UNIVERSITY EXAMINATIONS

UNIVERSITEITSEKSAMENS

UNISA university of south africa

BIT3702

May/June 2017

MOLECULAR CELL BIOLOGY

Duration 2 Hours

100 Marks

EXAMINATION PANEL AS APPOINTED BY THE DEPARTMENT

Closed book examination

This paper consists of THREE pages

Answer ALL questions

[TURN OVER]

QUESTION 1 **[20]**

1 1 Compare the general structural organisation of eukaryotic and prokaryotic cells and their subcellular stuctures (5)

1 2 Describe the biosynthetic route taken by an secreted protein from translation to the final destination (15)

QUESTION 2 **[20]**

Discuss the cell cycle of a eukaryotic cell and molecular regulation of its checkpoints

QUESTION 3 **[20]**

3 1 Illustrate how a eukaryotic cell may produce two types of proteins (isoforms) from the same gene (10)

3 2 Contrast how selection of the translational start site occurs on bacterial and eukaryotic mRNA (10)

QUESTION 4 **[20]**

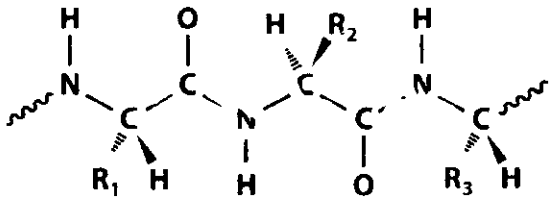

Fig 1

Consider Fig 1 and answer the following questions,

4 1 Label the α-carbon atoms and draw boxes around the atoms of each peptide (8)

4 2 What do the R groups represent? (3)

4 3 Why is there limited free rotation around the carbonyl C=O to N amide bonds? (3)

4 4 Assuming that the chemical structure represents the correct conformation of the peptide linkage, are the peptide groups in the *cis* or *trans* conformation? (3)

4 5 Which bonds allow rotation of peptide groups with respect to each other? (3)

QUESTION 5 **[20]**

5 1 Discuss "domains" and "motifs" as comparable structural features of proteins (5)

5 2 Discuss forces that are critical in protein-protein interactions (15)

TOTAL 100

1st Examiner. Prof MM Ntwasa
2nd Examiner: Mr MC Monyama