KATHMANDU UNIVERSITY
End Semester Examination
09- January 2024

Marks Scored:

Level : B.Tech.
Year : III

Course : BIOT 302
Semester : I

Exam Roll No. :
Registration No.:

Time: 30 mins.

F. M. : 20
Date :

SECTION "A"
[20 Q × 1 = 20 marks]

Choose and encircle the most appropriate alternative from each set of choices.

1. Which of the following is **NOT** TRUE about VDJ recombination?
   a. Non Homologous DNA repair system participates
   b. Rag1 and Rag2 jointly form transposon like system
   c. Recombination takes place in both B and T cells
   d. Recombination takes place between two 7 mer and 9 mer recombination signal sequences

2. Which of the following is a serine family of recombinase?
   a. Bacteriophase lamda integrase at attB sites
   b. Salmonella Hin invertase with hix sites
   c. Phage P1 cre with lox sites
   d. Yeast FLP recombinase with frt sites

3. What is the correct order of transcription?
   a. Closed complex to open complex to promoter escape to elongation
   b. Open complex to promoter escape to elongation to closed complex
   c. Open complex to closed complex to elongation to promoter escape
   d. Open complex to closed complex to promoter escape to elongation

4. What is the difference between torpedo and allosteric model?
   a. Exonuclease travels and displaces polymerase or allosterically modifies polymerase
   b. Endonuclease travels and displaces polymerase or modifies polymerase
   c. Exonuclease hinders recruitment of polymerase or allosterically modifies it
   d. Endonuclease hinders recruitment of polymerase or allosterically modifies it

5. From 5' prime to 3' of the unspliced RNA transcript we find the following
   a. 5'splice site followed by 3'splice site followed by branch point followed by poly pyrimidine tract
   b. 5's splice site followed by branch point followed by 3'splice site followed by poly pyrimidine tract
   c. 5'splice site followed by poly pyrimidine tract followed by branch point followed by 3'splice site
   d. 5'splice site followed by branch point followed by poly pyrimidine followed by 3'splice site

6. T-ag and t-ag of SV40 virus
   a. Are RNAs transcribed from two different genes
   b. Are differentially capped forms of mRNA
   c. Are alternative isoforms of the same mRNA
   d. Are not mutually exclusively formed

7. mRNA transport
   a. is often followed by mRNA splicing
   b. is a passive process that does not require energy
   c. mostly takes place from cytoplasm to nucleus
   d. does not require GTPase protein like Ran

8. 5' carbon of uracil interacts with ribose sugar in
   a. uridine which is the conventional ribonucleoside
   b. dihydrouridine which is a modified version of uridine
   c. pseudouridine which is a modified version of uridine
   d. inosine which is also a modified version of uridine

9. In peptidyl transferase reaction
   a. NH2 group of the peptidyl tRNA attacks the ester bond of amino acyl tRNA
   b. NH2 group of amino acyl tRNA attacks the ester bond of peptidyl tRNA
   c. COOH group of peptidyl tRNA attacks the NH2 group of amino acyl tRNA
   d. COOH group of the amino acyl tRNA attacks the NH2 group of peptidyl tRNA

10. GCN4
   a. Is a translational regulator of galactose utilizing genes
   b. Is regulated at the level of transcription at different concentration of amino acids
   c. Is translated from its own ORF that lies downstream of uORF1-4
   d. Is translated from uORF 1-4

11. Oskar
   a. mRNA is uniformly distributed along the anterior to posterior axis
   b. mRNA translation is repressed by 4E-BP called Cup
   c. mRNA contains 5'UTR sequence that binds to Bruno
   d. mRNA is regulated by Cup binding to eIF4G

12. Suppose a gene is frame shift mutated in the middle. This causes premature stop codon and terminates the production of the gene little bit beyond the midway. What is a good suppressor of this mutation?
   a. Another frame shift downstream
   b. Substitution of the stop codon to another codon
   c. Substitution mutations upstream of the frame shift
   d. tRNA suppressor mutations

13. What is the relationship between CAP, glucose and cAMP?
   a. High glucose makes more cAMP with activates CAP
   b. Low glucose makes more cAMP with inactivates CAP
   c. Low glucose makes more cAMP with activates CAP
   d. High allolactose makes more cAMP which activates CAP

14. Controlling of the araBAD operon is an example of:
   a. One activator and one repressor affecting transcription
   b. One activator modifying the shape of the DNA
   c. Two repressors working together
   d. Two activators working together

15. Which of the following describes retroregulation?
    a. Two gene products are formed one of which is degraded.
    b. Two gene produced reciprocally regulate each other.
    c. Two gene products activate a third gene.
    d. Two gene products are repressed by a third gene product.

16. What about promoter, enhancer and operator is **TRUE**?
    a. Enhancers and operators lie within promoters
    b. Enhancers and promoters lie within operators
    c. Enhancers and operators regulate promoters
    d. Enhancers and promoters regulate operators

17. Which of the following is **NOT** a property of an insulator?
    a. It blocks signal from enhancer to a promoter
    b. It prevents the spread of transcriptional silencing
    c. It can be found on 5' or 3' side of the promoter
    d. Its methylation is carried out by maintenance methylase

18. What is the difference between dicer and slicer?
    a. Dicer converts premiRNA to miRNA, slicer cleaves mRNA/guide RNA hybrid
    b. Slicer converts premiRNA to miRNA, dicer cleaves mRNA/guide RNA hybrid
    c. Dicer converts premiRNA to miRNA, slicer converts primiRNA to premiRNA
    d. Slicer converts premiRNA to miRNA, dicer converts primiRNA to premiRNA

19. Riboswitches
    a. Use proteins to regulate mRNA expression
    b. Use small metabolites to regulate mRNA expression and translation
    c. Are structures in DNA that are regulated
    d. Are structures in proteins that are regulated

20. In a given E. coli strain both YFP and GFP are expressed using the same promoter. All cells fluctuate between green, yellow and lime at the same time. What is **TRUE**?
    a. There is no intrinsic or extrinsic noise
    b. There is both intrinsic and extrinsic noise
    c. There is no intrinsic noise but there is extrinsic noise
    d. There is intrinsic noise but no extrinsic noise