N.A

BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – M.Sc.(BT)-2022
Course Name – Genetic Engineering
Course Code - MBTC203
(Semester II)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Predict which of the following nucleotides should be there at 3' end during primer?

a) Any of A, T, G or C will work out
b) Either A or T
c) Either G or C
d) Specifically G

(ii) For the production of unlabelled and huge amount of proteins, select which of the following is true?

a) Transcription is carried out in vivo and translation in vitro
b) Transcription and translation both are carried out in vivo
c) Transcription and translation both are carried out in vitro
d) Transcription is carried out in vitro and translation in vivo

(iii) If a putative protein sequence is cloned in an expression vector and the expressed protein is not showing protease activity, then select which of the following might be correct?

a) The protein can be incorrectly folded which can block the protease activity
b) There might be some other cofactor required for protease activity
c) The protein is not protease
d) All of these

(iv) Select which of the following statements about CRISPR-Cas9 is false?

a) CRISPR-Cas9 performs a DNA editing reaction in human cells
b) CRISPR-Cas9 technology relies on both a protein and guide RNA
c) CRISPR-Cas9 performs the same reaction in bacterial and human cells
d) CRISPR-Cas9 technology does not require any expensive equipment

(v) In pyrosequencing, the addition of nucleotide is measured by the

a) intensity of color
b) intensity of chemiluminiscence
c) intensity of fluorescence
d) none of these

(vi) Assess: Type II restriction enzymes require ..... as cofactor for its activity

a) ATP
b) Mg2+
c) Both a and b
d) None of the above

(vii) How many histidine residues are present in a His-tag of a recombinant protein?

a) 2
b) 4
c) 6
d) 8

(viii) The technique of electroporation is used for what purpose?

a) Trnasformation of 100 kb genomic DNA into the bacterial cell
b) Transformation of 5 kb plasmid DNA into the bacterial cell
c) Conjugation of 100 kb genomic DNA into the bacterial cell
d) Conjugation of 5 kb plasmid DNA into the bacterial cell

(ix) In pBR 322, pBR stands for

a) Plasmid Bacterial Recombination
b) Plasmid Bolivar and Rodriguez
c) Plasmid Bacterial Replication
d) Plasmid Baltimore and Rodriguez

(x) There are some advantages of expressing protein as a fusion protein. Predict how it may enhance stability, folding by

a) Solubility, phosphodiester bond formation
b) Insolubility, phosphodiester bond formation
c) Solubility, disulphide bond formation
d) Insolubility, disulphide bond formation

(xi) Identify which of the following is the problem of expressing eukaryotic protein in Prokaryote

a) Inclusion body
b) Sequence similarity
c) Restriction Digestion
d) Hybridization

(xii) Down regulation of expression of endogenous genes by transformation with constructs that would generate sense RNA, rather than anti-sense RNA is classified as:

a) Co-suppression
b) Suppression
c) Multisuppression
d) Anti-suppression

(xiii) Phagemid consist of

a) Plasmid vector carrying λ phage's cos site
b) plasmid and M13 components
c) Plasmid vector carrying origin of replication of λ phage only
d) Plasmid vector carrying origin of replication of plasmid only

(xiv) Insertion of recombinant DNA within the gene encoding for β–galactosidase leads to _____

a) amplification
b) transformation
c) insertional inactivation
d) cloning

(xv) Introduction of gene isolate from bone marrow producing Adenosine deaminase should be introduced at what age to permanently cure ADA?

a) Teenage
b) Adulthood
c) Old age
d) Embryonic stage

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Briefly describe the nomenclature of restriction enzymes. (3)
3. Summarize the features of a plasmid vector. (3)
4. Explain the chemistry behind chain termination DNA sequencing method. (3)
5. Explain the commonly used hybridization methods used for screening libraries. (3)
6. Evaluate the significance of cloning into a TA vector before cloning into a expression vector. (3)

OR

Explain the basic features to design primers for basic PCR reaction? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the importance of synthesis of restriction enzyme in bacterial cell? How does bacterial Genomic DNA is protected from restriction digestion. (5)
8. Illustrate the steps involved in the creation of knock out mice (5)
9. Compare in between YEp and YCp. Mention their uses in RDT. (5)
10. Evaluate the application of CRISPR-Cas9 mediated gene editing (5)
11. Explain the mutation detection techniques: SSCP and RFLP schematically. (5)
12. A gene encoding for a novel protein is cloned in pBR322 and transformed in E. coli strain DH5α. Develop rDNA process for this objective and explain how do you select positive recombinants? (5)

OR

Write what is a viral vector? Explain types of viral vectors and their specific characteristics. (5)

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