Biology
Classified MCQ
Unit 7
2000 - 2020

Unit 7 – Molecular Biology and Recombinant DNA Technology

Molecular basis of genetics

(1) Which of the following is required to maintain the Hardy – Weinberg equilibrium in a population?
(1) Flow of genes from other populations. (2) Occurrence of nutations.
(3) Occurrence of migrations. (4) Selective advantages of alleles in survival.
(5) Random mating. (2001)

(2) Which one of the following is not necessary for the replication of DNA?
(1) Adenosine triphosphate (2) m-RNA (3) Endonuclease
(4) DNA templates (5) Ligase (2003)

(3) Which of the following provides the best support for the view that all organisms on earth had a common ancestor?
(1) All organisms have RNA. (2) All organisms have DNA.
(3) All organisms have proteins. (4) All organisms have a common genetic code.
(5) All proteins are coded by DNA. (2007)

(4) Select the correct symbolic base pairing of DNA.
(A) A = T (B) C = G (C) A = T (D) C = T (E) A = U (2009)

(5) Which of the following is arranged in correct order by size, from largest to smallest?
(1) Chromosome → Gene → nucleotide → nitrogenous base.
(2) Codon → chromosome → gene → nucleotide
(3) Chromosome → gene → nittogenous base → nucleotide
(4) Gene → chromosome → codon → nucleotide
(5) Nucloeotide → chromosome → gene → codon (2011)

(6) Three types of RNA are involved in the synthesis of proteins in cells. Which of the following shows the correct sequence of the participation of the three types of RNA in protein synthesis?
(1) mRNA, tRNA, rRNA (2) rRNA, tRNA, mRNA
(3) tRNA, mRNA, rRNA (4) tRNA, rRNA, mRNA
(5) rRNA, mRNA, tRNA (2011)

• Questions 7 and 8 are based on the following terms used in molecular genetics.
1. Transcription 2. transformation 3. Conjugation 4. Replication 5. Translation

(7) Process in which RNA is produced using a DNA template is
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5 (2012)

(8) Process in which amino acids are assembled at a ribosome to form a polypeptide is
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5 (2012)

(9) In DNA replication, which of the following is catalysed by DNA polymerase.
(1) Unwinding of double helix.
(2) Breaking of sugar phosphate bonds of each strand.
(3) Addition of a phosphate group to the 3' carvon or 5' carbon of ribose.
(4) Addition of a nucleotide with a base complementary to the base in the template strand to the new DNA strand.
(5) Formation of double stranded DNA by intertwining the two nucleotide strands.
(2012)

(10) If a DNA molecule contains 8000 nucleotides of which 20% are adenine, the number of guanine nucleotides present in this DNA molecule is,
1) 1600 2) 2000 3) 2400 4) 3200 5) 1000 (2013)

(11) Which one of the following is not directly required for replication of DNA ?
(1) Nucleotides (2) DNA templates (3) Polymerase enzymes
(4) Ligase enzymes (5) ATP (2014)

(12) Five enzymes involved in DNA replication are given below. Which of them catalyses the unwinding of the double stranded structure of DNA?
(1) Helicase (2) DNA polymerase (3) Primase
(4) Ligase (5) DNA gyrase (2015)

(13) Which one of the following is incorrect regarding protein synthesis?
(1) Each amino acid in a protein is determined by a particular codon.
(2) Protein synthesis is regulated by 'start' and 'stop' codons.
(3) Base sequence of DNA determines the amino acid sequence in proteins.
(4) RNA polymerase catalyses the production of a copy of the DNA in transcription.
(5) Amino acids are brought to the ribosome surface by m-RNA during protein synthesis. (2015)

(14) Which of the following combinations of triplet codes in the corresponding mRNA and tRNA is the correct representation of the triplet code of CAT in DNA?

	mRNA	tRNA
(1)	GAA	CAT
(2)	CAT	CAT
(3)	GUA	CAU
(4)	GTA	CAU
(5)	GUA	CAT

(2016-29)

(15) This question is based on the statement with three blanks given below.

"variants of genes, which are called ....., arise due to ..... that occur as a result of mistakes in ....."

which of the following indicates in correct order, the terms that are best suited to fill the blanks of the above statement?

(1) genotypes, variations, DNA replication (2) alleles, mutations, transcription
(3) alleles, mutations, DNA replication (4) mutants, variations, protein synthesis
(5) heterozygotes, mutations, meiosis (2018-29)

(16) During replication of DNA, a cytosine molecule had been added instead of a thymine molecule
in a gene. This mutated gene produced a peptide with the same amino acid sequence as the gene before mutation. This is an example for
(1) insertion and nonsense mutation. (2) substitution and silent mutation.
(3) insertion and silent mutation. (4) substitution and missense mutation.
(5) insertion and missense mutation. (2019-33)

Contribution of chromosomes for inheritance of characters.

(1) Chromosomal theory of inheritance states that
(1) all cell nuclei contain chromosomes.
(2) chromosomes carry genetic information.
(3) chromosomes exist in homologous pairs.
(4) homologous chromosomes segregate at meiosis.
(5) chromosomes behave like genetic factors discovered by Mendel. (2007)

(2) The following are some steps occurring during the process of meiosis.
A – Formation of four daughter cells.
B – Separation of homologous chromosomes
C – Exchange of genetic material
D – Duplication of chromosomes
E – Division of cytoplasm
F – Pairing of homologous chromosomes
Which of the following is the correct order of steps of meiosis?
(1) DCBEFA (2) FDBCEA (3) DFCBEA
(4) FDECBA (5) DBFEBA (2011)

(3) Which of the following statements best explains the evolutionary advantage of meiosis?
(1) Meiosis is necessary for sexual reproduction.
(2) Meiosis contributes to maintain a constant number of chromosomes from generation to generation.
(3) Meiosis alternates with mitosis from generation to generation.
(4) Due to meiosis same genes are transmitted from generation to generation.
(5) Genetic recombinations are possible due to meiosis. (2017-33)

Genetic variation created by mutations.

(1) Which of the following statements regarding mutations is correct?
(1) Mutations always produce disadvantageous characters in organisms.
(2) Mutations occur more frequently in plants than in animals.
(3) Structural changes in DNA give rise to mutations.
(4) Mutations do not occur in viruses.
(5) Mutations cannot be induced in the laboratory. (2000)

(2) Which of the following statements is incorrect regarding mutations?
(1) They occur spontaneously in cells.
(2) They are very important for the evolution of organisms.
(3) They are always transmitted to the next generation during reproduction.
(4) They may occur when meiosis takes place.
(5) They may change the number of chromosomes in a cell. (2001)

(3) Down's Syndrome in man is caused by
(1) a change in a base pair sequence of a gene.
(2) loss of one of the X chromosomes from nucleus.
(3) addition of an extra autosomes from nucleus.
(4) a double recessive condition of a mutant gene.
(5) a polyploid condition in nucleus. (2006)

(4) Which of the following statements is/are incorrect regarding mutations?
(A) A mutation by be produced by a change of a single base in a DNA molecule.
(B) Change in the total number of chromosomes in a cell may cause a mutation.
(C) Most mutations produce dominant phenotypes.
(D) Mutations may remain undetected in organisms for several generations.
(E) Most mutations are in somatic cells. (2007)

(5) Which statement is incorrect regarding mutations?
(1) Most mutations cause sterility.
(2) Most mutations are recessive.
(3) Most mutations are caused by errors of DNA replication.
(4) Occurrences of mutations can be useful.
(5) UV radiations cause mutations. (2008)

(6) Which of the following staraments is incorrect?
(1) Most mutations are produced at the time of DNA replication.
(2) Mutations are usually harmful
(3) Alvinism is caused by non-disjunction of chromosomes at meiosis.
(4) Klineefelter's syndrome is caused by aneuploidy.
(5) Some nutations can be identified by examining chromosomes under the microscrope. (2009)

(7) Which of the following statements regarding mutations is correct?
(1) External mutagens cause spontaneous mutations.
(2) Hemophilia is an example for a lethal dominant mutation.
(3) Cancer occurs due to chromosomal mutations.
(4) Polydactyl occurs due to a dominant mutation.
(5) Albinism is an example for a lethal recessive mutation. (2014)

(8) Which of the following genetic disorders of man occurs/occur due to a change in the number of sex chromosomes?
(A) Huntingdon's disease (B) Downs syndrome (C) Turner syndrome
(D) Klienfelter's syndrome (E) Cystic fibrosis (2014)

(9) Which of the following disorders result/results in due to a change in the number of chromosomes?
(A) Downs syndrome (B) Klinefelter syndrome (C) Sickle cell anaemia
(D) Cystic fibrosis (E) Thalassemia (2017-47)

(10) Turner syndrome is best illustrated in which of the following persons?
(1) A girl born with a gene mutation on X chromosome
(2) A boy born with a gene mutation on y chromosome
(3) A boy or a girl born with only one X chromosome
(4) A girl born with only one X chromosome
(5) A boy born with an additional y chromosome (2018-30)

(11) Select the incorrect statement regarding an expert in genetic counselling
(1) He is knowledgeable on genetic disorders of humans.
(2) He advices persons with genetic disorders about the nature of the problem.
(3) He advices to abort a foetus if one of the parents is a carrier of a genetic disorder.
(4) He helps family members of the person with genetic disorder to manage the situation.
(5) He explains the persons with genetic disorder and family members how the disorder inherited. (2018-32)

(12) Substitution of a single nucleotide in a DNA sequence may result in
(A) silent mutation (B) shift in the reading frame
(C) formation of a shorter peptide (D) cancer
(E) shortening of gene. (2020-48)

Gene technology

(1) Which of the following developments of The DNA technology is not used in the human DNA finger printing technique?
(1) Ability to use minute quantities of DNA for analysis.
(2) Ability to cut long DNA molecules into small fragments using enzymes.
(3) Ability to separate small DNA molecules by electrophoresis.
(4) Ability to determine the sequence of nucleotides in a DNA molecule.
(5) Ability to identify specific DNA molecules using DNA probes. (2001)

(2) Which of the following statements is incorrect regarding a bacterial plasmid?
(1) It is a circular DNA molecule.
(2) It replicates and moves along with daughter cell during cell division.
(3) It has only a small number of genes.
(4) It performs useful functions.
(5) It is essential for the existence of the cell. (2004)

(3) Which statement is incorrect?
(1) Bacterial plasmids are used as vectors in gene cloning.
(2) Bacterial genes have been introduced into some crop plants, using genetic engineering techniques.
(3) Ligase enzymes can cut long DNA molecules into short pieces.
(4) DNA probes are used to detect DNA molecules with similar nucleotide sequences.
(5) Bacteriophages can be used to make vectors for gene cloning. (2008)

(4) Which of the following is not an essential step in procedure for cloning a foreing gene in a bacterium?
(1) DNA molecules are cut into pieces with restriction enzymes.
(2) Agarose gel electrophoresis is used to separate pieces of DNA.
(3) DNA pieces in the gel are blotted into nitrocellulose membranes.
(4) Different DNA molecules are joined with ligase enzymes.
(5) Plasmids are used as vectors to introduce DNA into bacterial cells. (2010)

(5) In genetic engineering technology several enzymes are used to produce recombinant DNA. Which one of the following enzymes is used to recognize and cut a specific sequence of nucleotide bases in DNA?
(1) Exonuclease (2) Ligase (3) Polymerase
(4) Restriction endonuclease (5) Deoxyribonuclease (2011)

(6) Restriction endonuclease enzymes are capable of
(1) cutting DNA randomly.
(2) restricting protein synthesis.
(3) cutting DNA at specific base sequences.
(4) adding nucleotides to a growing nucleic acid chain.
(5) joining DNA molecules. (2017-31)

(7) A genetically modified organism is different from other members of the same species because
(1) it carries an extra chromosome.
(2) it carries a gene or genes from another organism.
(3) it is generated by cloning of another organism.
(4) it cannot produce fertile offspring by interbreeding with other members of the same species.
(5) its gene expression is well regulated. (2018-31)

(8) DNA polymerase obtained from thermophilic bacteria is used for PCR because
(1) they contain more DNA polymerase than other organisms.
(2) that DNA polymerase does not have proofreading ability.
(3) that DNA polymerase is stable at high temperatures required for separation of DNA strands in the laboratory.
(4) it is the only DNA polymerase which can copy DNA in the laboratory.
(5) that DNA polymerase does not need a primer to initiate DNA synthesis. (2019-34)

(9) A function of topoisomerase is
(1) sealing the gaps of DNA strands.
(2) unwinding the double helix of DNA
(3) stabilizing separated DNA strands.
(4) relaxing the strain of overtwisted DNA strands.
(5) breaking the hydrogen bonds between DNA strands. (2020-32)

(10) Translation of eukaryotes differs from that of prokaryotes because it
(1) does not start before transcription is terminated.
(2) occurs in the nucleus.
(3) uses UAG, UAA or UGA as stop signals.
(4) does not form polysomes.
(5) does not start at AUG codon. (2020-33)

Applications of gene technology

(1) Which of the following is not an example of an application of genetically modified organisms?
(1) Production of crop plants like soya bean resistant to weedicides.
(2) Production of golden rice in nutrients like vitamin A.
(3) Large scale production of hepatitis B vaccine, using yeast cells.
(4) Growing cotton plants that can produce insecticidal proteins.
(5) Extraction of copper, using *Thiobacillus ferroxidans* from low grade ores. (2009)

(2) Which of the following is not a current application of genetic engineering in plants?
(1) Production of plants resistant to herbicides
(2) Production of plants which can fix nitrogen
(3) Production of plants with insecticidal proteins
(4) Production of plants resistant to viral diseases
(5) Production of nutrient rich plants. (2013)

(3) Which of the following is not a general application of recombinant DNA technology at present?
(1) Production of hormones for treating dwarfism
(2) Production of vaccines
(3) Production of virus resistant plants
(4) Introduction of genetically modified genes into human gametes
(5) Production of weedicide resistant crop plants. (2014)

(4) A DNA fragment can be inserted in to a plasmid vector if that fragment has
(1) a nucleotide sequence identical to that of the vector.
(2) been cut by the same restriction enzyme which had been used to cut the vector.
(3) originated from the same cell type as of the vector.
(4) the same length as that of the vector.
(5) at least one origin of replication (Ori). (2019-35)

Unit 7 – Molecular Biology and Recombinant DNA Technology

Molecular basis of genetics

(1)	5	(2)	2	(3)	4	(4)	3	(5)	1	(6)	1	(7)	1
(8)	5	(9)	4	(10)	3	(11)	5	(12)	1	(13)	5	(14)	3
(15)	4	(16)	2										

Contribution of chromosomes for inheritance of characters.

(1)	5	(2)	3	(3)	5

Genetic variation created by mutations.

(1)	3	(2)	3	(3)	3	(4)	5	(5)	1	(6)	3
(7)	4	(8)	4	(9)	3	(10)	4	(11)	3	(12)	2

Gene technology

(1)	4	(2)	5	(3)	3	(4)	3	(5)	4	(6)	3
(7)	2	(8)	3	(9)	4	(10)	1				

Applications of gene technology

(1)	5	(2)	2	(3)	2	(4)	all