

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI –600 086
(For candidates admitted from the academic year 2010 - 11)

SUBJECT CODE: BI/PC/MB24

M. Sc. DEGREE EXAMINATION, APRIL 2011

BIOINFORMATICS
SECOND SEMESTER

COURSE : CORE

PAPER : MOLECULAR BIOLOGY

TIME : 3 HOURS

MAX. MARKS: 100

SECTION – A

ANSWER ALL QUESTIONS

(20 X 1=20)

1. A DNA molecule has the sequence 5'ATCGTAC3'. This DNA molecule could form a double helix with the DNA molecule:
a. 5'ATCGTAC3' b. 3'ATCGTAC5' c. 3'TAGCATG5' d. 5'TAGCATG3'
2. What is added to the 3' end of the many eukaryotic mRNAs after transcription?
a. introns b. a poly tail c. a cap structure consisting of a modified G nucleotide
d. exons
3. The following activity is termed as DNA polymerase proof reading activity
a. 5' - 3' polymerase activity b. 3' -5' polymerase activity
c. 5' - 3' exonuclease activity d. 3' -5' exonuclease activity
4. T_m of the DNA depend on
a. length of DNA b. % of GC content
c. Presence of cations d. presence of anions
5. Which eukaryotic RNA polymerase transcribes tRNA genes?
a. RNA polymerase I b. RNA polymerase II
c. RNA polymerase III d. DNA polymerase I
6. The primary RNA transcript of the chicken ovalbumin gene is 7700 nucleotides long, but the mature mRNA that is translated on the ribosome is 1872 nucleotides long. This size difference occurs primarily as a result of:
a. capping b. cleavage of polycistronic mRNA c. removal of poly A tails
d. splicing
7. Catalytic activity of RNA in spliceosome is through
a. U_1 and U_5 b. intron branch point U_2 and U_6
c. intron branch point U_4 and U_6 d. U_2 and U_4
8. Which of the following genomes is richest in interspersed repeat sequences?
a. *Drosophila* genome b. Human genome
c. Maize genome d. *Saccharomyces* genome

9. The reverse transcriptase mechanism present in the transposable elements (TEs)
- a. Class I TEs
 - b. Class II TEs
 - c. Class III TEs
 - d. Both class II and class III TEs
10. Most sequences in the human genome belong to
- a. Genes
 - b. Pseudogenes
 - c. Gene fragments
 - d. Interspersed repeats
11. Gene density can be high
- a. in telomeres
 - b. anywhere on the chromosomes
 - c. in centromeres
 - d. in metaphase chromosomes
12. Which microorganism's genome was first sequenced?
- a. Oryza
 - b. Haemophilus
 - c. Human
 - d. fruit fly
13. Who discovered the EST technique?
- a. Craig Venter
 - b. Watson
 - c. Ian Wilmut
 - d. none of the above
14. The characteristic feature of mitochondrial genome is
- a. intron less DNA
 - b. Repetitive DNA
 - c. Polycistronic RNA
 - d. Satellite DNA
15. The stop codon of mitochondrial translation is
- a. AGA
 - b. TGA
 - c. TAA
 - d. AAA
16. Promoters for eukaryotic mRNA synthesis:
- a. are more complex than prokaryotic promoters
 - b. can require binding of multiple transcription factors to form a transcription complex
 - c. have specific DNA sequences such as the "TATA" box that are recognized by proteins
 - d. all of these
17. Why is there no duplication of the DNA between meiosis I and meiosis II?
- a. to produce genetically identical daughter cells
 - b. to increase genetic variability
 - c. to reduce the chromosome number to haploid in the resulting daughter cells
 - d. the chromosomes duplicate twice during meiosis I
18. During meiosis, the chromatids become daughter chromosomes during which stage?
- a. Prophase I
 - b. Anaphase II
 - c. Metaphase II
 - d. Telophase I
19. The characteristic features of onco genes
- a. induce the cancer
 - b. suppress the tumour suppressor genes
 - b. all the above
 - d. none of the above
20. Role of synoptosomal complex is
- a. formation of centrioles
 - b. help to exchange of chromosomes
 - c. to form the daughter nuclei
 - d. to form the cytoplasm

SECTION – B

ANSWER ANY FOUR QUESTIONS. EACH ANSWER SHOULD NOT EXCEED 500 WORDS. ALL ANSWERS CARRY EQUAL MARKS. DRAW DIAGRAMS WHEREVER NECESSARY (4 X 10 = 40)

21. How do the RNA polymerases of prokaryotes and Eukaryotes differ?
22. What is hairpin structure? How it is formed?
23. What are the translation factors involved in the eukaryotic translation mechanism?
24. Explain the salient features of CpG islands
25. Briefly explain the genome organization of chloroplast.
26. Differentiate between normal cell, benign tumour cell and metastatic tumour cell.
27. Draw and describe the cytological events of Prophase I of Meiosis cell division.

SECTION – C

ANSWER ANY TWO QUESTIONS. EACH ANSWER SHOULD NOT EXCEED 1200 WORDS. ALL ANSWERS CARRY EQUAL MARKS. DRAW DIAGRAMS WHEREVER NECESSARY (2 X 20 = 40)

28. Describe in detail about the post transcriptional processing of mRNA.
29. Explain in briefly about the Eukaryotic genome organization
30. Describe the characteristic of mitochondrial DNA and describe transcription in mitochondria.
31. What do you mean by mitotic check point? What are the probable checkpoints in mitotic cycle? How these check points are regulated by molecular mechanism.
