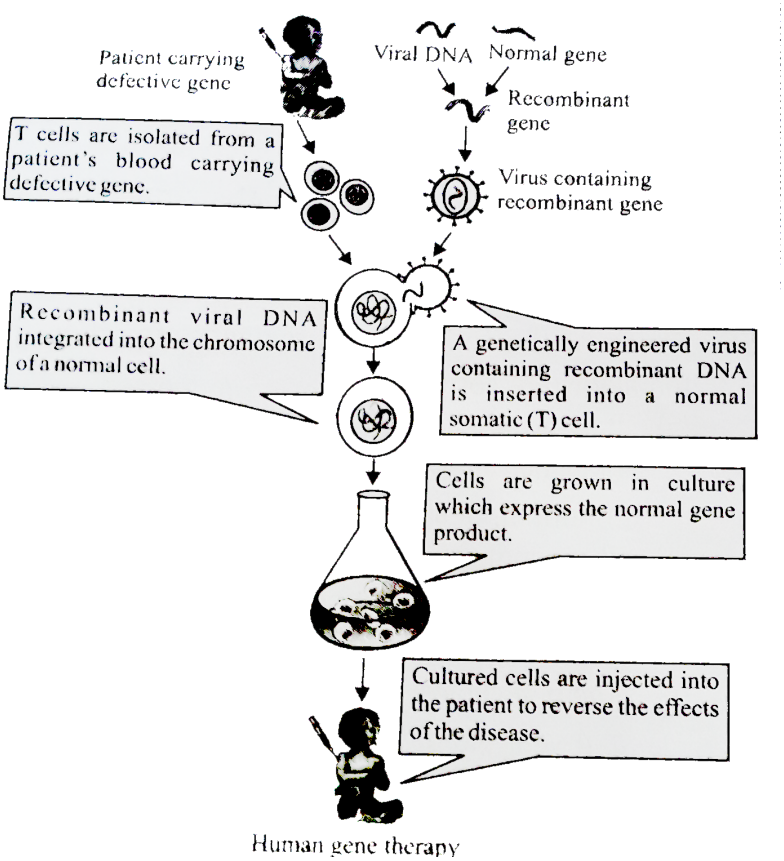
59. Figure given below depict the procedure for gene therapy.

Pick up the disorders for which this technique has been

applied successfully



A. Adenosine Deaminase (ADA) Deficiency

B. AIDS

C. Myasthenia gravis

D. both (a) and (c)

Answer: A

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60. For effective treatment of a disease

A. early diagnosis is required but understanding of its pathophysiology is not required

B. early diagnosis is not required but understanding of its pathophysiology is required

C. early diagnosis and understanding of its pathophysiology is required

D. neither early diagnosis nor understanding of its pathophysiology is required

Answer: C

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61. Early detection of a disease is possible by

A. PCR

B. gene therapy

C. recombinant DNA technology and ELISA

D. both (a) and (c)

Answer: D

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62. Read the given statements and select the correct option

Statement 1 : PCR technique is helpful in detecting bacterial and viral diseases even when symptoms of the disease are not yet visible

Statement 2 : Very low concentrations of bacteria or viruses in human body can be detected by amplification of their nucleic acids using the PCR technique

A. Both statements 1 and 2 are correct

B. Statement 1 is correct but Statement 2 is incorrect

C. Statement 1 is incorrect but Statement 2 is correct

D. Both statements 1 and 2 are incorrect

Answer: A

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63. Which of the following statements is not correct ?

A. Insulin used for diabetic patients was earlier extracted from pancreas of slaughtered cattle and pigs which was more efficient than the genetically engineered insulin

B. PCR technique is applied to detect HIV suspected AIDS patients and to detect mutations in genes in suspected cancer patients

C. Bone marrow transplantation requires periodic infusion of genetically engineered lymphocytes in ADA deficient patients

D. Bioremediation is the one of the applications of biotechnology.

Answer: A

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64. A doctor while operating on an HIV (+)ve patient accidentally cuts himself with a scalpel. Suspecting himself to have contracted the virus which test will he take to rule out/confirm his suspicion ?

A. PCR

B. Routine urine examination

C. TLC

D. DLC

Answer: A

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65. ___ is a single stranded DNA or RNA, tagged with a radioactive molecule and is used to detect mutated genes.

A. RNAi

B. Probe

C. Plasmid

D. Primer

Answer: B

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66. Technique used to detect the DNA in a clone is

A. polymerase chain reaction

B. gel electrophoresis

C. chromatography

D. autoradiography

Answer: A

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67. Read the following statements regarding ELISA and select the incorrect one

A. It is used for the early diagnosis of diseases

B. It is based on the principle of antigen-antibody interaction

C. Infection by pathogen can be detected the presence of antigenes like proteins and glycoproteins

D. none of these

Answer: D

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68. Molecular probes are used for many genetic disorder like

A. Duchenne muscular dystrophy

B. cystic-fibrosis

C. Tay-Sachs disease

D. all of these

Answer: D

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69. Second generation vaccines are prepared by recombinant DNA technology. Which out of the following are the examples of such vaccines ?

A. Hepatitis B virus vaccine

B. Herpes virus vaccine

C. Salk's polio vaccine

D. Both (a) and (b)

Answer: D

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70. Animals that have had their DNA manipulated to possess and express a foreign are called

A. transgenic animals

B. somatic hybrids

C. somaclones

D. super animals

Answer: A

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71. 95 % of the existing transgenic animals are

A. fish

B. pigs

C. sheep

D. mice

Answer: D

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72. The transgenic animals are those which have

A. foreign RNA in all its cells

B. foreign DNA in some of its cells

C. foreign DNA in all its cells

D. both (a) and (c)

Answer: C

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73. Read the given statements and select the correct option

Statement 1 : Transgenic mouse is termed as super mouse because it its twice bid in size than the normal mouse

Statement 2 : In uper mouse the gene for human growth factor has been introduced and expressed

A. Both statements 1 and 2 are correct

B. Statement 1 is correct but Statement 2 is incorrect

C. Statement 1 is incorrect but Statement 2 is correct

D. Both statements 1 and 2 are incorrect

Answer: A

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74. Giant mouse has been produced through

A. gene transfer

B. gene differentiation

C. tissue culture

D. all of these

Answer: A

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75. Given below are certain features of mouse. Read them and select why mouse is the most preferred animal for studies on gene transfer

(i) Short oestrous cycle and gestation period

(ii) Relatively short generation time

(iii) Covenient in vitro fertilisation

(iv) Production of several offspring per pregnancy

A. (i) and (ii) only

B. (i) only

C. (i),(ii) and (iv) only

D. (i),(ii),(iii) and (iv)

Answer: D

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76. What is ANDI ?

A. Transgenic cow

B. Transgenic dog

C. Transgenic sheep

D. Transgenic monkey

Answer: D

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77. Given are names of some transgenic animals. Identify the name of transgenic sheep

A. Rosie

B. Dogie

C. Tracy

D. ANDI

Answer: C

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78. Which of the following is not a genetically modified organism (GMO) ?

A. Golden rice

B. Rosie

C. Dogie

D. Dolly

Answer: D

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79. A human protein which is being obtained from transgenic animals and is used to treat emphysema is

A. alpha-lactalbumin

B. thyroxine

C. $\alpha - 1$- antitrypsin

D. insulin

Answer: C

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80. Match column I with column II and seclect the correct option from the given codes

	Column I		Column I
A.	$\alpha - 1 -$ antitrypsin	(i)	AIDS
B.	Transposon	(ii)	Gene therapy
C.	ELISA	(iii)	Emphysema
D.	Retroviral vector	(iv)	Mobile genetic element

A. A-(i),B-(iii),C-(ii),D-(iv)

B. A-(iii),B-(iv),C-(i),D-(ii)

C. A-(i),B-(ii),C-(iii),D-(iv)

D. A-(iii),B-(i),C-(ii),D-(iv)

Answer: B

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81. Match column I with column II and select the correct option from the given codes

	Column I		Column I
A.	$\alpha - 1 -$ antitrypsin	(i)	AIDS
B.	Transposon	(ii)	Gene therapy
C.	ELISA	(iii)	Emphysema
D.	Retroviral vector	(iv)	Mobile genetic element

A. A-(iii),B-(iv),C-(ii),D-(i)

B. A-(iii),B-(ii),C-(iv),D-(i)

C. A-(ii),B-(iv),C-(iii),D-(i)

D. A-(i),B-(iv),C-(ii),D-(iii)

Answer: A

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82. Which of the following is not a benefit of transgenic animals ?

A. Investigation of new treatments for diseases

B. Early detection of diseases

C. Testing the safety of vaccines

D. To produce useful biological products

Answer: B

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83. Select the correct options to fill up the blanks.

(i) _____ enzyme is crucial for the immune system to function and its absence is caused by the deletion of a gene

(ii) Insulin consists of _____ and _____ that are linked together by _____

(iii) Transgenic mice are being used to test the safety of the ____

(iv) _____ involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA

A. (i) Adenosine deaminase (ii) A-chain,B-chain,disulphide bridges (iii) polio vaccine (iv) RNAi

B. (i) RNAi (ii) R-chain,B-chain,disulphide bridges (iii) adenosine deaminase (iv) polio vaccine

C. (i) Adenosine deaminase (ii) A-chain,B-chain,hydrogen bonds (iii) polio vaccine (iv) RNAi

D. (i) RNAi (ii) A-chain,B-chain, non-covalent bridges (iii) polio vaccine (iv) adenosine deaminase

Answer: A

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84. Genetic engineering has been successfully used for producing

A. transgenic mice for testing safety of polio vaccine before use in humans

B. transgenic cow-Rosie which produces high fat milk for making ghee

C. animals like bulbs for farm work as they have super power

D. all of these

Answer: A

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85. The organisation which makes decision regarding the validity of GM research and the safety of introducing GM-organisms for public services is

A. Genetic Engineering Approval Committee

B. Genome Environment Action Committee

C. Genetic Environment Approval Committee

D. Genetics and Ethical Issue Action Committee

Answer: A

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86. Which of the following statements is correct regarding Genetic Engineering Approval committee (GEAC) ?

A. It makes decision regarding the validity of GM research

B. It ensures the safety of introducing GM-organisms for public services

C. Genetic modification of organisms can have unpredictable results when such organisms are

introduced into the ecosystem. Therefore, the Indian government has set up organisms such as GRAC

D. all of these

Answer: D

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87. A monopoly granted to a person who has either invented a new and useful article, made inprovement in an existing article or invented a new process of making an article is called

A. biopiracy

B. bioethics

C. patent

D. genetic modification

Answer: C

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88. Rules of conduct that may be used to regulate our activities in relation to the biological world is called

A. bioethics

B. biowar

C. biopatent

D. biopiracy

Answer: A

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89. Biopatents are

(i) right to use invention

(ii) right to use biological entities

(iii) right to use products

(iv) right to use process.

A. (i) and (ii)

B. (ii) only

C. (i),(ii) and (iv)

D. (i),(ii),(iii) and (iv)

Answer: D

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90. X is the right granted by a government to an inventor to prevent others from commercial use of this invention. When 'X' are granted for biological entities and for products derived from them, these are called 'Y'

Read the above paragraph and identify X and Y

A. X - patent, Y - biopatent

B. X - piracy, Y - biopiracy

C. X - patent, Y - biopiracy

D. X - piracy, Y - biopatent

Answer: A

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91. Which of the following statements is/are correct

A. The current interest in the manipulation of microbes, plants and animals has raised serious ethical isssues

B. One possible risk of genetic engineering is the accidental production of antibiotic resistant microrrganisms

C. Although risks are possible,genetic engineering offers more of a contribution to human welfare than threats

D. all of these

Answer: D

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92. Which variety of rice was patented by a U.S. company even though the highest number of varieties of this rice are found in India ?

A. Sharbati Sonora

B. Co-667

C. Basmati

D. Lerma Rojo

Answer: C

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93. Which of the following has been covered under the broad patent category ?

A. Triticum

B. Oryza

C. Pisum sativum

D. Brassica

Answer: B

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94. Which Indian plants have either been patented or attempts have been made to patent them by western nations for their commercial use ?

A. Basmati rice

B. Turmeric

C. Neem

D. All of these have been targeted

Answer: D

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95. Use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment is termed as

A. resource partitioning

B. biopiracy

C. patenting

D. biofortification

Answer: B

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96. Biopiracy means

A. use of biopatents

B. thefts of plants and animals

C. stealing of bioresources

D. exploitation of bioresources without authentic permission

Answer: D

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97. Match column I with column II and select the correct option from the given codes

	Column I		Column II
A.	Biopiracy	(i)	Effort to fix the non-functional gene
B.	Biopatent	(ii)	Gene silencing
B.	Gene therapy	(iii)	illegal removal of biological material
D.	RNAi	(iv)	Right granted for biological entities

A. A-(iv),B-(ii),C-(i),D-(iii)

B. A-(ii),B-(iv),C-(i),D-(iii)

C. A-(iii),B-(iv),C-(i),D-(ii)

D. A-(iii),B-(iv),C-(ii),D-(i)

Answer: C

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98. Which step has been taken by Government of India to cater to the requirement of patent terms and other emergency provisions in this regard ?

A. Biopiracy Act

B. Indian Patents Bill

C. ETI Act

D. Negotiable instruments Act

Answer: B

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99. Potential pathogens for bioweapons are

A. Bacillus anthracis

B. Yerisinia pestis

C. Vibrio cholerae

D. all of these

Answer: D

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100. Select the incorrect matched pair

A. Monoclonal antibodies - Hybridomas

B. PCR - Phenylketonuria

C. Bioweapons -Bacillus anthracis

D. Tracy - First transgenic animal for food production

Answer: D

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101. NaCl is harmful to most crop plants. A scientist at the University of Toronto genetically modified a plant so that it could be grown in dry parts of the world where the available water has a high level of NaCl. This genetically modified plant copes with the high levels of NaCl by transporting salt into its vacuoles where it accumulated to abnormally high level. which feature would be observed in the genetically modified plant when compared to a non-modified plant ?

A. The leaves in the modified plant are more yellow in colour

B. The modified plant has salt srystals on the surface of its leves

C. The cytosol (the materal between the plasma membrane and the vacuole membrane, excluding the organelles) in the modified plant has a lower osmotic pressure

D. The cytosol in the modified plant has a higher osmotic pressure

Answer: D

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102. Which statement about genetically modified (GM) food is false ?

A. Scientists have used genetic modification, in various forms, as a mean of improving crop yields, crop quality, and pest resistance for many years

B. Genetic modification includes products made by artifical mutagenesis and by non-natural crosses between unrelated species

C. A mojor difficulty in labelling foods as 'GM-free' is that it is virtually impossible to measure genetically modified DNA or protein molecules in most food made from GM crops

D. The recent decision by McCain Foods to stop processing GM potatoes means that they will eventually use less pesticides to produce the potatoes that are required to make fries.

Answer: D

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103. There was great excitement around the world when the sheep 'Dolly' was cloned using a nucleus derived from an adult cell of its 'mother' which was them transplanted into an enucleated egg. There is also excitement when it is announced that genes causing human diseases, like muscular

dystrophy, have been cloned. Which statement about these two examples of cloning is correct ?

A. They both involve cutting a piece of DNA from the genome

B. One involves the cloning of a nucleus and the other is the cloning of a piece of DNA

C. They both produce products genetically identical to the original donor of cellular material

D. They raise no ethical questions

Answer: B

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104. Bacteria genetically engineered to express a gene from a plant will

A. synthesis a protein with the same sequence of amino acids as in the plant and, therefore, the protein will have the same structure and function as in the plant

B. Synthesis a protein with essentially the same sequence of amino acids as in the plant with differences relating to different codon Wobble rules between prokartotes nad eukaryotes

C. not be able to synthesis a protein due to the presence of exon splicing sequences in the DNA sequence from the plant

D. not be able to synthesise a protein because translation is coupled with transcription and posttranscriptional processing does not occur in it

Answer: A

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105. Bacterial artificial chromosomes (BACs), cosmids, phages, plasmids and yeast artifical chromosomes (YACs) are all commonly used cloning vectors that differ in their cloning capacities, with a range from approximately 100 bp to 1000 kb. Which of the following is the correct order for these vectors in terms of increasing cloning capacity ?

A. BAC,cosmid,phage,plasmid,YAC

B. YAC,BAC,cosmid,phage,plasmid

C. Plasmid,phage,cosmid,BAC,YAC

D. Plasmid,cosmid,phage,BAC,YAC

Answer: C

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106. You discovered a novel eukaryotic organism that glows in the dark. You believe this trait is due to a single gene, and you wish to clone the gene. Which of the following strategies is most likely to be successful ?

A. Isolate the genomic DNA from the organism, digest with a restriction endonuclease, Insert into a plasmid

vector and transform into bacteria. Screen colonies for the ability to glow in the dark

B. Isolate the genomic DNA from the organism, digest with a restriction endonuclease, insert into a plasmid vector and transform into eukaryotic cells such as yeast. Screen colonies for the ability to glow in the dark

C. Isolate mRNA from the organism, reverse transcribe and generate cDNA, insert into a plasmid vector and transform into bacteria. Screen colonies for the ability to glow in the dark

D. Isolate mRNA from the organism, reverse transcribe and generate cDNA, insert into a plasmid vector and

transform into eukaryotic cells such as yeast. Screen colonies for the ability to glow in the dark.

Answer: D

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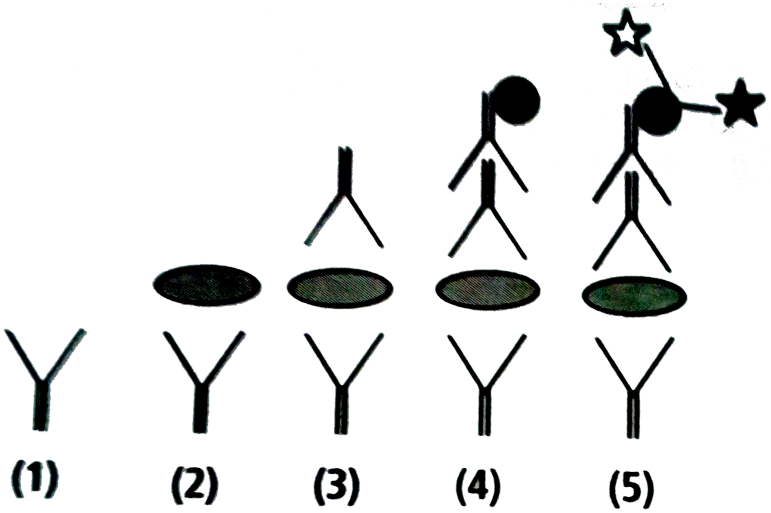
107. Which of the following types of ELISA contain the following steps ?

Antigen binding,Blocking, primary antibody,Secondary antibody,Enzyme-linked antibody, Substrate,Colorimetric

reading (Represented in diagram)



A. Direct ELISA

B. Indirect ELISA

C. Competitive ELISA

D. Sandwich ELISA

Answer: D

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108. Bt cotton is not

A. a GM plant

B. insect resistant

C. a bacterial gene expressing system

D. resistant to all pesticides

Answer: D

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109. C-peptide of human insulin is

A. a part of mature insulin molecule

B. responsible for formation of disulphide bridges

C. removed during maturation of pro-insulin to insulin

D. responsible for its biological activity

Answer: C

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110. GEAC stands for

A. Genome Engineering Action Committee

B. Ground Environment Action Committee

C. Genetic Engineering Approval Committee

D. Genetic and Environment Approval committee

Answer: C

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111. $\alpha - 1$ antitrypsin is

A. an antacid

B. an enzyme

C. used to treat arthritis

D. used to treat emphysema

Answer: D

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112. A probe which is a molecule used to locate specific sequence in a mixture of DNA or RNA molecules could be

A. a single stranded RNA

B. a single stranded DNA

C. either RNA or DNA

D. can be ssDNA but not ssRNA

Answer: C

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113. Choose the correct option regarding retrovirus

A. An RNA virus that can synthesise DNA during infection

B. A DNA virus that can synthesise RNA during infection

C. A ssDNA virus

D. A dsRNA virus

Answer: D

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114. The site of production of ADA in the body is

A. erythrocytes

B. lymphocytes

C. blood plasma

D. osteocytes

Answer: B

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115. A protoxin is

A. a primitive toxin

B. a denatured toxin

C. toxin produced by protozoa

D. inactive toxin

Answer: D

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116. Pathophysiology is the

A. study of physiology of pathogen

B. study of normal physiology of host

C. study of altered physiology of host

D. none of these

Answer: C

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117. The trigger for activation of toxin of Bacillus thuringiensis is

A. acidic pH of stomach

B. high temperature

C. alkaline pH of gut

D. mechanical action in the insect gut

Answer: C

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118. Golden rice is

A. a variety of rice grown along the yellow river in China

B. long stored rice having yellow colour tint

C. a transgenic rice having gene for $\beta -$ carotene

D. wild variety of rice with yellow coloured grains.

Answer: C

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119. In RNAi, genes are silenced using

A. ssDNA

B. dsDNA

C. dsRNA

D. ssRNA

Answer: C

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120. The first clinical gene therapy was done for the treatment of

A. AIDS

B. cancer

C. cystic fibrosis

D. SCID (Severe Combined Immuno Deficiency resulting from deficiency of ADA).

Answer: D

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121. ADA is an enzyme which is deficient in a genetic disorder SCID. What is the full form of ADA ?

A. Adenosine Deoxyaminase

B. Adenosine deaminase

C. Aspartate deaminase

D. Arginine deaminase

Answer: B

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122. Silencing of a gene could be achieved through the use of

A. RNAi only

B. antisense RNA only

C. both RNAi and antisense RNA

D. none of the above

Answer: C

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123. Assertion : Green revolution was comparatively less effective in developing world where farmers were dependent

on conventional breeding

Reason : In developing world, inability to buy expensive agro-chemicals forced farmers to rely on conventional breeding.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

124. Assertion : Transgenic plants having virus coat protein gene, express resistance to that virus and other related varieties

Reason : Coat protein gene interferes with uncoating of viruses inside the plant cells.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

125. Assertion : 'Cry' proteins are named so because they are crystal proteins

Reason : 'Cry' proteins are solubilised is acidic environment of insect midgut and then release toxic core fragments after proteolytic action.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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126. Assertion : The RNAi can be introduced in an organism by insertion of gene encoding complementary RNA only

Reason : There are no methods by which in vitro synthesised complementary RNA can be inserted in an organism to induce RNAi (RNA interference)

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: D

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127. Assertion : Plantibodies are animal antibodies produced in plants

Reason : Plantibodies are just a theoretical concept

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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128. Assertion : Human insulin can be produced into bacterial cells using biotechnology

Reason : To produce human insulin the A, B and C polypeptides of the human insulin are produced separately in the bacterial cells, extracted and combined by creating disulphide bonds

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: C

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129. Assertion : The first clinical gene for ADA therapy was given to cure SCID

Reason : The normal gene was delivered into the patient's cell using retroviral vector

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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130. Assertion : Complementary pairing between nucleotides is used to diagnose presence of a specific DNA segment in a mixture

Reason : DNA probes having radioactive isotoped help to detect DNA by autoradiography.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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131. Assertion : ELISA test is based on antigen-antibody interactions where a pathogen can be detected by the presence of antibodies (proteins,glycoproteins, etc) on it

Reason : The pathogen antibody to be identified is

immobilised on the surface of specially constructed ELISA plates and is then tested.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: D

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132. Assertion : Colon bacilli can be used to produce glycoproteins that can be used fot hepatitis B treatment

Reason : Hepatitis B is a viral disease and its spread in the body can be checked using interferons.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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133. Assertion : GM salmon was the first transgenic animal for performing vaccine safety tests

Reason : For the production of GM salmon, genetically modified ova were fused with normal sperms of the same species.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: D

134. Assertion : Biotechnology produces transgenic microorganism that function as microfactories for proteins Reason : Transgenic microorganisms can be developed to produce proteins of human use like insulin.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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135. Assertion : Organisations like GEAC are necessary to monitor GM researches and to test the safety of introducing GM organisms for public services

Reason : GM researches can have unpredictable results which even can be disastrous when genetically modified organisms are introduced into the ecosystem.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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136. Assertion : USA's patent of brazzein is an examoke of biopiracy

Reason : Brazzein a protein obtained from West African plant, Pentadiplandra brazzeana and the gene encoding it has been patented by USA.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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137. Assertion : Bacillus anthracis exemplifies how biotechnology can be used for destructive processes

Reason : The spores of anthrax bacterium were spread via letters in the form of powder.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: B

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