1. What are *trans*-regulation transcription and *cis*-regulation regulation transcription? Please take an example to describe its principle. (10%)
2. Please describe the cellular function of σ factor in mammalian gene transcription regulation. (10%)
3. Phage infection is an important tool to identify cDNA or genomic DNA from different library. Could you describe the process and what kinds of regulators were involved in T4 and T7 lytic cascade in detail? (10%)
4. Gene targeting was a new tool to physiologically identify the gene function and drug discovery. Please describe how to generate a gene targeting mice? (10%)
5. Nucleosome is the basic unit of chromosome. Please describe the composition of nucleosome and the cellular function of these compositions. (10%)
6. What is epigenetics? Please take an example to explain it. (10%)
7. If you got part sequence of a novel gene as bellow, what kind of methods and how you could get the full length cDNA of this novel gene. Please describe the method name and principle. (** you could not but the cDNA clone by commercial purchase) (20%)

   Partal sequence:

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1 cagggcacta gagctgcaga catgagtgca gagggctacc agtacagagc actgtacgac
61 tacaagaagg agcgagagga agacattgac ctacacctgg gggacatact gactgtgaat
121 aaaggctcct tagtggcact tggattcagt gatggccagg aagcccggcc tgaagatatt
181 ggctggttaa atggctacaa tgaaaccact ggggagaggg gagactttcc aggaacttac
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8. If you are a clinical investigator. One day, you found A gene expression in lung cancer patients was lower than normal patients in lung tissue. One hypothesis was rise in you mind that A gene perhaps a critical factor co-related with lung cancer formation. How will you to design experiment process to proof your hypothesis? (20%)