ST MARY’S UNIVERSITY

TWICKENHAM, LONDON

MSc Degree Examination students registered for

Level **SEVEN**

Title**: Principles of Molecular Biology**

Code: **NGE7001**

Semester: **ONE**

Date: **7th January, 2020**

Time: **1:30 pm – 3:30 pm**

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 the booklet, not on this exam paper.**

1. DNA damage that occurs in newly synthesised DNA is mostly repaired by:
2. Nucleotide repair
3. Non-homologous end joining
4. Mismatch repair
5. Base excision repair
6. Which of the following statements is correct?
7. DNA Polymerase III always adds nucleotides to the C5 hydroxyl group
8. DNA Polymerase III always adds nucleotides to the C3 hydroxyl group
9. DNA Polymerase III always moves in a 3’-5’ direction in the new strand
10. DNA Polymerase III always moves in a 5’-3’ direction in the template strand
11. Which of the following is not a major outcome of NFkB activation?
12. Unregulated mutation
13. Increased inflammation
14. Increased cell proliferation
15. Disturbed immunity
16. Name the two main transcription factors that are involved in the regulation of lipid metabolism due to intake of polyunsaturated fatty acids:
17. PPAR and NFkB
18. NFkB and SREBP
19. PPAR and SREBP
20. None of the above
21. PPARs stimulate gene transcription by binding to specific DNA sequences called:
22. PPAR activation sequence
23. PPAR activation element
24. PPAR binding element
25. None of the above
26. A spliceosome:
27. has three binding sites (E, P, A)
28. is responsible for the translation of codon into amino acids
29. connects exons together
30. none of the above
31. A centimorgan is defined as:
32. the distance between chromosome positions for which the expected average number of intervening chromosomal crossovers in 100 generations is 0.01
33. 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
34. the distance between chromosome positions for which the expected average number of intervening chromosomal crossovers in a single generation is 0.01
35. none of the above
36. Which of the following is not a type of post-translational modification:
37. Folding (secondary and tertiary structures)
38. Carbohydrate or lipid addition
39. Polyadenylation (poly-A tail)
40. Peptide activation
41. Telomeres are susceptible to oxidative damage because they are rich in:
42. Guanine
43. Thymine
44. Cytosine
45. Adenosine
46. Copy number variations can be:
47. Inherited only
48. De novo only
49. Both a and b
50. Neither a nor b
51. Recombination of chromosomal regions depends primarily on:
52. Inheritance patterns of chromosomal regions
53. Copy number variation (CNV) of chromosomal regions
54. Physical distance of chromosomal regions
55. All of the above
56. Although it is not possible to count accurately, it is estimated that the number of SNPs in a human genome is approximately:

1. Three thousand
2. Three hundred thousand
3. Three million
4. Three billion
5. Small nuclear ribonucleoproteins:
6. Consist of small nuclear RNA and ribosomes
7. Re-join introns and excise exons
8. Both a and b
9. Neither a nor b
10. In NFkB activation, after IkBa is phosphorylated by IkB kinase it is then degraded by:
11. Proteasomes
12. Lysosomes
13. Autosomes
14. All of the above
15. Which of the following is not a major outcome of NFkB activation?
16. Increased inflammation
17. Decreased DNA oxidation
18. Increased cell proliferation
19. Disturbed immunity

Section B:

Answer **TWO** questions from this section (35 marks each).

1. Provide a detailed overview of the structure of telomeres (10 marks). Describe thoroughly how telomeres are associated with ageing and disease; include appropriate scientific literature in your answer (25 marks).
2. In relation to gene expression, describe with details post-transcriptional modifications (10 marks) and the process of replication (25 marks).
3. Provide a detailed description of DNA translation (35 marks).

**END OF EXAMINATION**