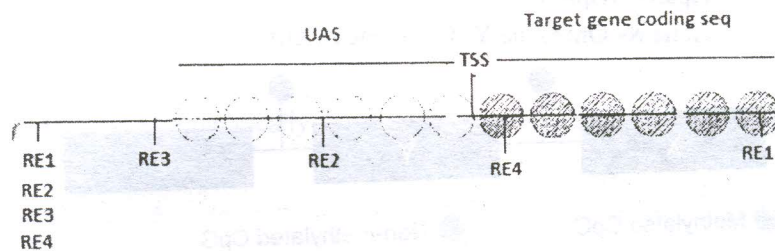


2015

**BIOCHEMISTRY****Paper – BCT – 304****( Molecular Biology – II )****Full Marks – 25***The figures in the margin indicate full marks**Candidates are required to give their answers in their own words as far as practicable*

1.



- (a) How would you verify this nucleosome map in the UAS of your target gene? How would your final gel look like? 2+1½
- (b) How would you assay SWI/SNF mediated nucleosome sliding? 2
- (c) Give an example where nucleosomes are permissive for transcription. 1

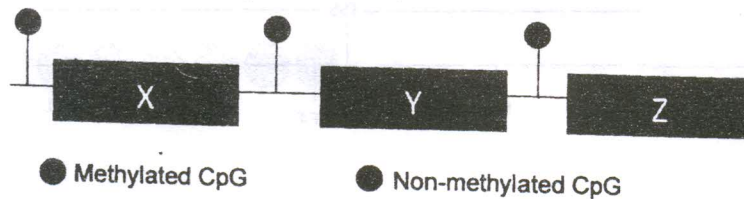
*Or*

2. (a) How would you prove that abundance of H4Ac is highest in +/- 500 bP of TSS of your target gene? 3
- (b) What is a 10 bp ladder? 2
- (c) Compare Solenoid and Zigzag model of 30 nm fibre. 1½
3. (a) What are histone variants? Name a histone variant involved in (i) DNA damage pathway; (ii) transcription regulation. Name the centromeric variant of histone H3 and explain how it regulates chromatin structure. 3½
- (b) You have subjected the following chromatin template to restriction endonuclease digestion with HpaII or MspI or both. HpaII cannot cleave Methylated DNA sequence; MspI cleaves Methylated DNA sequence. Number

[Turn Over]

of fragments expected upon each enzyme digestion or a combination of both the enzymes and the transcription status of each gene under normal condition will be :

- (i) HpaII- 3  
MspI- 3  
HpaII+ MspI-2  
Gene X- Off; Gene Y- Off; Gene Z- On
- (ii) HpaII- 2  
MspI- 2  
HpaII+ MspI- 3  
Gene X- Off; Gene Y- Off; Gene Z- On
- (iii) HpaII- 2  
MspI- 2  
HpaII+ MspI- 3  
Gene X- On; Gene Y- On; Gene Z- Off

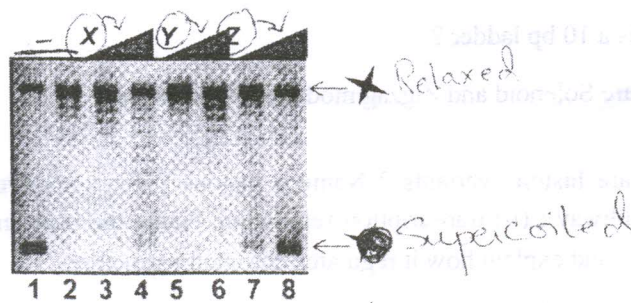


3

Or

4. (a) What are histone Chaperones ? Apart from histone Chaperones what other factor is critical for a proper chromatin assembly ? Name a replication dependent and independent histone chaperone. 1+1+1

(b) A wild type and two mutant histone chaperone proteins (X, Y, Z) are checked for their activity. A mutant show partially compromised activity, while the other show greater loss of function as compared to wild type. Can you suggest which one is wild type and the two mutants ?



3½

5. (a) Mention the name of major core and common submit of eukaryotic RNA polymerase.

(b) TBP helps RNA polymerase to recognize TATA box — how it acts when there is no TATA in a promoter ?

(c) What are the function of TF II H and TF II B ?

(d) Mention the name and role of one elongation factor is eukaryotic transcription.

1+1+2+1

*Or*

6. (a) Which factor stimulates proofreading of transcripts during eukaryotic transcription ?

(b) Describe the major features of class I and class II promoter element.

(c) Describe the process of “repressor-directed histone deacetylation”. 1+2+2

7. (a) Show diagrammatically the processing of pre-rRNA and ribosomal assembly in vertebrates. 2

(b) Mention the role of RnaseP AND RnaseD in tRNA processing. 1

(c) How 7-methylguanosine residue is formed at the 5'terminal of mRNA ? 2

*Or*

8. (a) Protein diversity can be generated at the level of mRNA processing by : 1

(i) Alternative splicing

(ii) RNA interference

(iii) Adding a cap at the 5' end and a poly (A) tail at the 3' end

(iv) Splicing

(v) RNA degradation.

(b) Discuss in brief the different pathways by which mRNA can be degraded. 2

(c) What is pseudoexons ? How is it involved in diseases state ? 2

For Neatness — 2