GX2399

OLLSCOIL NA hEIREANN, GAILLIMH

NATIONAL UNIVERSITY OF IRELAND, GALWAY

SPRING EXAMINATIONS 2001
FIRST YEAR DIPLOMA IN NURSING EXAMINATION

BIOLOGICAL SCIENCES

BIOCHEMISTRY/NUTRITION/PHYSICS (NU190)
(TOTAL MARKS 120)

Prof. R.J.Mayer
Prof. John Smith
Dr. W. van der Putten
Dr. M.P. Carty
Ms. G. Nolan

Time allowed: One and a half hours

Use a separate answer book for each section i.e. Biochemistry, Nutrition and Physics. You are expected to answer *Two* questions from Biochemistry, *Two* questions from Nutrition and *One* Question from Physics. Each question carries equal marks (20% each).

SECTION ONE
(Answer both questions)
BIOCHEMISTRY

Question One

Answer five of the short questions below, confining your answers to *less than ten lines, or to less than five lines if you also draw a diagram.*

1. Outline, with the aid of a diagram, the structure of a eukaryotic cell.
2. What is nutritional disease? Describe two kinds of nutritional disease.
3. Explain the terms *hydrophilic* and *hydrophobic*. Which of the following is more soluble in water: sodium chloride (NaC1) or a fatty acid (CH_3-CH_2-CH_2-CH_2-CH_2-CH_3)?
4. Lactose consists of which two sugars? Give an example of a defect in lactose metabolism.
5. Proteins are polymers of which type of monomer? What kind of bond joins these monomers together to form a protein?
6. Describe two properties of enzymes that make them good catalysts.
7. Explain the term biological oxidation, and explain how it differs from combustion.
8. In what form is the energy released during biological oxidation stored? What kind of high-energy bond is found in the major energy storage molecule?
9. Describe three different processes in the cell that require energy.
10. Calculate the concentration (i.e. *molarity*) of glucose in a 100 mg/ml solution (the molecular weight of glucose is 180).

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Question Two
Answer **four** of the short questions below, confining your answers to *less than ten lines, or to less than five lines if you also draw a diagram.*

1. Name the four bases found in DNA. What kind of bond is formed during base-pairing in DNA?
2. How many strands in a DNA molecule? How does this allow DNA to be copied during DNA replication?
3. How is DNA arranged in the nucleus? How many chromosomes in a human cell?
4. Explain what is meant by 'transcription of RNA'.
5. What is the genetic code? How many bases in a codon?
6. Which kind of RNA is joined to an amino acid during protein synthesis, and what is the name of the enzyme that carries out this reaction?
7. Briefly outline the steps in protein synthesis. Name the organelle on which protein synthesis occurs in the cell.
8. How does amino acid sequence affect the structure of a protein? Give an example of how the structure of a protein determines its function.

SECTION TWO
(Answer both questions)
NUTRITION

Question One
Write an account of dietary treatment of Type 1 Diabetes **OR** Type 2 Diabetes.

Question Two
Write notes on **TWO** of the following:

(a) Fats.
(b) Nasogastric Feeding
(c) Parenteral Feeding
(d) High protein supplements

SECTION THREE
(Answer one question)
PHYSICS

Question One
Answer all seven parts of this question. Each part carries equal marks.

1. What is a vector and Scalar. Give three examples of each.

2. Give the S.I. units for velocity, acceleration and power.

3. A basket contains 25 oranges, 10 apples, 15 bananas and 20 pears and 30 grapes. Draw a Bar diagram and a Pie-chart illustrating the content of the basket.

/Contd. overleaf

4. The amount of gas in a container is doubled while the volume of the container is increased by a factor two. What is the final pressure of the gas, compared to the original pressure?

5. Calculate the weight of a 80 kg pilot subjected to three times the gravitational acceleration ($G = 9.8\ m/s^2$).

6. Describe, using vectors, good lifting technique.

7. Name five good nursing practices to ensure safety with electrical equipment.