**Molecular Basis of Inheritance**

1. **What is it that forms the basis of DNA Fingerprinting?**

(a) The relative difference in the DNA occurrence in blood, skin and saliva.

(b) The relative amount of DNA in the ridges and grooves of the fingerprints.

(c) Satellite DNA occurring as highly repeated short DNA segments.

(d) The relative proportions of purines and pyrimidines in DNA.

1. **In *E. coli*, the lac operon gets switched on when**

(a) Lactose is present and it binds to the repressor.

(b) Repressor binds to operator.

(c) RNA polymerase binds to the operator.

(d) Lactose is present and it binds to RNA polymerase.

1. **If Meselson and Stahl’s experiment is continued for four generations in bacteria, the ratio of 15N/15N : 15N/14N : 14N/14N containing DNA in the fourth generation would be**
2. 1 : 1 : 0

(b) 1 : 4 : 0

(c) 0 : 1 : 3

(d) 0 : 1 : 7

1. **Regulatory proteins are the accessory proteins that interact with RNA polymerase and affect its role in transcription. Which of the following statements is correct about regulatory protein?**

(a) They only increase expression.

(b) They only decrease expression.

(c) They interact with RNA polymerase but do not affect the expression.

(d) They can act both as activators and as repressors.

1. **DNA-dependent RNA polymerase catalyzes transcription on one strand of the DNA which is called the,**

(a) Coding strand

(b) Alpha strand

(c) Antistrand

(d) Template strand

1. **A nitrogenous base is linked to the pentose sugar through**

(a) Phosphoester linkage

(b) O-glycosidic linkage

(c) Phosphodiester linkage

(d) N-glycosidic linkage

1. **Thymine can also be designated as**

(a) 3 - Methyl uracil (b) 2 - Methyl uracil

(c) 4 - Methyl uracil (d) 5 - Methyl Uracil

1. **Which statement is true in the context of histones?**

(a) They are positively charged acidic proteins.

(b) They are positively charged amphoteric protein.

(c) They are positively charged basic proteins.

(d) None of the above

1. **Which is true about the structure of heterochromatin?**

(a) Loosely packed; Stain light

(b) Loosely packed; Stain dark

(c) Densely packed; Stain light

(d) Densely packed; Stain dark

1. **The experiment which provides unequivocal proof that DNA is genetic material and it came from the experiment of**

(a) Watson and Crick

(b) Wilkins and Franklin

(c) Hershey and Chase

(d) Avery, MacLeod and Maclyn McCarty

1. **DNA is a preferred genetic material over RNA due to one of the following reasons**

(a) Bases are arranged linearly in a single strand.

(b) Bases show less propensity of mutation.

(c) 2’ OH group in RNA is more liable.

(d) None of the above

1. **After replication, each DNA molecule has one parental and one newly synthesized strand. This scheme is referred to as**

(a) Fully conservative

(b) Mutation

(c) Crossing over

(d) None of the above

1. **In Meselson and Stahl experiment, 15N can only be differentiated on the basis of**

(a) Radioactivity

(b) Density gradient

(c) Physical observation

(d) All the above methods

1. **DNA dependent DNA polymerase catalyses polymerization in \_\_\_\_\_\_\_\_ direction only (in terms of newly synthesized strands).**

(a) 5 → 3

(b) 3′ → 5′

(c) 5′→ 3′

(d) 3 → 5

1. **The coding sequences of DNA are known as \_\_\_\_\_\_\_\_ and the intervening sequences are known as \_\_\_\_\_\_\_\_ respectively.**

(a) Exon, intron

(b) Intron, exon

(c) Cistron, exon

(d) Exon, cistron

1. **ρ-factor in the process of transcription in bacteria is also known as**

(a) Initiation factor

(b) Elongation factor

(c) Termination factor

(d) Vital factor

1. **In bacteria, in context of mRNA, which of the following is not true?**

(a) Transcription and translation takes place in different compartment.

(b) Post-transcriptional modifications are required like splicing.

(c) Translation occurs only after transcription.

(d) All the above

1. **In eukaryotes, RNA polymerase III is responsible for synthesis of**

(a) 28S RNA, 18S RNA and 5.8S RNA

(b) tRNA, hnRNA, rRNA

(c) tRNA, 5sRNA, snRNA

(d) hnRNA, tRNA, rRNA

1. **The intervening sequences in the primary transcript of mRNA are removed by**
2. Recombination
3. Linkage
4. Capping
5. Splicing
6. **Humans requires \_\_\_\_\_\_\_\_ codons to synthesize 20 amino acids.**

(a) 64 codons

(b) 61 codons

(c) 62 codons

(d) 60 codons

1. **\_\_\_\_\_\_\_\_ cell-free system for protein synthesis finally helped the genetic code to be deciphered.**

(a) George Gamow’s

(b) Marshall Nirenberg’s

(c) Har Gobind Khorana’s

(d) J. D. Watson’s

1. **Some amino acids are coded by more than one codon. Hence the genetic code exhibits**

(a) Specificity

(b) Selectivity

(c) Degeneracy

(d) Regenerancy

1. **In Eukaryotes, which of the following mechanisms is not correct in terms of regulation of gene expression?**

(a) Transcription

(b) Splicing

(c) Transport of mRNA from cytoplasm to nucleus

(d) Translation

1. **β-galactosidase is synthesized by *E. coli* to catalyze hydrolysis of \_\_\_\_\_\_\_\_ into** \_\_\_\_\_\_\_\_ and glucose.

(a) Galactose, lactose

(b) Galactose, glucose

(c) Lactose, galactose

(d) Maltose, galactose

1. **A polycistronic structural gene is regulated by a common promoter and regulator gene in bacteria and is commonly termed as**
2. Codon
3. Operon
4. Genetic code
5. None of these
6. **Which of the following is NOT a salient feature of the Human Genome Project?**

(a) The human genome contains 3614.7 million nucleotide bases.

(b) Less than 2 per cent genome codes for proteins.

(c) Over 50 per cent of the genes discovered are yet to be investigated regarding their

functions.

(d) Chromosome Y has the fewest of genes.

1. **Under HGP, the scientists have located 1.4 million locations where difference in single DNA base exists. It is termed as**

(a) Microsatellites

(b) Single nucleotide polymorphism

(c) Polymorphonuclear regions

(d) Sequential nucleotide polymorphism

1. **If one strand of DNA has the nitrogenous base sequence as ATCTG, then what would be the complementary RNA strand sequence?**

(a) TTAGU (b) UAGAC

(c) AACTG (d) ATCGU

1. **Which one of the following is wrongly matched?**

(a) Transcription – Writing information from DNA to tRNA.

(b) Translation – Using information in mRNA to make protein.

(c) Repressor protein – Binds to operator to stop enzyme synthesis.

(d) Operon – Structural genes, operator and promoter.

1. **The commonly used vectors for human genome sequencing are**

(a) T-DNA

(b) BAC and YAC

(c) Expression vectors

(d) T/Cloning vectors

|  |  |
| --- | --- |
| 1 | c |
| 2 | a |
| 3 | d |
| 4 | d |
| 5 | a |
| 6 | d |
| 7 | d |
| 8 | c |
| 9 | d |
| 10 | c |
| 11 | c |
| 12 | d |
| 13 | b |
| 14 | c |
| 15 | a |
| 16 | c |
| 17 | d |
| 18 | c |
| 19 | d |
| 20 | b |
| 21 | b |
| 22 | c |
| 23 | c |
| 24 | c |
| 25 | b |
| 26 | a |
| 27 | b |
| 28 | b |
| 29 | a |
| 30 | b |