

Shahjalal University of Science and Technology, Sylhet

Department of Biochemistry and Molecular Biology

Full Marks: 20

BMB 328 Genetic Engineering

Time: 1 Hour

1. Explain what is meant by the following terms in terms of Genetic Engineering: 1.0x4=4
 - (a) Protein Engineering
 - (b) Mutagenesis
 - (c) Marker Systems
 - (d) Cloning

2. Explain what is meant by the following statement in relation to selection of the recombinant DNA using different selectable markers: 1.0x4=4
 - (a) Antibiotics affecting cell wall synthesis
 - (b) Antibiotics affecting translation
 - (c) Insertional inactivation of antibiotic resistance
 - (d) Insertional inactivation of enzymatic activity

3. A knockout mouse is a genetically engineered mouse in which researchers have inactivated, or "knocked out," an existing gene (target gene) by replacing it or disrupting it with an artificially produced nonfunctional allele. The target gene is disrupted (knocked out) in embryonic stem cells (ES) by homologous recombination. This gene disruption often causes changes in a mouse's phenotype, which includes appearance, behavior and other observable physical and biochemical characteristics.
 - (a) Explain how, you prepare the ES cells with a knockout mutation and can identify the recombinant cell from the non recombinant one 2.5
 - (b) Explain how, the prepared ES cells with knockout mutation can be used to generate a transgenic mice 2.5
 - (c) Explain which, properties make the difference between the knockout and transgenic mouse. 1

4. Give a schematic production of recombinant insulin in *Escherichia coli* (*E. coli*). 2

5. Unscramble each of the clue words. 0.25x10=2.5
 Copy the letters in the numbered boxes to other boxes with the same number.

a	SILIONATO	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 516 </div>	
b	COERTNISRTI	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 217 </div>	
c	NROOSARFAITTMN	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 3 </div>	
d	PIADLSM	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px; text-align: center;">P L A S M I D</div> <div style="display: flex; justify-content: space-around; width: 100px;"> 11 </div>	
e	MERTBCAONNI	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 47 </div>	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 1234567 </div>
f	SORSIPEEXN	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px; text-align: center;">E X P E R I M E N T</div> <div style="display: flex; justify-content: space-around; width: 100px;"> 148 </div>	
g	GERTAT GEEN	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 113 </div>	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px;"></div> <div style="display: flex; justify-content: space-around; width: 100px;"> 10 </div>
h	NEZYSME	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px; text-align: center;">E N Z Y M E S</div> <div style="display: flex; justify-content: space-around; width: 100px;"> 12 </div>	
i	BEACIART	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px; text-align: center;">B A C T E R I A</div> <div style="display: flex; justify-content: space-around; width: 100px;"> 156 </div>	
j	NAD	<div style="border: 1px solid black; display: inline-block; width: 100px; height: 1.2em; margin-bottom: 2px; text-align: center;">D N A</div> <div style="display: flex; justify-content: space-around; width: 100px;"> 9 </div>	