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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (Special) Degree in Applied Biology
Fourth year – Semester I Examination – October/November 2017

MIB 4206- MOLECULAR BIOTECHNOLOGY
Time: Two (02) hours

Answer ALL questions

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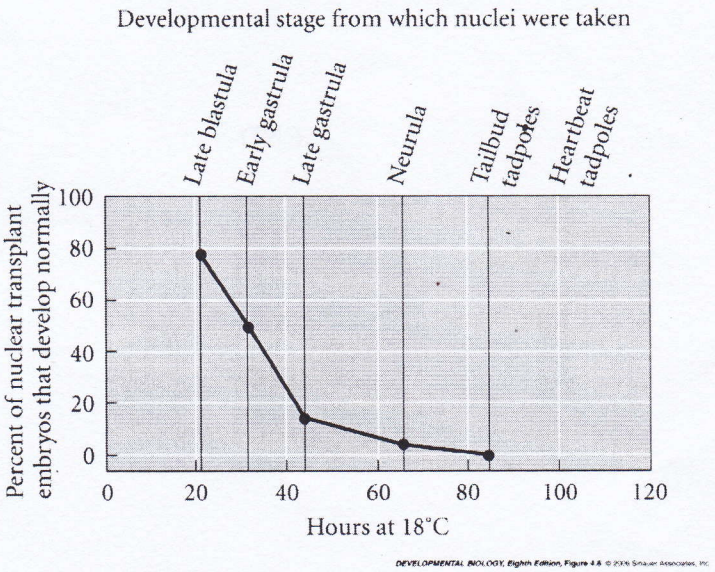
1. You have cloned a novel transcription factor in your studies of mouse development. In order to begin to characterize this transcription factor you need to collect some basic information about the gene and its products. (You only have to name the techniques you will use, not tell me how it's done).
   a) List the techniques that you would use (i) to determine if the transcript is expressed at a specific stage of development and (ii) to determine which cells of the embryo express this transcript at the given stage. Discuss briefly why you would use each specific technique. **(20 marks)**
   b) List the techniques you would use to determine the function of this transcription factor in an organ or tissue in the developing embryo. Discuss the specific experiments that you would carry out and the potential outcomes and conclusions of the experiments. **(50 marks)**
   c) Based on the data shown in the graph below, discuss why the success rate of nuclear transplant drops dramatically with the use of endodermal nuclei from progressively later stages of development. **(30 marks)**



2. a) Assess growing transgenic lepidopteran resistant Bt rice in Sri Lanka. **(30 marks)**

   b) Evaluate the attempt to produce low methane emission transgenic rice. **(40 marks)**

   c) Discuss a quantitative GMO detection method of your choice. **(30 marks)**

3. a) Rationalize the use ofPAL in mitigating phenylketonuria. **(20 marks)**

   b) Propose improvements to the enzymatic process of ethanol production from starch. **(50 marks)**

   c) "X" is aRNA virus that causes a critical disease in cows. Propose a method to identify this virus from urine samples of cows. Design a vaccine against this virus using your knowledge on molecular vaccines. **(30 marks)**

4. a) Describe how biotechnological interventions have helped improve the following aspects in the food industry. Use examples to assist your explanation.

   i. Production of fermented beverages **(30 marks)**
   ii. Food enzymes **(30 marks)**
   iii. Improving nutritive properties **(30 marks)**

   b) List the potential risks and concerns from the point of consumers and agriculturalists when it comes to GM food. **(10 marks)**

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