DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB34

SYLLABUS : Biotechnology and its Applications

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Silencing of mRNA has been used in producing transgenic plants resistant to:
(a) bollworms (b) nematodes
(c) white rusts (d) bacterial blights

2. Important objective of biotechnology in agriculture section is –
(a) To produce pest resistant varieties of plants
(b) To increase the nitrogen content
(c) To decrease the seed number
(d) To increase the plant weight

3. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells)
(a) both sense and anti-sense RNA
(b) a particular hormone
(c) an antifeedant
(d) a toxic protein

4. Which one of the following techniques made it possible to genetically engineered living organism ?
(a) Recombinant DNA techniques
(b) X-ray diffraction
(c) Heavier isotope labelling
(d) Hybridization

5. Consider the following four statements
(i) The first transgenic buffalo, Rosie produced milk which was human alpha-lactal albumin enriched.
(ii) Restriction enzymes are used in isolation of DNA from other macro-molecules.
(iii) Downstream processing is one of the steps of R-DNA technology.
(iv) Disarmed pathogen vectors are also used in transfer of R-DNA into the host.
Which are the two statements incorrect?
(a) Statement (ii) and (iii)
(b) Statement (iii) and (iv)
(c) Statement (i) and (iii)
(d) Statement (i) and (ii)

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. cDNA probes are copied from the messenger RNA molecules with the help of –
(a) Restriction enzymes
(b) Reverse transcriptase
(c) DNA polymerase
(d) Adenosine deaminase

7. In history of biology, human genome project led to the development of :
(a) biotechnology (b) biomonitoring
(c) bioinformatics (d) biosystematics

8. Dolly sheep was obtained by –
(a) Cloning the udder cell (somatic cell) fused with enucleated oocyte
(b) Cloning of gametes
(c) Tissue culture
(d) None of the above

9. Which of the following forms the basis of DNA Finger printing?
(a) The relative proportions of purines and pyrimidines in DNA.
(b) Satellite DNA occurring as highly repeated short DNA segments.
(c) The relative difference in the DNA occurrence in blood, skin and saliva.
(d) The relative amount of DNA in the ridges and grooves of the fingerprints.

10. The genetically-modified (GM) brinjal in India has been developed for:
(a) insect-resistance
(b) enhancing shelf life
(c) enhancing mineral content
(d) drought-resistance

11. Which of the following statement(s) is/are true ?
(i) Biowar is the use of biological weapons against humans and /or their crops and animals.
(ii) Bioethics is the unauthorized use of bioresources and traditional knowledge related to bioresources for commercial benefits.
(iii) Biopatent is exploitation of bioresources of other nations without proper authorisation.
(a) (ii) only (b) (i) only
(c) (i) and (ii) only (d) (i) and (iii) only

12. 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 is always costly.
(d) All of these

13. Which of the following genes were introduced in cotton to protect it from cotton bollworms?
(a) Cry Ac and Cry ab
(b) Bt Ac and Bt Ab
(c) Cry IAc and Cry II Ab
(d) Nif genes

14. Hirudin is
(a) a protein produced by *Hordeum vulgare*, which is rich in lysine
(b) a toxic molecuel isolated from *Gossypium hirsutum*, which reduces human fertility
(c) a protein produced from transgenic *Brassica napus* which prevents blood clotting
(d) an antibiotic produced by a genetically engineered bacterium *Escherichia coli*.

15. Early detection of a disease is possible by
(a) PCR
(b) Gene therapy
(c) recombination DNA technology ad ELISA
(d) both (a) and (c)

16. Gene therapy can be referred to as
(a) pre-clinical testing for inherited diseases in new-borns\
(b) treatment of diseases caused by genetic defect
(c) genetic engineering using rDNA technology
(d) cancer treatment using in vitro cultured stem cells

17. 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

18. *Flavr Savr* is the transgenic variety of
(a) cotton (b) rice
(c) tomato (d) potato

19. Biopiracy is related to
(a) Traditional knowledge
(b) Biomolecules and regarding bioresources genes isolated from bioresources
(c) Bioresources
(d) All of the above

RESPONSE GRID					
	6. ⓐⓑⓒⓓ	**7.** ⓐⓑⓒⓓ	**8.** ⓐⓑⓒⓓ	**9.** ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ
	11. ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ	**14.** ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ
	16. ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ	**19.** ⓐⓑⓒⓓ	

Space for Rough Work

20. Genetically engineered bacteria have been used in commercial production of
(a) thyroxine (b) human insulin
(c) testosterone (d) penicillin

21. Golden rice is a promising transgenic crop, when released for cultivation, it will help in
(a) producing petrol like fuel from rice.
(b) alleviation of vitamin A.
(c) pest resistance.
(d) herbicide tolerance.

22. Chloramphenicol and erythromycin (broad spectrum antibiotics) are produced by
(a) *Streptomyces* (b) *Nitrobacter*
(c) *Rhizobium* (d) *Penicillium*

23. The transgenic animals are those which have
(a) foreign DNA in some cells.
(b) foreign DNA in all of their cells.
(c) foreign RNA in all of their cells.
(d) Both (a) and (c).

24. The transgenic plants are the plants having
(a) no gene.
(b) genes in transposition.
(c) genes with no function to perform.
(d) genes of an other organism.

25. Recombinant DNA technology can be used to produce quantities of biologically active form of which one of the following products in *E.coli*?
(a) Luteinizing hormone (b) Ecdyson
(c) Rifamycin (d) Interferon

26. Which of the following combinations of risk are associated with genetically modified food ?
I. Toxicity
II. Allergic reaction
III. Antibiotic resistance in micro-organisms present in alimentary canal. –
(a) I and II (b) I, II and III
(c) I and III (d) II and III

27. Cheese and Yogurt are products obtained by
(a) distillation (b) pasteurization
(c) fermentation (d) dehydration

28. Main objective of producing herbicide resistant GM crops is
(a) encourage ecofriendly herbicides.
(b) reduce herbicide accumulation in food articles for health safety.
(c) eliminate weeds from fields without the use of manual labour.
(d) eliminate weeds from the fields without the use of herbicides.

29. Which one of the following is the correctly matched pair of a product and the microorganism responsible for it ?
(a) Ethyl alcohol- Yeast
(b) Acetic acid- *Lactobacillus*
(c) Cheese - *Nitrobacter*
(d) Curd - *Azotobacter*

30. Humulin is
(a) A form of chitin
(b) A powerful antibiotic
(c) A new digestive enzyme
(d) Human insulin

31. A genetically engineered micro-organism used successfully in bioremediation of oil spills is a species of
(a) *Pseudomonas* (b) *Trichoderma*
(c) *Xanthomonas* (d) *Bacillus*

32. Prenatal screening in humans, AIDS virus testing in humans, and genetic engineering for protection against insect attack in plants all
(a) are types of gene therapy.
(b) are examples of the application of r-DNA technology.
(c) require use of the same restriction enzyme.
(d) are carried out using gene guns.

33. Genetically engineered bovine growth hormone (BGH), which is highly effective for improving overall growth and milk production in cattle, remains a hotly debated issue because
(a) BGH is clearly hazardous to human health.
(b) BGH is an environmental hazard.
(c) BGH could drive traditional family farmers out of business.
(d) scientists remain unconvince d that BGH really works.

34. DNA vaccines are
(a) mixture of hormones (b) recombinant vaccines
(c) synthetic vaccines (d) pure DNA or RNA

35. Toxic component of *Bacillus thuringiensis* is protein. Commercial preparation of *Bacillus thuringiensis* consists of mixture of spores, cry protein and inert carrier. *Bt* stands for *Bacillus thuringiensis* for in popular crop of *Bt* cotton. *Tricoderma* is used in biocontrol of fungal pathogen because it has capacity to secrete the enzyme
(a) DNAase (b) RNAase
(c) Chitinase (d) Cry protein

RESPONSE GRID

20. ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ	**22.** ⓐⓑⓒⓓ	**23.** ⓐⓑⓒⓓ	**24.** ⓐⓑⓒⓓ
25. ⓐⓑⓒⓓ	**26.** ⓐⓑⓒⓓ	**27.** ⓐⓑⓒⓓ	**28.** ⓐⓑⓒⓓ	**29.** ⓐⓑⓒⓓ
30. ⓐⓑⓒⓓ	**31.** ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ
35. ⓐⓑⓒⓓ				

Space for Rough Work

36. GEAC stands for
(a) Genome Engineering Action Committee
(b) Ground Environment Action Committee
(c) Genetic Engineering Approval Committee
(d) Genetic and Environment Approval committee

37. A transgenic food crop'which may help in solving the problem of night blindness in developing countries is
(a) *Flavr Savr* tomatoes (b) Starlink maize
(c) *Bt* Soybean (d) Golden rice

38. 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

39. It is sometimes necessary to genetically engineered mammalian cells to produce proteins because they
(a) can produce larger quantities of protein than bacteria.
(b) can read eukaryotic genes and bacteria cannot.
(c) can add sugars to make glycoproteins and bacteria cannot.
(d) are easier to grow than bacteria.

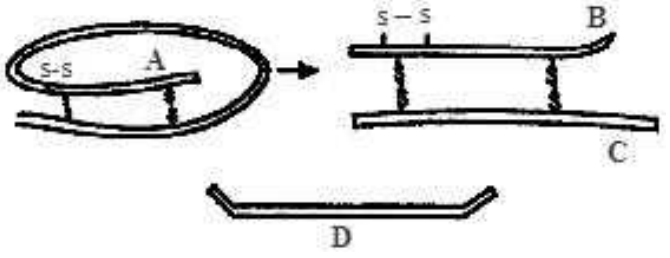
40. Which one of the following is commonly used in transfer of foreign DNA into crop plants?
(a) *Meloidogyne incognita*
(b) *Agrobacterium tumefaciens*
(c) *Penicillium expansum*
(d) *Trichoderma harzianum*

41. α-I antitrypsin is
(a) an antacid
(b) an enzyme
(c) used to treat arthritis
(d) used to treat emphysema

42. Which one of the following genes is defective in patients suffering from severe combined immuno-deficiency syndrome (SCID) ?
(a) RNAase
(b) ADA
(c) Ribonucleotide reductase
(d) DNAase

43. Which one of the following option is incorrect?
(a) The majority of baculoviruses used as biological control agents are in the genus Nucleopolyhedrovirus.
(b) Nucleopolyhedrovirus are excellent model for broad-spectrum insecticidal applications.
(c) Nucleopolyhedrovirus have no negative impacts on plants, mammals, birds, fish or even on non-target insects.
(d) This is especially desirable when beneficial insects are being conserved to aid in an overall IPM programme.

44. Select the correct set of the names for A, B, C and D.



	A	B	C	D
(a)	Proinsulin	B-peptide	A-peptide	Insulin
(b)	Proinsulin	A-peptide	B-Peptide	Free C-Peptide
(c)	Proinsulin	A-peptide	B-peptide	Insulin
(d)	Proinsulin	B-Peptide	A-peptide	Free C-Peptide

45. Match the Column I with Column II and choose the correct option.

	Column I		Column II
A.	Golden rice	I.	Increased shelf life
B.	Flavr Savr tomato	II.	HGH
C.	Mouse	III.	Vitamin A
D.	Transgenic pig	IV.	Organ transplantation

(a) A-III; B-I; C-II; D-IV
(b) A-II; B-I; C-III; D-IV
(c) A-II; B-III; C-I; D-IV
(d) A-IV; B-I; C-II; D-III

RESPONSE GRID					
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐ(ⓒⓓ		**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 34 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB34

1. (b) In this technique nematode specific genes are introduced in the host plant in such a way that it produces both sense and antisense RNA. The two RNA's being complementary to each other form a double stranded RNA (dsRNA) which is also called interfering RNA responsible for initiating RNA interference (RNA i). This (dsRNA) bind to and prevent translation of specific mRNA of nematode (gene silencing). Thus transgenic plants based on RNAi technology are resistant to nematode.

2. (a)

3. (a) RNA interference technique, sense & antisense RNA fused to form dsRNA that silent the expression of m- RNA of nematode. RNA interference is a novel strategy adopted to prevent infestation of nematode *Meloidegyne incognitia* in roots of tobacco plants. .

4. (a) Recombinant DNA technology is the process joining together two DNA molecules from two different species that are inserted into a host organism to produce new genetic combination.

5. (d) Transgenic Rosie is actually cow. Restriction enzymes cut the DNA at specific sites.

6. (b)

7. (c) Common activities in bioinformatics include mapping and analysing DNA and protein sequences, aligning different DNA *etc.* are the part of human genome project.

8. (a) Dolly sheep was obtained by cloning the udder cell (somatic cell) fused with enucleated oocyte.

9. (a)

10. (a)

11. (b) Biowar or biological war or bioterrorism is the development of biological weapons against people, their crops and animals.

12. (d) The transgenic food, containing enzyme produced by antibiotic resistance gene, can cause allergies because it is a foregin protein. The bacteria present in alimentary cancal can take up antibiotic resistance gene and become resistant to that antibiotic. Transgenes can endanger native species if Bt toxin is expressed in pollens which are transported by pollinator honey bees. GM crop prodution causes changes in natural environment which may be harmful for all organisms.

13. (c) Two cry genes, cry IAc and cry IIAb have been incorporated in cotton. The genetically modified crop is called Bt cotton as it contains Bt toxin genes. The genes cry I Ac and cry II Ab control cotton bollworms.

14. (c) Hirudin is a protein that stops blood clotting. The gene encoding hirudin was chemically synthesized. This gene was then transferred ito *Brassica napus*, where hirudin accumulaes in seeds. The hirudin is purified and used as medicine.

15. (d) Using conventional methods of diagnosis (serum and urine analysis, etc.) early detection is not possible. Recombinant DNA technology, Polymerase Chain Reaction (PCR) and Enzyme Linked Immunosorbent Assay (ELISA) are some of the techniques that serve the purpose of early diagnosis.

16. (b) Gene therapy is a collection of methods that allows correction of gene defect that has been diagonsed in a child/embryo. Correcting of a genetic defect involves delivery of a normal gene into the individual or embryo to take over the function of and compensate for the non-functional gene.

17. (a) Bioethics may be viewed as the set of standards that may be used to regulate various activites based on their effects on the biological world. This is because biotehncology has aroused social as well as political concerns, which have ranged from biotechnology being unnatural to detrimental to biodiversity.

18. (c) **19. (d)** **20. (b)** **21. (b)** **22. (a)**
23. (b) **24. (d)** **25. (d)** **26. (b)** **27. (c)**
28. (c) **29. (a)**

30. (d) The first commercial example of enzyme modification of a protein for human use is the conversion of pig insulin to human insulin called "humulin".

31. (a)

32. (b) These are all good examples of the end products of various r-DNA technologies.

33. (c) The use of BGH does not appear to have serious health or environmental drawbacks, but it could offer such a competitive edge to corporate farming operations that smaller, more traditional family farms might be forced out of business. This scenario is a good example of how genetic engineering can have unintended social consequences.

34. (d) DNA vaccines are used as injection of pure DNA or RNA into skeleton muscles leading to expression of DNA in the muscle cell.

35. (c) **36. (c)**

37. (d) Golden rice is a transgenic food crop which may help in solving the problem of night blindness in developing countries. Golden rice or miracle rice is rich in vitamin A or β-carotene and iron and decaffeinated coffee are also valuable achievements of gene transfer technology.

38. (d) Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into cotton plant to form a genetically modified crop called Bt cotton. Bt cotton has high yield and resistance to bollworms.

39. (c) Only mammalian cells can correctly attach these sugars to proteins.

40. (b) *Agrobacterium tumefaciens* is the causal agent of crown gall disease (the formation of tumours) in over 140 species of dicot. This disease caused by a DNA plasmid (T_i plasmid) carried by bacterium and transferred to the plant cells. T_i plasmid has been widely used in plant engineering as a vector in order to inject gene in host plant to form transgenic plant.

41. (d) **42. (b)** **43. (b)** **44. (b)** **45. (a)**