

CUET Biology Solved Paper-2023

Held on 27 May 2023

1. The two closely linked genes HBA1 and HBA2 are associated with _____

(a) α thalassemia (b) β thalassemia
(c) Haemophilia (d) Sickle cell anaemia

2. Match List I with List II

List I
(Crops)

A. Wheat
B. Cauliflower
C. Brassica
D. Chilli

List II
(Variety)

I. Pusa Sadabahar
II. Himgiri
III. Pusa Shubhra
IV. Pusa Swarnim

Choose the correct answer from the options given below:

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

3. Identify the tools for recombinant DNA technology:

A. Restriction enzymes and host organism
B. Ligases and vectors
C. Ribosome
D. Polymerase enzyme

Choose the correct answer from the options given below:

(a) A, B and D only (b) A, B and C only
(c) A, B, C and D (d) A, C and D only

4. Match List I with List II

List I

A. Mucus lining
B. Acid in stomach
C. PMNL-neutrophils
D. Interferons

List II

I. Physiological barrier
II. Cellular barrier
III. Physical barrier
IV. Cytokine barrier

Choose the correct answer from the options given below:

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

5. The parturition is induced by a complex neuroendocrine mechanism. Which of the following hormone is not involved on this process?

(a) Estrogen (b) Cortisol
(c) Oxytocin (d) Melanin

6. Identify curative method (s) used to treat ADA deficiency disease in human.

A. Gene Therapy
B. Bone Marrow Transplantation
C. Complete Blood Replacement

- D. Enzyme Replacement Therapy

Choose the correct answer from the options given below:

(a) A, B and D only (b) B, C and D only
(c) A, C and D only (d) A and C only

7. Montreal protocol is related to _____

(a) Ozone depletion (b) Green house gases
(c) Acid rain (d) Deforestation

8. Which of the following serve as an important biofertiliser in paddy field?

(a) *Glomus* (b) *Oscillatoria*
(c) *Rhizobium* (d) *Azospirillum*

9. Progestasert and LNG-20 are the examples of:

(a) Copper releasing IUD's
(b) Hormone releasing IUD's
(c) Oral Contraceptives
(d) Non-medicated IUD's

10. Which of the following statements are correct about the structure of a sperm?

A. It is composed of head, thorax, neck and tail
B. The neck region contains a lot of mitochondria
C. The mitochondria produces energy for the movement of tail
D. The tail facilitate sperm motility essential for fertilisation

Choose the most appropriate answer from the options given below:

(a) A and B only (b) B and C only
(c) C and D only (d) B and D only

11. In the process of protein synthesis the amino acids bind to tRNA at:

(a) Anticodon site (b) 3' end
(c) 5' end (d) any place of tRNA

12. Match List I with List II

LIST I

(Microorganism)

A. *Trichoderma polysporum*

B. *Monascus purpureus*

C. *Saccharomyces cerevisiae*

D. *Aspergillus niger*

LIST II

(Product Obtained)

I. Ethanol

II. Citric Acid

III. Cyclosporin A

IV. Statins

Choose the correct answer from the options given below:

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

13. GEAC is:

- (a) Genetic Engineering Approval Committee
(b) Genetic Engineering Addressal Committee
(c) Genetic Engineering Approval Council
(d) Genetic Engineering Approving Council

14. Which of the following does not affect genetic equilibrium/Hardy Weinberg Equilibrium?

- (a) Mutation
(b) Genetic drift
(c) Genetic recombination
(d) Random mating

15. Extinction of Steller's sea Cow and passenger pigeon is due to _____

- (a) Invasion of alien species
(b) Over exploitation by human
(c) Habitat loss and fragmentation
(d) Co-extinction

16. Select the condition(s) in which decomposition does not take place in

- A. In warm and moist environment
B. In presence of decomposers
C. In absence of decomposers
D. In absence of detritivores
E. In presence of complex compounds like lignin and chitin.

Choose the correct answer from the options given below:

- (a) C, D and E only (b) C and D only
(c) A, D and E only (d) B, D and E only

17. Match List I with List II

List I

- A. Curd
B. Butyric acid
C. Swiss cheese
D. Clot buster

List II

- I. *Streptococcus*
II. *Propionibacterium sharmanii*
III. *Clostridium butylicum*
IV. *Lactobacillus*

Choose the correct answer from the options given below:

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

18. Which one of the following is not an example of terrestrial ecosystem?

- (a) Forest (b) Grassland
(c) Estuaries (d) Deserts

19. Which of the following is not a marine fish?

- (a) Hilsa (b) Rohu
(c) Sardines (d) Pomfrets

20. Which one of the following is an example of community protected biodiversity conservation method?

- (a) Wild life sanctuaries (b) Biosphere reserves
(c) Sacred groves (d) Botanical gardens

21. Trisomy of Chromosome 21 in humans leads to

- (a) Klinefelter's syndrome (b) Turner's syndrome
(c) Down's syndrome (d) Phenylketonuria

22. Which one of the following is an example of co-evolution?

- (a) Sea anemone and clown fish
(b) Barnacles and Whale
(c) Wasp and Fig
(d) Cuckoo and crow

23. Arrange the following events of Meselson and Stahl's experiment in order of their occurrence

- A. DNA extracted from the culture, twenty minutes after transfer from ^{15}N to ^{14}N medium had a hybrid density.
B. *E. Coli* with heavy DNA were transferred into a medium with $^{14}\text{NH}_4\text{Cl}$.
C. *E. Coli* were grown in a medium containing $^{15}\text{NH}_4\text{Cl}$.
D. DNA extracted from the culture after forty minutes had equal amounts of hybrid DNA and light DNA.

Choose the correct answer from the options given below:

- (a) A, B, C, D (b) D, C, A, B
(c) B, A, D, C (d) C, B, A, D

24. Cross between two different but related species is called

- (a) Cross breeding
(b) Interspecific hybridisation
(c) Out crossing
(d) Out breeding

25. Match List I with List II

LIST I

- A. Homology
B. Analogy
C. Adaptive radiation
D. Saltation

LIST II

- I Darwin's finches
II Single step large mutation
III Convergent Evolution
IV Divergent Evolution

Choose the correct answer from the option given below:

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

26. Bamboo species exhibit unusual flowering phenomenon, because it flowers:
- Once in 12 years in their life time.
 - Only once in their life time.
 - Three times in their life span.
 - Many times in their life span.
27. Which one is not a unit of vegetative propagation?
- Bulb
 - Runner
 - Tuber
 - Seed
28. In an electrostatic precipitator electrodes wires produce a corona that releases _____ to make dust particles get attracted towards collecting plate.
- Protons
 - Electrons
 - Neutrons
 - Positrons
29. Match List I with List-II
- | | |
|---|-------------------|
| LIST I | LIST II |
| A. One species is benefitted and other harmed. | I. Amensalism |
| B. One species is benefitted and other neither harmed nor benefitted. | II. Parasitism |
| C. Both the interacting species are benefitted. | III. Commensalism |
| D. One species is harmed and other remains unaffected. | IV. Mutualism |
- Choose the correct answer from the options given below:
- A-I, B-III, C-IV, D-II
 - A-II, B-III, C-I, D-IV
 - A-II, B-III, C-IV, D-I
 - A-IV, B-II, C-I, D-III
30. Which one of the following is NOT a method of molecular diagnosis for early detection of a disease?
- rDNA technology
 - RNAi
 - PCR
 - ELISA
31. Hind-II cuts DNA at a particular by recognising a specific sequence of _____
- 6 bp
 - 5 bp
 - 4 bp
 - 3 bp
32. Match List I with List II
- | | |
|---------------------------|------------------------|
| List I | List II |
| A. Transforming principle | I. Jacob and Monod |
| B. Replication of DNA | II. Frederick Griffith |
| C. Lac operon concept | III. Alec Jeffreys |
| D. DNA Fingerprinting | IV. Watson and Crick |
- Choose the correct answer from the options given below
- A-II, B-III, C-IV, D-I
 - A-II, B-IV, C-I, D-III
 - A-IV, B-II, C-III, D-I
 - A-I, B-III, C-II, D-IV
33. Which of the following is/are not the characteristic of wind pollinated flowers?
- Light and non-sticky
 - Possess well exposed stamens
 - Large and often feathery stigma
 - Often have many ovules in each ovary.
- Choose the correct answer from the options given below:
- A and C only
 - C only
 - B and D only
 - D only
34. Arrange the following steps regarding HIV infection in correct sequence
- Viral RNA produced by the infected cell
 - Virus infects macrophages.
 - Viral DNA is produced by reverse transcriptase
 - Viral RNA is introduced into the cell.
 - Viral DNA incorporates into the host genome.
- Choose the correct answer from the options given below:
- D, B, A, C, E
 - B, C, D, A, E
 - B, D, C, E, A
 - D, C, B, E, A
35. The endosperm is absent in the seed of :
- Wheat
 - Castor
 - Maize
 - Pea
36. Identify the diagnostic test used to detect the sex of the foetus from the following:
- ELISA
 - WIDAL
 - Amniocentesis
 - Urine analysis
37. Which of the following statement is FALSE in relation to colour blindness?
- Colour blindness is an autosome-linked recessive disorder
 - Boys are more likely to be colour blind than girls
 - A daughter will not normally be colour blind, unless her mother is a carrier and her father is colour blind
 - Colour blind people generally fail to discriminate between red and green color
38. Arrange the following steps of gel electrophoresis in correct order.
- DNA fragments were forced to move towards anode under electric field through agarose gel
 - Staining DNA fragments with Ethidium Bromide
 - DNA fragments separated according to their size
 - Visualising them in UV rays
- Choose the correct answer from the options given below:
- A, C, B, D
 - A, B, C, D
 - B, A, C, D
 - B, C, D, A
39. Which one of the following human ancestors probably lived in East African grasslands two million years ago?
- Ramapithecus
 - Dryopithecus
 - Australopithecines
 - Neanderthal man

40. Widal test is used to diagnose:

- (a) Typhoid (b) Malaria
(c) Pneumonia (d) Cancer

41. Read the paragraph given below and answer the question.

If a person is born with a hereditary disease, can a corrective therapy be taken for such a disease? Gene therapy is an attempt to do this. Gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo. Here genes are inserted into a person's cells and tissues to treat disease.

ADA enzyme is crucial for the functioning of _____

- (a) Immune System
(b) Respiratory System
(c) Cardiovascular System
(d) Excretory System

42. Read the paragraph given below and answer the question.

If a person is born with a hereditary disease, can a corrective therapy be taken for such a disease? Gene therapy is an attempt to do this. Gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo. Here genes are inserted into a person's cells and tissues to treat disease.

ADA deficiency can be permanently cured by

- A. Bone Marrow Transplant
B. Gene therapy
C. Enzyme replacement therapy
D. DNA recombination

Choose the correct answer from the options given below:

- (a) A, B and D only (b) B only
(c) B and C only (d) C only

43. Read the paragraph given below and answer the question.

If a person is born with a hereditary disease, can a corrective therapy be taken for such a disease? Gene therapy is an attempt to do this. Gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo. Here genes are inserted into a person's cells and tissues to treat disease.

Gene therapy method involves:

- (a) Cloning of cells with alternative gene
(b) Delivery of normal functional gene in the embryo to compensate for non functional gene
(c) Modification of defective genes in the cells
(d) cDNA recombination

44. Read the paragraph given below and answer the question.

If a person is born with a hereditary disease, can a corrective therapy be taken for such a disease? Gene therapy is an attempt to do this. Gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo. Here genes are inserted into a person's cells and tissues to treat disease.

ADA deficiency is caused due to:

- (a) Deficiency of bone marrow
(b) Deletion of gene for adenosine deaminase
(c) Addition of Adenosine
(d) Deletion of amino group in genome

45. Read the paragraph given below and answer the question.

If a person is born with a hereditary disease, can a corrective therapy be taken for such a disease? Gene therapy is an attempt to do this. Gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo. Here genes are inserted into a person's cells and tissues to treat disease.

The first clinical gene therapy was given in _____ to

- (a) 1990, 4 year old boy
(b) 1990, 4 year old girl
(c) 1992, 3 year old boy
(d) 1992, 3 year old girl

46. Read the paragraph given below and answer the question.

Bee-keeping is the maintenance of hives of honeybees for the production of honey. Honey is a food of high nutritive value and also finds use in the indigenous systems of medicine. Honeybee also produces bee-wax, which finds many uses in industry, such as in the preparation of cosmetics and polishes of various kinds. The increased demand of honey has led to large-scale beekeeping practices; it has become an established income generating industry, whether practiced on a small scale or on a large scale.

Bee-keeping can be practiced in any area where there are sufficient bee pastures. There are several species of honeybees which can be reared. Beehives can be kept in one's courtyard, on the verandah of the house or even on the roof.

Bee-keeping is also known as:

- (a) Sericulture (b) Apiculture
(c) Pisciculture (d) Aquaculture

47. Read the paragraph given below and answer the question.

Bee-keeping is the maintenance of hives of honeybees for the production of honey. Honey is a food of high nutritive value and also finds use in the indigenous systems of medicine. Honeybee also produces beeswax, which finds many uses in industry, such as in the preparation of cosmetics and polishes of various kinds. The increased demand of honey has led to large-scale beekeeping practices; it has become an established income generating industry, whether practiced on a small scale or on a large scale.

Bee-keeping can be practiced in any area where there are sufficient bee pastures. There are several species of honeybees which can be reared. Beehives can be kept in one's courtyard, on the verandah of the house or even on the roof.

Which of the following is not suitable for practicing bee-keeping?

- (a) Wild Shrubs (b) Fruit Orchards
(c) Barren Land (d) Cultivated crops

48. Read the paragraph given below and answer the question.

Bee-keeping is the maintenance of hives of honeybees for the production of honey. Honey is a food of high nutritive value and also finds use in the indigenous systems of medicine. Honeybee also produces bee wax, which finds many uses in industry, such as in the preparation of cosmetics and polishes of various kinds. The increased demand of honey has led to large-scale beekeeping practices; it has become an established income generating industry, whether practiced on a small scale or on a large scale.

Bee-keeping can be practiced in any area where there are sufficient bee pastures. There are several species of honeybees which can be reared. Beehives can be kept in one's courtyard, on the verandah of the house or even on the roof.

Bees help the farmers by:

- (a) Visiting pesticide free plants
(b) Decreasing crop yield
(c) Pollinating Crops
(d) Collecting nector

49. Read the paragraph given below and answer the question.

Bee-keeping is the maintenance of hives of honeybees for the production of honey. Honey is a food of high nutritive value and also finds use in the indigenous systems of medicine. Honeybee also produces beeswax,

which finds many uses in industry, such as in the preparation of cosmetics and polishes of various kinds. The increased demand of honey has led to large-scale beekeeping practices; it has become an established income generating industry, whether practiced on a small scale or on a large scale.

Bee-keeping can be practiced in any area where there are sufficient bee pastures. There are several species of honeybees which can be reared. Beehives can be kept in one's courtyard, on the verandah of the house or even on the roof.

Identify the reasons as to why a bee-keeper could not get enough honey with the practiced beekeeping in the garden of his home.

- A. He had used chemical pesticides in his garden.
B. There were not enough flowers in the garden.
C. There were no medicinal plants growing in his garden.
D. There was no verandah in his courtyard.

Choose the correct answer from the options given below:

- (a) A and C only (b) A and B only
(c) B and C only (d) C and D only

50. Read the paragraph given below and answer the question.

Bee-keeping is the maintenance of hives of honeybees for the production of honey. Honey is a food of high nutritive value and also finds use in the indigenous systems of medicine. Honeybee also produces beeswax, which finds many uses in industry, such as in the preparation of cosmetics and polishes of various kinds. The increased demand of honey has led to large-scale beekeeping practices; it has become an established income generating industry, whether practiced on a small scale or on a large scale.

Bee-keeping can be practiced in any area where there are sufficient bee pastures. There are several species of honeybees which can be reared. Beehives can be kept in one's courtyard, on the verandah of the house or even on the roof.

Identify the statements which are not true for bee-keeping

- A. Bee-keeping is a very old cottage industry.
B. Bee-keeping is a labour intensive activity.
C. The demand for honey is poor.
D. Bee-keeping also yields beeswax.

Choose the correct answer from the options given below:

- (a) A and B only (b) A and C only
(c) C and D only (d) B and C only

Hints & Explanations

1. (a) Thalassemia is an autosome-linked recessive blood disease that is transmitted from parents to the offspring when both the partners are unaffected carrier for the gene (or heterozygous). α Thalassemia is controlled by two closely linked genes HBA1 and HBA2 on chromosome 16 of each parent and it is observed due to mutation or deletion of one or more of the four genes.
2. (b)
Wheat \rightarrow Himgiri
Cauliflower \rightarrow Pusa Shubhara
Brassica \rightarrow Pusa Swarnim
Chilli \rightarrow Pusa Sadabahar
3. (a) Statements A, B and D are correct about the tools of recombinant DNA technology.
Recombinant DNA technology or the genetic engineering can be accomplished only if the key tools such as restriction enzymes, polymerase enzymes, ligases, vectors and the host organism are present. Ribosome is not used as tool of recombinant technology.
4. (d)
Mucus lining \rightarrow Physical barrier
Acid in stomach \rightarrow Physiological barrier
PMNL-neutrophils \rightarrow Cellular barrier
Interferons \rightarrow Cytokine
5. (d) The process of childbirth is called parturition which is induced by a complex neuroendocrine mechanism involving cortisol, estrogens and oxytocin. Melanin is pigment that is produced skin cells. It is not involved in the process of parturition.
6. (a) Adenosine deaminase (ADA) deficiency is a type of inherited disorder that is caused due to the deletion of the gene for adenosine deaminase. It can be cured by gene therapy, bone marrow transplantation and by enzyme replacement therapy. Complete blood replacement is not used for the treatment of ADA deficiency.
7. (a) Montreal protocol is related to ozone depletion.
8. (b) *Oscillatoria* is a cyanobacteria that serves as an important biofertiliser in paddy fields.
9. (b) Intra Uterine Devices (IUDs) are effective contraceptive that are inserted by doctors or expert nurses in the uterus through vagina. These Intra Uterine Devices are presently available as the non-medicated IUDs, copper releasing IUDs and the hormone releasing IUDs. Progestasert and LNG-20 are examples of hormone releasing IUDs.
10. (c) Statements A and B are incorrect while statements C and D are correct about.
The correct statements are:-
A- A sperm is composed of a head, neck, a middle piece and a tail.
B- The middle piece possesses numerous mitochondria, which produce energy for the movement of tail that facilitate sperm motility essential for fertilisation.
11. (b) In the process of protein synthesis the amino acids bind to tRNA at 3' end. The end in which amino acids linked with tRNA is known as amino acid acceptor.
12. (d)
Trichoderma polysporum \rightarrow Cyclosporin A
Monascus purpureus \rightarrow Statins
Saccharomyces cerevisiae \rightarrow Ethanol
Aspergillus niger \rightarrow Citric Acid.
13. (a) The Indian Government has set up organisations that makes decisions regarding the validity of GM research and the safety of introducing GM-organisms for public services is known as GEAC (Genetic Engineering Approval Committee).
14. (d) There are five factors that affect the Hardy Weinberg Equilibrium such as gene migration or gene flow, genetic drift, mutation, genetic recombination and natural selection. Random mating does not affect genetic equilibrium/ Hardy Weinberg Equilibrium.
15. (b) Many species extinctions in the last 500 years such as Steller's sea cow, passenger pigeon were due to overexploitation by humans.
16. (a) Statements C, D and E are not involved in the process of decomposition. Decomposition is largely an oxygen-requiring process. The rate of decomposition is controlled by chemical composition of detritus and climatic factors. In a particular climatic condition, decomposition rate is slower if detritus is rich in lignin and chitin, and quicker, if detritus is rich in nitrogen and water-soluble substances like sugars. Temperature and soil moisture are the most important climatic factors that regulate decomposition through their effects on the activities of soil microbes. Warm and moist environment favour decomposition whereas low temperature and anaerobiosis inhibit decomposition resulting in build up of organic materials.
17. (b)
Curd \rightarrow *Lactobacillus*
Butyric acid \rightarrow *Clostridium butylicum*
Swiss cheese \rightarrow *Propionibacterium sharmanii*
Clot buster \rightarrow *Streptococcus*.
18. (c) Forest, grassland and desert are some examples of terrestrial ecosystems while pond, lake, wetland, river and estuary are some examples of aquatic ecosystems.
19. (b) Fishes that live in marine water are known as marine fishes such as *Hilsa*, Sardines, Pomfrets etc. Fishes that live in fresh water are known as freshwater fishes such as Rohu, Catla, etc.
20. (c) Sacred groves is an example of community that protected biodiversity conservation method.
21. (c) Down's Syndrome is a type of genetic disorder that occurs due to presence of an additional copy of the chromosome at number 21 thus called trisomy of 21. The affected individual is short statured with small round head, furrowed tongue and partially open mouth. Palm is broad with characteristic palm crease. Physical, psychomotor and mental development is retarded.
22. (c) Plant-animal interactions often involve co-evolution that is, the evolutions of the flower and its pollinator species are tightly linked with one another. In many species of fig trees, there is a tight one-to-one relationship with the pollinator species of wasp. It means that a given fig species can be pollinated only by its 'partner' wasp species and no other species. The female wasp uses the fruit not only as an oviposition (egg-laying) site but uses the developing

seeds within the fruit for nourishing its larvae. The wasp pollinates the fig inflorescence while searching for suitable egg-laying sites. In return for the favour of pollination the fig offers the wasp some of its developing seeds, as food for the developing wasp larvae.

23. (d) The correct sequence of the events of Meselson and Stahl's experiment in order of their occurrence is:- C, B, A, D.
C- *E. Coli* were grown in a medium containing $^{15}\text{NH}_4\text{Cl}$ (^{15}N is the heavy isotope of nitrogen) as the only nitrogen source for many generations.
B- *E. Coli* with heavy DNA were transferred into a medium with $^{14}\text{NH}_4\text{Cl}$
A- DNA extracted from the culture, twenty minutes after transfer from ^{15}N to ^{14}N medium had a hybrid density.
D- DNA extracted from the culture after forty minutes had equal amounts of hybrid DNA and light DNA.
24. (b) Cross between two different but related species is known as interspecific hybridisation. In this method, male and female animals of two different related species are mated. In some cases, the progeny may combine desirable features of both the parents and may be of considerable economic value such as the mule.
25. (b)
Homology → Divergent evolution
Analogy → Convergent evolution
Adaptive radiation → Darwin's finches
Saltation → Single step large mutation
26. (b) Bamboo species exhibit unusual flowering phenomenon because it flowers only once in their life time.
27. (d) The type of asexual reproduction in which plants reproduce with the help of their stems, leavers and roots is known as vegetative propagation. Bulb, tuber, runner are the unit of vegetative propagation. Seed is fertilised ovule and it is not involved in vegetative propagation.
28. (b) In an electrostatic precipitator electrodes wires produce a corona that releases electrons to make dust particles get attracted towards collecting plate.
29. (c)
One species is benefitted and the other harmed → Parasitism
One species is benefitted and other neither harmed nor benefitted → Commensalism
Both the interacting species are benefitted → Mutualism
One species is harmed and other remains unaffected → Amensalism.
30. (b) Recombinant DNA technology, Polymerase Chain Reaction (PCR) and Enzyme Linked Immuno-sorbent Assay (ELISA) are some molecular method that are used for the early diagnosis /detection of a disease. RNAi is not used for early diagnosis of disease.
31. (a) *Hind-II* cuts DNA at a particular by recognising a specific sequence of 6 bp.
32. (b)
Transforming principle → Frederick Griffith
Replication of DNA → Watson and Crick
Lac operon concept → Jacob and Monod
DNA fingerprinting → Alec Jeffreys
33. (d) Statement (D) is not the characteristic of wind pollinated flowers.
Wind pollination requires such type of the pollen grains that are light and non-sticky so that they can be transported in wind currents. They often possess well-exposed stamens

so that the pollens are easily dispersed into wind currents, and large often-feathery stigma to easily trap air-borne pollen grains. Wind pollinated flowers often have a single ovule in each ovary and numerous flowers packed into an inflorescence.

34. (c) The correct sequence of steps regarding HIV infection are- (B)- Virus infects macrophages → (D)- Viral RNA is introduced into the cell → (C)- Viral DNA is produced by reverse transcriptase → (E)- Viral DNA incorporates into the host genome → (A)- Viral RNA produced by the infected cell.
35. (d) The endosperm is absent in the seed of pea because endosperm is completely consumed by the developing embryo.
36. (c) Amniocentesis is the diagnostic test used to detect the sex of the foetus.
37. (a) Statement (a) is false about the colour blindness. The correct statement is that colour blindness is a sex-linked recessive disorder.
38. (a) The correct order of steps of gel electrophoresis is- (A). DNA fragments were forced to move towards anode under electric field through agarose gel → (C). DNA fragments separated according to their size → (B). Staining DNA fragments with ethidium bromide → (D). Visualising them in UV rays.
39. (c) *Australopithecines* probably lived in East African grasslands two million years ago.
40. (a) *Salmonella typhi* is a pathogenic bacterium which causes typhoid fever in human beings. It is diagnosed by a test named as Widal test.
41. (a) According to the paragraph, ADA enzyme is crucial for the functioning of immune system.
42. (b) ADA deficiency can be permanently cured by gene therapy. In some children ADA deficiency can be cured by bone marrow transplantation; in others it can be treated by enzyme replacement therapy but the problem with both of these approaches that they are not completely curative.
43. (b) In gene therapy method genes are inserted into a person's cells and tissues to treat a disease. Correction 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.
44. (b) ADA deficiency is a type of genetic disorder that is caused due to deletion of gene for adenosine deaminase.
45. (b) The first clinical gene therapy was given in 1990 to a 4-year old girl with adenosine deaminase (ADA) deficiency. This enzyme is crucial for the immune system to function.
46. (b) According to paragraph, bee-keeping is also known as apiculture.
47. (c) Bee-keeping can be predicted in area where there are sufficient bee pastures of some wild shrubs, fruits orchards and cultivated crops. So barren land is not suitable for practicing bee- keeping.
48. (c) Bees help the farmers by pollinating crops.
49. (b) Statements (A) and (B) are only reason. A bee-keeper could not get enough honey with the practiced beekeeping in the garden of his home because he had used chemical pesticides in his garden and there were not enough flowers in the garden.
50. (d) Statements (B) and (C) are not correct about bee-keeping.