

1. Paul Berg, 2. Griffith, 3. MacLeod & McCarty, 4. Cohen & Boyer, 5. Hershey & Chase, 6. F. Sanger, 7. D. Baltimore, 8. M. Nirenberg, 9. Shine & Dalgarno, 10. Sung-Hou Kim, 11. Arthur Kornberg, 12. Roger Kornberg, 13. Craig Venter, 14. Francis Collins, 15. Bill Clinton, 16. Barbara McClintock, 17. *Bacillus subtilis*, 18. *Streptococcus pneumoniae*, 19. *Hemophilus influenzae*, 20. *Escherichia coli*, 21. *Mycoplasma genitalium*, 22. *S. cerevisiae*
 23. riboswitches, 24. catabolite repression, 25. attenuation, 26. Lac Operon, 27. Trp Operon, 28. Ara Operon, 29. sigma factor, 30. small regulatory RNA, 31. CAP, 32. quorum sensing, 33. sporulation, 34. cell cycle, 35. two component signal transduction, 36. phosphorelay systems

*** Using above list, find the most appropriate keyword(s) in following questions (multiple choices are possible) (Questions 1~16)**

| ex) proposed transformation principle ANSWER: 2 (Griffth) | ANSWER |
|--|--------|
| 1 first determination of 3D structure of tRNA | |
| 2 blender experiment using bacteriophage (DNA as a genetic material) | |
| 3 proposed that transformation principle is DNA | |
| 4 characterization of DNA polymerase | |
| 5 the first sequenced bacterial genome in 1995 | |
| 6 characterization of RNA polymerase | |
| 7 discovery of transposon | |
| 8 making first recombinant DNA | |
| 9 inventing dideoxytermination in DNA sequencing | |
| 10 first usage of plasmid vector | |
| 11 identification genetic codes | |
| 12 Transcriptional regulation | |
| 13 Translational regulation | |
| 14 Global regulatory system | |
| 15 Positive control | |
| 16 Negative control | |

***True or False (Questions 17~38)**

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| 17 Because DNA synthesis occurs in only 1 direction, one strand of DNA is synthesized continuously and the other is synthesized in a series of fragments. | |
| 18 All genes in <i>E. coli</i> require posttranscriptional modification. | |
| 19 Archaea have the same characteristics of transcription as bacteria. | |
| 20 DNA polymerase I also functions in the removal of mismatched bases as soon as they are added before the next base is incorporated. | |
| 21 Intercalating agents distort DNA so that missense mutations normally occur. | |
| 22 Base analogs are structurally similar to the bases found in DNA but when incorporated into a growing DNA molecule, they will pair with the wrong base at the next replication. | |
| 23 Transposable elements are unable to cause mutations in the host cell. | |
| 24 The simplest transposable element is an insertion sequence that contains inverted repeat sequences at each end and a gene encoding transposase. | |
| 25 In Hfr conjugation, chromosomal genes are transferred in addition to the F factor. | |

*** from Watson & Crick's Nature paper**

- 50 Following is quoted from Nature paper written by Jim Watson & Francis Crick in 1953.
Fill the blank.
..."There is a residue on each chain every ()Å, in the z-direction. We have assumed an angle of () between adjacent residues in the same chain, so that the structure repeats after () residues on each chain, that is, after 34Å. The distance of a phosphorus atom from the fibre axis is 10Å"....
- 51 What is the central dogma of molecular biology?
- 52 What is the biological role of restriction enzymes in the cell?
- 53 What are three general correction mechanisms for mutations in the living organisms?
- 54 Bacteria growing asexually have a limited genetic variation which may not be enough to adapt to the environment. To overcome this disadvantage, Bacteria can exchange their genetic materials by horizontal gene transfer (HGT). What are three general mechanisms for this HGT?
- 55 What is the definition of white, green and red biotechnology?
- 56 From a given sequence, identify all possible reading frames.
5'-AACGAGTATTCGAGGGGC-3' (template strand)
- 57 You have a restriction enzyme recognizing a specific site of 6 bases. When you use this enzyme to digest the genome of *E. coli* (3.8Mbps), how many fragment can be made theoretically if A,T,G,C are found equal in *E. coli* genomic sequence?

*수고하셨습니다. Good Luck!