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1. A putative mutation was discovered in the -450 region of a gene, *abc*. Design an experiment to determine if this mutation altered expression of *abc* transcript. Illustrations compulsory. (5)
  2. What is the function of repressor in the lac operon? Design a simple experiment to identify the region of DNA to which the repressor binds. Illustrations compulsory. (5)
  3. 1-2 mark Questions: Fill in blank/True-False/1-2 sentence answers/MCQ:
    - a. What does RNA pol III synthesize? (1)
    - b. Closed/open conformation of RNA pol holoenzyme is formed when Sigma factor binds to the enzyme. (1)
    - c. All of the following cell types contain the enzyme telomerase which protects the length of telomeres at the end of chromosomes, except:
      - a. Germinal
      - b. Adult Somatic
      - c. Hemopoietic
      - d. Tumor (1)
    - d. State 2 differences between Rho dependent termination and intrinsic termination of transcription. (2)
    - e. With reference to lac operon; What happens when (1) Glucose is absent and lactose is present (2) Only lactose is present. Illustrate with diagrams only. (2)
    - f. The reaction in DNA replication catalyzed by DNA ligase is
      - a) Addition of new nucleotides to the leading strand
      - b) Addition of new nucleotide to the lagging strand
      - c) Formation of a phosphodiester bond between the 3'-OH of one Okazaki fragment and the 5'-phosphate of the next on the lagging strand
      - d) Base pairing of the template and the newly formed DNA strand (1)
    - g. Which of the following enzymes is the principal replication enzyme in *E. coli*?
      - a) DNA polymerase I
      - b) DNA polymerase II
      - c) DNA polymerase III
      - d) DNA polymerase IV (1)
    - h. The binding of lac repressor to DNA could be considered to be analogous to
      - a) uncompetitive inhibition of an enzyme
      - b) competitive inhibition of an enzyme
      - c) allosteric effects in enzyme regulation
      - d) mixed-type inhibition of an enzyme (1)