**ST MARY’S UNIVERSITY**

**TWICKENHAM, LONDON**

MSc Degree Examination students registered for

Level **SEVEN**

Title**: Principles of Molecular Biology**

Code: **NGE7001**

Semester: **Resit**

Date: **July 2019**

Time:

TIME ALLOWED: **THREE** HOURS

**Section A: Answer all questions in this section; there is one correct answer for each question (2 marks each).**

PLEASE PROVIDE YOUR ANSWERS AS A LIST IN YOUR ANSWER BOOKLET, NOT ON THIS EXAM PAPER.

1. Copy number variation is a form of
2. Sequence variation
3. Transcription variation
4. Epigenetic variation
5. None of the above
6. Which is the correct order of events in gene regulation via PPARs?
7. Ligand attachment, RXR-PPAR heterodimer formation, chaperone involvement, co-regulator attachment
8. Ligand attachment, chaperone involvement, RXR-PPAR heterodimer formation, co-regulator attachment
9. Ligand attachment, chaperone involvement, co-regulator attachment RXR-PPAR heterodimer formation,
10. None of the above
11. DNA damage that occurs in newly synthesised DNA is mostly repaired by:
12. Nucleotide repair
13. Non-homologous end joining
14. Mismatch repair
15. Base excision repair
16. Which of the following is not a type of RNA?
17. Ribosomal RNA (rRNA)
18. Messenger RNA (mRNA)
19. Transcription RNA (tRNA)
20. Small nuclear RNA (snRNA)
21. Which of the following is not a type of post-translational modification?
22. Copy number variation
23. Folding (secondary and tertiary structures)
24. Carbohydrate or lipid addition
25. Peptide activation
26. The “Central Dogma” of protein expression refers to the:
27. Activation of a gene, which stimulates transcription and formation of mRNA
28. Transportation of mRNA to the cytoplasm
29. Translation of RNA to a specific protein
30. All of the above
31. Which of the following is not a major outcome of NFkB activation?
32. Unregulated mutation
33. Increased inflammation
34. Increased cell proliferation
35. Disturbed immunity
36. PPARs stimulate gene transcription by binding to specific DNA sequences called:
37. PPAR activation sequence
38. PPAR activation element
39. PPAR binding element
40. None of the above
41. Define the type of Single Nucleotide Polymorphism in the following diagram:



1. Missense
2. Nonsense
3. Frameshift
4. None of the above
5. Which of the following statements is correct?
6. DNA Polymerase III always adds nucleotides to the C5 hydroxyl group
7. DNA Polymerase III always adds nucleotides to the C3 hydroxyl group
8. DNA Polymerase III always moves in a 3’-5’ direction in the new strand
9. DNA Polymerase III always moves in a 5’-3’ direction in the template strand
10. One of the differences between DNA damage and mutations is that:
11. DNA damage is replicated when cells replicate
12. Mutations are physical abnormalities in the DNA sequence
13. Both a and b are correct
14. Neither a nor b are correct
15. Which of the following statements is correct?
16. Chromatin is larger than nucleosomes
17. Nucleosomes are larger than condensed chromatin loops
18. Chromatin loops are smaller than nucleosomes
19. None of the above
20. A spliceosome:
21. has three binding sites (E, P, A)
22. is responsible for the translation of codon into amino acids
23. connects exons together
24. none of the above
25. A centimorgan is defined as:
26. the distance between chromosome positions for which the expected average number of intervening chromosomal crossovers in 100 generations is 0.01
27. It is defined as the distance between chromosome positions for which the expected average number of intervening gene crossovers in a single generation is 0.01
28. the distance between chromosome positions for which the expected average number of intervening chromosomal crossovers in a single generation is 0.01
29. none of the above
30. Translation to protein does not include:
31. Initiation
32. Elongation
33. Interpretation
34. Termination

**Section B:** **Answer TWO questions from this section (35 marks each)**

1. Provide an in-depth description of the process of translation **(30 marks).** In your answer, include possible post-translational modifications **(5 marks).**
2. Provide an overview of DNA damage and repair mechanisms. In your answer include details for each mechanism **(25 marks),** and differences between DNA damage and mutations **(10 marks**).
3. Provide a detailed overview of DNA replication **(30 marks)**. In your answer, include the differences between DNA replication and DNA transcription **(5 marks).**

**END OF EXAMINATION**