Index No:...........................

UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES
DEPARTMENT OF PHARMACY
FOURTH BPHARM PART II EXAMINATION – OCTOBER 2021
PH 4231 MOLECULAR GENETICS – SEQ

TIME: TWO HOURS

INSTRUCTIONS

- There are **four** questions in part **A** and **B** in this SEQ paper.
- Answer all questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

PART A

01.

1.1. Gregor Mendel discovered the fundamental laws of inheritance through experiments in his garden. Briefly describe the "law of segregation". (***10 marks***)

1.2. In peas, seeds can be round (R) or wrinkled (r) and flower colour can be purple (P) or white (p). Answer the below questions considering a cross of PPRr (parent A) with PpRr (parent B).

    1.2.1. List different types of gametes that can be produced by each parent. (***06 marks***)

    1.2.2. Draw a Punnett square to find the different possible offspring from this cross.

    (***25 marks***)

    1.2.3. Write the possible phenotypes of these offspring and the chance (percentage) for each. (***24 marks***)

1.3. List five deviations from Mendel's law of inheritance. (***15 marks***)

1.4. Briefly explain one of the above deviations you mentioned. (***20 marks***)

2. "RNA plays an important role in each step of gene expression".

    2.1. List three main RNA types involved in gene expression. (***05 marks***)

    2.2. Mention the function of each RNA you mentioned above. (***15 marks***)

    2.3. Describe the "translation" step in the gene expression. (***30 marks***)

PART B

2.4. Briefly explain the indications for prenatal diagnosis and the actions that have taken to prevent the occurrence of such genetic disorders. (*50 marks*)

3.

3.1. List five main categories of genetic disorders. (*10 marks*)

3.2. List the criteria to identify autosomal dominant and X-linked recessive disorders used in genetic counselling programs. (*24 marks*)

3.3. Tabulate the differences between meiosis and mitosis. (*20 marks*)

3.4. Briefly explain the indicators for hereditary cancers. (*20 marks*)

3.5. Mention two examples for such hereditary cancer types and genes that predispose to the disease. (*20 marks*)

3.6. List two non-invasive procedures available for prenatal diagnosis of the genetic disorders. (*06 marks*)

4. "The largest and most obvious division of living organisms is into prokaryotes vs. eukaryotes".

4.1. Briefly explain the above statement mentioning six unique characteristics of prokaryotes compared to eukaryotes. (*24 marks*)

4.2. What is the commonest laboratory diagnostic method used to identify bacterial mutants? (*06 marks*)

4.3. Explain the steps of the method mentioned in 4.2 using a labelled diagram. (*20 marks*)

4.4. Briefly explain the principle behind the method described in 4.3 in relation to the utilization of tryptophan for their survival. (*40 marks*)

4.5. Name the two forms of bacterial transduction. (*10 marks*)

@@@@@@@@@@

2