Initiation of Eukaryotic Gene Transcription (Worksheet)

FILL IN THE BLANKS

1. The “on switch” controlling gene expression in eukaryotic cells is chemical modification of __________ and _________ of chromatin.

2. Heterochromatin in transcriptionally _________ (active or inactive) and euchromatin is transcriptionally _________ (active or inactive).

3. Conformational changes of DNA and associated histones turn heterochromatin into euchromatin. DNA in active euchromatin is _________ (methylated/unmethylated) and histones in heterochromatin are _________ (acetylated/unacetylated).

4. Fine-tuning of gene expression starts with transcription control and it depends on the presence of DNA control sequence elements to which protein factors including RNA polymerase can bind.

Use the following animation and the lecture PowerPoint and your book to understand the process and answer the question below about initiation of transcription in eukaryotes.

Transcription and complex enhancers
http://highered.mcgraw-hill.com/sites/0072437316/student_view0/chapter18/animations.html#

In the above figure:
a. Region A is known as the ____________ as it is in the proximity of the coding region of the gene.

b. The protein factors that bind to this region are ____________ that assemble before binding of RNA polymerase. This is where the transcription initiation complex forms waiting for an additional signal from an activator.

c. The arrow-marked double line represents _______________ of base pairs separating A DNA sequences from B DNA sequences.

d. Region B is distant from the coding region of the gene and contains _______ control elements.

e. Enhancer sequences within region B bind to protein _______ that bend the DNA bringing the activator to the transcription initiation complex assembled at region A kicking off or boosting transcription.

f. The distal control sequences in region B also have sequences known as _______ to which repressor proteins bind preventing bending and interaction with the assembled transcription initiation complex on the region A.

g. Basal transcription factors and RNA polymerase that assemble on the proximal promoters of all genes are present in all tissues. Differential gene expression is controlled by expression of ____________ that bind to specific enhancers.