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Answers Key:

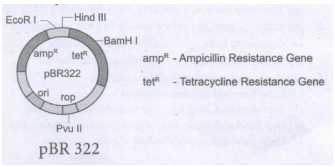
Answer the Following questions

1. **Applications of Biotechnology**

   1. Biotechnology is one of the most important applied interdisciplinary sciences of the 21st century. It is the trusted area that enables us to find the beneficial way of life.
   2. Biotechnology has wide applications in various sectors like agriculture, medicine, environment and commercial industries.
   3. This science has an invaluable outcome like transgenic varieties of plants e.g. transgenic cotton (Bt-cotton), rice, tomato, tobacco, cauliflower, potato and banana.
   4. The development of transgenics as pesticide resistant, stress resistant and disease resistant varieties of agricultural crops is the immense outcome of biotechnology.
   5. The synthesis of human insulin and blood protein in E.coli and utilized for insulin deficiency disorder in human is a breakthrough in biotech industries in medicine.
   6. The synthesis of vaccines, enzymes, antibiotics, dairy products and beverages are the products of biotech industries.
   7. Biochip based biological computer is one of the successes of biotechnology.
   8. Genetic engineering involves genetic manipulation, tissue culture involves aseptic cultivation of totipotent plant cell into plant clones under controlled atmospheric conditions.
   9. Single cell protein from Spirulina is utilized in food industries.
   10. Production of secondary metabolites, biofertilizers, biopesticides and enzymes.
   11. Biomass energy, biofuel, bioremediation and phytoremediation for environmental biotechnology.

2. i. Intravarietal hybridization
   The cross between the plants of same variety.
   ii. Intervarietal hybridization
   The cross between the plants belonging to two different varieties of the same species
   iii. Interspecific hybridization
   The cross between the plants belonging to different species belonging to the same genus
   Example: Gossypium hirsutum x Gossypium arboretum - Deviraj.
   IV. Intergeneric hybridization
   The crosses between the plants belonging to two different genera.
   Example: Raphanobrassica and Triticale.

Answer the following Questions

3. 

pBR 322

   (i) pBR 322 plasmid is a reconstructed plasmid and most widely used as cloning vector;
   (ii) It contains 4361 base pairs. In pBR, p denotes plasmid, Band R respectively the names of scientist Boliver and Rodriguez who developed this plasmid.
   (iii) The number 322 is the number of plasmid developed from their laboratory.
   (iv) It contains amp^R and tet^R two different antibiotic resistance genes and recognition sites for several restriction enzymes.
   (v) ori and antibiotic resistance genes. Rop codes for the proteins involved in the replication of the plasmid.

4. A restriction enzyme or restriction endonuclease is an enzyme that cleaves DNA into fragments at or near specific recognition sites within the molecule known as restriction sites.
   Types
   (i) Exonucleases - which remove nucleotides one at a time from the end of a DNA molecule. e.g. Bal 31, Exonuclease III.
   (ii) Endonucleases - which break the internal phosphodiester bonds within a DNA molecule. e.g. Hind II, EcoRI, PvulI, BamHI, TaqI.
   (iii) The restriction enzymes are called as molecular scissors
   (iv) They are used in recombinant DNA technology as they recognize & cut DNA within a specific sequence.

5. **Properties of Vectors:**

   1. Vectors are able to replicate autonomously to produce multiple copies of them along with their DNA insert in the host cell.
   2. It should be small in size and of low molecular weight, less than 10 Kb (kilo base pair) in size so that entry/transfer into host cell is easy.
   3. Vector must contain an origin of replication so that it can independently replicate within the host.
   4. It should contain a suitable marker such as antibiotic resistance, to permit its detection in transformed host cell.
   5. Vector should have unique target sites for integration with DNA insert and should have the ability to integrate with DNA insert it carries into the genome of the host cell. Most of the commonly used cloning vectors have more than one restriction site. These are Multiple Cloning Site (MCS) or polylinker. Presence of MCS facilitates the use of restriction enzyme of choice.

6. **GM Food - Benefits:**

   1. High yield without pest.
   2. 70% reduction of pesticide usage.

3. Reduce soil pollution problem.
4. Conserve microbial population in soil.

Risks - believed to:

1. Affect liver, kidney function and cancer.
2. Hormonal imbalance and physical disorder.
3. Anaphylactic shock (sudden hypersensitive reaction) and allergies.
4. Adverse effect in immune system because of bacterial protein.
5. Loss of viability of seeds show in terminator seed technology of GM crops.

7. Euheterosis: True heterosis
(i) Mutational Euheterosis: Simplest type Often lethal, recessive mutant genes from cross pollinated genes.
(ii) Balanced Euheterosis: Well balanced gene combinations, more adaptive to environmental conditions and agricultural.
Pseudo heterosis: Also called luxuriance, has superiority over parents in vegetative growth but not in yield and adaptation, usually sterile or poorly fertile.
8. 1. Tectona grandis is the plant gives wood better for making furniture.
2. It is one of the best timber in the world.
3. The heart wood is yellow to golden brown turner darker.
4. Durability and immune to attack of termites and fungi is well known.
9. 1. It is Andrographis paniculata belongs to Acanthaceae family.
2. It is a potent hepatoprotective to treat liver disorders.
3. Used to make Nilavembu Kudineer to treat malaria and dengue.
10.

S.No	Common name	Botanical name
1	Foxtail Millet	Staria italica
2	Kodo Millet	Paspalum scrobiculatum

11. Curcumin extracted from turmeric - yellow colour - good anti oxidant fight against cancer - anti inflammatory, anti diabetic, anti bacterial, antifungal and anti viral activities - stops platelets from clotting.
12.

Queen of Spices	King of Spices
Cardamom (Elettaria cardamomum)	Black pepper (Piper nigrum)
Family : Zingiberaceae	Family : Piperaceae

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QUESTION BANK 365

Answer the following Questions

13. Spirulina can be grown easily on materials like waste water from potato processing plants (containing starch), straw, molasses, animal manure and even sewage, to produce large quantities.
14. Restriction endonuclease. e.g: Hind II, EcoR I, Pvul, Bam H I, Taq I.
15. Polyethylene Glycol (PEG) and Dextran Sulphate.
16. **Primary Introduction Secondary Introduction** (i) No alternation of genes (i) Alternation by hybridization (ii) Adaptation capability is more (ii) Adaptation capability is more after hybridization
17. Micro organisms are efficient in fixing nitrogen, solubilizing phosphate and decomposing cellulose. They improve soil fertility, plant growth. They are ecofriendly and cost-effective than chemical fertilizers. Example. Azospirillum.
18. (i) Vegetative propagation is the best suited measure for maintaining hybrid vigour, since the desired characters are not lost and can persist over a Period of time.
(ii) Many breeders believe that its magnitude of heterosis is directly related to the degree of genetic diversity between the two parents.
19. 1. Aloin - a mixture of glucosides.
2. Its gel used as skin tonic.
3. Cooling effect and moisturizing effect helps in creams, lotions, shampoos, shaving creams, after shave lotions preparation.
4. Used has emollient, antibacterial, antioxidant, antifungal and antiseptic.
20. 1. It is used to describe foods that are prepared and eaten as a whole grain.
2. Ex. Quinoa. (Seeds from the Chenopodium quinoa) belong to the family Amaranthaceae.
3. Has carbohydrate protein have been eaten for 6000 years in Andes hilt region.
21. Organic farming is an alternative agricultural system in which plants/crops are cultivated in natural ways by using biological inputs to maintain soil fertility and ecological balance thereby minimizing pollution and wastage.
22. Botanical medicines: Medicinal plants which are marketed as powders or in other modified forms.
Bio medicines: Derived from the bio molecules of all organisms include micro organisms.

Choose the Best Answer

23. (d) confer resistance to antibiotics
24. (d) I,II & III
25. (b) IV, II, III, I
26. (d)

1	2	3	4
c	d	a	b

27. (d) High yield and resistant to ball worms
28. (c) Both reason and assertion is right.

29. (b)

i	ii	iii	iv
III	I	IV	II

30. (d) Mutation breeding
31. (c) Norin 10
32. (b)

I	II	III	IV
ii	i	iii	iv

33. (b)

i	ii	iii	iv
d	c	a	b

34. (a) Assertion is correct, Reason is wrong
35. (a) Lamiaceae
36. (c) Both statements are correct
37. (c) Marijuana

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