主观题　第1题　9分

名词解释

(先将英文名词翻译成中文，再进行解释)

(1) Promoter

(2) General transcription factors

(3) RNA editing

主观题　第2题　9分

名词解释

(先将英文名词翻译成中文，再进行解释)

(4) Ribozyme

(5) RNA processing

(6) Noncoding RNA

第3题　1分

(英文题目用英文作答，中文题目用中文作答)

(1) [填空1] is a universal transcription factor required for transcription initiation by all three RNA polymerases.

第4题　1分

(英文题目用英文作答，中文题目用中文作答)

(2) The largest subunit of RNA polymerases II has a seven amino acid repeat at the C terminus called the [填空1] . It is subject to phosphorylation.

第5题　1分

(英文题目用英文作答，中文题目用中文作答)

(3) [填空1] is a separate component from the core enzyme of E.coli RNA polymerase and has a critical role in promoter recognition.

第6题　1分

(英文题目用英文作答，中文题目用中文作答)

(4) tRNA的成熟过程中5'末端多余的核苷酸由[填空1]酶切除。

第7题　1分

(英文题目用英文作答，中文题目用中文作答)

(5) 在同一调控序列下转录的含有多个编码区的一段mRNA叫[填空1] mRNA。

单选题　第8题　2分

(1) The name of the structure that causes the synthesis of RNA to cease is called the...

A promoter region

B sigma factor

C terminator

D template

多选题 第9题 3分

(2) Which of the following statements are FALSE?

A The synthesis of messenger RNA is called translation.

B Initial attachment of the transcription enzyme to the gene, results in a structure termed the closed complex.

C The promotor of a gene is often located upstream of the transcription region.

D Unwinding of the DNA during transcription is the result of the activity of a helicase enzyme downstream of the RNA polymerase.

单选题 第10题 2分

(3) The Pribonow box of the promoter in E. coli is located…

A -35 sequence

B -10 sequence

C Upstream of -35 sequence

D Transcription start site

单选题 第11题 2分

(4) Which of the following statements about termination of *E. coli* transcription is FALSE?

A There are two ways of terminating transcription.

B Rho factor is always needed in termination.

C A string of Ts in the nontemplate DNA strand of an intrinsic terminator.

D Weak terminator has a reverse repeating sequence.

多选题 第12题 3分

(5) Which of the following statements about RNA splicing are FALSE?

A Splicing joins together two introns.

B Processing of eukaryotic mRNA occurs in the cytoplasm prior to translation.

C snRNPs U3, U4 and U5 form a trimer that binds to mRNA.

D The 5' splice site contains a GU, whereas the 3' splice site contains an AG.

单选题 第13题 2分

(6) Which of the following statements about translation is TRUE?

A Only the RNA sequence in the anticodon region of the tRNA is important for recognition between the tRNA and the aminoacyl tRNA synthetase.

B The large ribosomal subunit joins the translation initiation complex after the small subunit has already joined.

C Elongation of the polypeptide chain is terminated when a stop codon enters the P site of the ribosome.

D The SD sequence is found on the small ribosomal subunit.

单选题 第14题 2分

(7) Which of the following binds to the initiation complex first?

A IF2

B IF3

C initiator tRNA.

D large ribosomal subunit

多选题 第15题 3分

(8) Which of the following statements about translation are FALSE?

A The first amino acid enters through the A site.

B The I of the 3' anti-codon position can be paired with A, C or U of the 5' codon position.

C Peptidyl transferase is a protein that is present in the 50S ribosomal subunits.

D The tRNA that was in the P site moves into the E site as a result of translocation.

单选题 第16题 2分

(9) Which of the following statements about translation factors is FALSE?

A Translocation is promoted by the elongation factor EF-G in prokaryotes.

B During elongation, amino acids are brought to the ribosome with the help of EF-Tu.

C RF3 recognizes the stop codons UAA and UGA.

D Regeneration of the EF-Tu·GTP complex needs the help of EF-Ts.

单选题 第17题 2分

(10) Rifampicin (利福平) is an inhibitor of ( ) subunit of RNA polymerase that blocks initiation.

A α

B β

C σ

D β'

单选题 第18题 2分

(11) Which of the following statements about general transcription factors is FALSE?

A TBP is a universal transcription factor required by all three classes of genes.

B TFIIH phosphorylates the CTD of RNA Pol II and has DNA helicase activity.

C TFIIB acts as a bridge of TFIID and RNA Pol II.

D TFIIIA is required for transcription of the tRNA genes.

单选题 第19题 2分

(12) Which of the following genes has the promoter that lies wholly within the gene?

A 18S rRNA gene

B mRNA gene

C tRNA gene

D U6 snRNA gene

单选题 第20题 2分

(13) Which of the following statements about snRNP is TRUE?

A snRNAs which complex with specific proteins to form snRNPs.

B snRNAs contain very little uracil.

C snRNPs are mainly involved in polyadenylation

D snRNAs synthesized in the nucleus by RNA Pol II do not have a normal 5'-cap.

多选题 第21题 3分

(14) Which of the following statements about post-translational events are TRUE?

A Protein targeting is related to the signal sequence of the nascent peptide chain.

B Proteins can be modified by acetylation, glycosylation, phosphorylation, and so on.

C Signal sequences are always removed after protein targeting.

D Endogenous proteins are degraded by proteasome pathway.

主观题 第22题 9分

问答题

(1)比较真核生物与原核生物转录的异同点。

主观题 第23题 10分

问答题

(2)比较真核生物三种RNA聚合酶的性质和功能。

主观题 第24题 12分

问答题

(3) 叙述真核生物mRNA前体加工为成熟的mRNA分子的过程及机制。

主观题　　第25题　　14分

问答题

(4)比较真核生物与原核生物蛋白质合成的异同点。

主观题　　第26题　　12分

附加题(答对加分，总分不超过100分)

你通过实验研究一个*E. coli*基因的转录终止，对该基因3'端测序获得如下结果：

5'-CGAAGCGCCG**ATTGC**CGGCGCTTTTTTT-3'

3'-GCTTCGCGGC**TAACG**GCCGCGAAAAAAA-5'

然后你通过改变此序列获得突变基因，序列改变如下：

突变体A：

CGAAACTAAG**ATTGC**AGCAGTTTTTTTT

突变体B：

CGAAGCGCCG**TAGCA**CGGCGCTTTTTTT

突变体C：

CGAAGCGCCG**ATTGC**CGGCGCTTACGGC

你对每一个突变基因进行了分析，以测定转录的终止，并获得了如果下结果：

测试的突变基因	无Rho	有Rho
野生型	100%终止	100%终止
突变体A	40%终止	40%终止
突变体B	95%终止	95%终止
突变体C	20%终止	80%终止

请尽可能全面解释实验结果。

主观题　　第27题　　8分

附加题

(答对加分，总分不超过100分)

(2) 你正在研究人类β-地中海贫血病，患者不能合成正常的β-珠蛋白。你发现患者β-珠蛋白基因编码区正常，但mRNA比正常情况长出约100多个核苷酸。对患者β-珠蛋白基因测序发现，基因第一个内含子中有一个碱基发生了改变。请提出假说解释β-地中海贫血病患者缺失正常的β-珠蛋白的原因。