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SARDAR PATEL UNIVERSITY

M.Sc. Biotechnology Ist Semester Examination

Thursday, November 29, 2012

10:30 AM to 1:30 PM

PS01CBIT01 Molecular Biology

Max. Marks: 70

Note: 1. Attempt all questions
2. Figures to the right indicate marks

Q1 Choose the most appropriate answer. **(8 x 01)**

(i) In a nucleotide the nitrogenous base is attached to the sugar through a
(a) hydrogen bond (b) glycosidic linkage
(c) non-covalent bond (d) ionic bond

(ii) The expression of following genes is essential for the lysogenic path of lambda phage when it infect *E. coli*.
(a) cI, cII, cIII (b) N, cro
(c) att, xis, int (d) P, O

(iii) Promoter elements in prokaryotes usually possess consensus sequences at
(a) –10 and –35 (b) –10 and –25
(c) –25 and –60 (d) –25 and –75

(iv) Molecular chaperons are class of proteins that facilitate
(a) the proper folding of newly synthesized proteins
(b) unfolding of newly synthesized proteins
(c) degradation of newly synthesized proteins
(d) targeting of newly synthesized proteins

(v) The protein in eukaryotes which are subjected to degradation undergoes
(a) phosphorylation (b) carboxylation
(c) ubiquitinylation (d) methylation

(vi) Polysome is a complex of
(a) DNA and protein (b) tRNA and ribosomes
(c) RNA and protein (d) mRNA and ribosomes

(vii) Which of the following statements about histones is **not true**?
(a) histones are very similar between species
(b) histones have many basic amino acids
(c) histones are rich in lysine and arginine
(d) each histone has one single gene that codes for it

(viii) Alternative splicing means that
(a) the same gene can code for several different proteins
(b) several different genes can code for the same protein
(c) gene expression can be regulated at the level of transcription
(d) pieces of DNA can move around within the genome

Q2 Attempt any **SEVEN** of the following **(7 x 02)**

(a) Explain the term: global regulatory response.
(b) What is second genetic code?
(c) What is RNA editing?
(d) Explain the term: super helical density of DNA.
(e) Explain the terms: (a) propeller twist, (b) base pair tilt.
(f) Define Tm of DNA.
(g) Explain 'snurps'.
(h) Write the steps involved in 43S pre-initiation complex formation in eukaryotic system.
(i) What is histone fold?

Cont.

Q3	(A)	Explain how exogenous glucose inhibits both cAMP synthesis and uptake of other sugars.	**(06)**
	(B)	Explain in brief the regulation of ribosome assembly.	**(06)**
		OR	
	(B)	Write the general features of genetic code and describe the experiment used to decipher the genetic code.	**(06)**
Q4	(A)	Explain the molecular mechanism of DNA synthesis catalyzed by DNA polymerase.	**(06)**
	(B)	Describe the denaturation curve of DNA and discuss the significance of Tm.	**(06)**
		OR	
	(B)	Explain how each replicon is replicated only once per cell division cycle in eukaryotes.	**(06)**
Q5	(A)	Describe the process of initiation of transcription in eukaryotic system	**(06)**
	(B)	Write notes on the following.	**(2 x 03)**
	(i)	Structural motif in controlling gene expression	
	(ii)	DNA foot printing.	
		OR	
	(B)	Describe in detail the elongation cycle of translation giving role of ribosome and soluble factors.	**(06)**
Q6	(A)	Write a note on structural features of A, B and Z DNA. Brifely describe various chemical bonds which stabilize formation of DNA.	**(06)**
	(B)	Explain the molecular mechanism of activity of topoisomerases.	**(06)**
		OR	
	(B)	What is end replication problem in eukaryotic cell? Give the molecular details how cell solve it.	**(06)**

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