KUMARAGURU
college of technology
character is life

Register Number: …….

B.TECH DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Fourth Semester

BIOTECHNOLOGY

U13BTT403: Molecular Biology

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Synthesis of DNA in *E. coli* is the function of_____.
   a) DNA polymerase I b) Ligase
   c) Primase d) DNA Polymerase III
2. In nucleic acids, the phosphate group is attached to the _____ carbon of the sugar.
3. RNA contains which bases?
   a) Adenine, thymine, guanine, cytosine, uracil b) Adenine, thymine, guanine, cytosine
   c) Thymine, guanine, cytosine, uracil d) Adenine, guanine, cytosine, uracil
4. Polyadenylation of mRNA in eukaryotes in carried out ……..
5. Which of the following molecules contain a codon?
   a) Messenger RNA b) Transfer RNA
   c) Ribosomal RNA d) Small nuclear RNA
6. In prokaryotes, the ribosomal binding site on mRNA is called as …….
7. What is the best explanation for the stem loop arrangement seen in the absence of translation of the trpL gene?
   a) Region 4 binds to region 3 before region 2 has been transcribed. b) Region 1 is unable to bind to region 3 or 4.
   c) The 1:2 stem loop has more base pairs than a 2:3 stem loop. d) The ribosome prevents region 1 from binding to any other region.
8. Transcription and translation of a gene composed of 30 nucleotides would form a protein containing no more than ……. amino acids.
9. Due to which of the following DNA repair mechanisms, one is able to distinguish

newly synthesized DNA strands from older one?

a) New strands do not contain cytosine bases
b) New strands are lower in molecular size
c) Old strands are methylated while new strands are not
d) New strands are methylated while old strands are not

10. The mutation which will not affect the length of a protein is ……..

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. Contrast generalized transduction with that of specialized transduction.
12. Define a Cot value.
13. Outline the importance of the promoters in eukaryotic genes.
14. What are ribozymes?
15. State the significance of polycistronic mRNA.
16. Write the salient features of Wobble hypothesis.
17. Distinguish lytic and lysogenic cycles of lambda phage.
18. What is attenuation in gene regulation?
19. Compare non-sense mutation and mis-sense mutation .
20. What is effect of frame-shift mutation at protein synthesis level?

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. Explain the steps in replication of eukaryotic chromosomes and add a note on synthesis of telomeres (10+4)

22. a) i) Describe the various types of RNA polymerases and their role in transcription in eukaryotes. (7)

ii) Discuss the salient features of transfer RNA with suitable illustration. (7)

(OR)

b) i) Discuss the steps in prokaryotic transcription process. (7)

ii) Describe RNA interference (RNAi) and add note on its role in gene silencing in eukaryotes (7)

23. a) i) Discuss the salient features of genetic code (7)

ii) Explain any five post-translational modifications. (7)

(OR)

b) i) Describe mechanism of protein synthesis in prokaryotes (7)

ii) Discuss any four protein inhibitors and their mode of action (7)

24. a) Demonstrate the tryptophan synthesis in living cells in the high level and low levels of tryptophan.

(OR)

b) i) Examine the status of Lac operon in presence and absence of lactose in *E.coli.* (7)

ii) Explain various stages of lambda phage gene regulation in lytic cycle. (7)

25. a) i) Describe transition and transversion mutations with suitable examples. (7)

ii) Discuss the direct reversal of DNA repair mechanism with suitable illustration. (7)

(OR)

b) i) Explain any two physical mutagens and their mode of action (7)

ii) How mutation at DNA level is is repaired by excision repair mechanism? (7)

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