Specific Examination Objectives

Question Topic	Total	Average Difficulty
Chapter 3 Proteins	1	1.00
Chapter 4 Nucleic Acid Extraction Methods	10	1.50
Chapter 5 Detection of Nucleic Acids	11	1.55
Chapter 6 Analysis of Nucleic Acids & Proteins	9	1.56

Exam ID	Total Questions	Average Difficulty
CLS405 Molecular Exam #2	31	1.52

On this examination, the student will be expected to:

1. [Level 1/Molecular Diagnostics/Chapter 3 Proteins/4270]

   Define 'gene'.

2. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4283]

   State the fraction in which DNA is found when performing an organic DNA extraction.

3. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4284]

   Name the substance which is utilized to precipitate DNA, after its separation from other cellular constituents.

4. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4286]

   Name the most abundant form of RNA in all cells.

5. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4288]

   State the substance which may be selectively isolated by PolyT oligomers bound to a matrix resin column.

6. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4289]

   Name the procedure by which DNA quality can be assessed relatively simply and quickly.

7. [Level 2/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4290]

   List, in order, the steps required for DNA isolation from cells in a clinical sample.

8. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4291]

   State the intracellular component which precipitates out of solution in inorganic DNA isolation or 'salting out' procedures, in the presence of low pH and high salt concentrations.

9. [Level 3/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4294]

   Given specific analytical data, calculate the 260 nm/280 nm ratio.

10. [Level 1/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4295]

    State the value of the absorptivity constant when measuring the concentration of RNA by spectrophotometry at 260 nm.

11. [Level 3/Molecular Diagnostics/Chapter 4 Nucleic Acid Extraction Methods/4296]

    Explain the usefulness of the 260 nm/280 nm ratio for isolated DNA.

See last page for explanation of question levels.

12. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4298]

State a polymer compound which is utilized as a support medium through which nucleic acids move

13. [Level 2/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4301]

Cite several specific examples of pulse-field gel electrophoresis procedures.

14. [Level 3/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4303]

Explain the usefulness of Polyacrylamide gel electrophoresis when separating a mixture of oligonucleotides with a resolution between bands of 1 bp.

15. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4304]

Identify the substance used as the matrix in capillary electrophoresis, through which nucleic acids pass.

16. [Level 2/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4307]

Explain what effect molecular size and charge will have on the migration rate in capillary electrophoresis.

17. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4308]

Identify the substance which is added to an electrophoresis buffer for the purpose of denaturing DNA.

18. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4309]

Identify the substance which is utilized to increase the density of a sample relative to the density of the buffer prior to loading the sample into a gel.

19. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4310]

State the name of the device used to make wells in a solidifying gel into which samples will be loaded.

20. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4311]

Name the the substance which is added to a sample that does not associate with DNA and runs ahead of the smallest fragments in the sample in order to monitor the progress of electrophoresis.

21. [Level 1/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4313]

Name the substance used in nucleic acid analysis which intercalates between nitrogen bases.

22. [Level 3/Molecular Diagnostics/Chapter 5 Detection of Nucleic Acids/4314]

Explain the function of Tris acetate EDTA in performing nucleic acid analysis.

23. [Level 2/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4315]

Explain the function of the 'labeled probe' in Southern blot analysis.

24. [Level 2/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4316]

List, in order, the specific steps in Southern blot analysis.

25. [Level 2/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4320]

Explain the function of hydrochloric acid in DNA electrophoresis.

26. [Level 1/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4321]

List three methods of transferring DNA from a gel to a membrane substrate.

See last page for explanation of question levels.

27. [Level 2/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4322]

Define what is meant by a 'probe', with respect to nucleic acid analysis.

28. [Level 2/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4324]

Explain how the melting temperature of nucleic acid is defined.

29. [Level 1/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4325]

State the kind of molecule which comprises most membranes that bind to nucleic acids in blotting procedures.

30. [Level 1/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4329]

Name the blotting procedure of which the 'microarray' or 'chip' is an example.

31. [Level 1/Molecular Diagnostics/Chapter 6 Analysis of Nucleic Acids & Proteins/4330]

Name a specific nucleic acid analysis procedure that could be utilized to analyze the entire human genome at one time.

Levels given in brackets at the beginning of the question objective indicate the level of difficulty for the actual question on this examination, NOT the level of difficulty for the stated objective. Levels of difficulty were developed using Bloom, et.al. Taxonomy of Educational Objectives. Also shown in the brackets are the Category of the question, the Topic of the question, and the number of the question in the database.

Explanation of Categories in the Cognitive Domain: (with Outcome-Illustrating Verbs)
Level 1: Recall
Knowledge of terminology; specific facts; ways and means of dealing with specifics (conventions, trends and sequences, classifications and categories, criteria, methodology); universals and abstractions in a field (principles and generalizations, theories and structures). Knowledge is (here) defined as the remembering (recalling) of appropriate, previously learned information.
* defines; describes; enumerates; identifies; labels; lists; matches; names; reads; records; reproduces; selects; states; views.

Level 2: Comprehension
Grasping (understanding) the meaning of informational materials.
* classifies; cites; converts; describes; discusses; estimates; explains; generalizes; gives examples; makes sense out of; paraphrases; restates (in own words); summarizes; traces; understands.

Level 3: Application
The use of previously learned information in new and concrete situations to solve problems that have single or best answers.
* acts; administers; articulates; assesses; charts; collects; computes; constructs; contributes; controls; determines; develops; discovers; establishes; extends; implements; includes; informs; instructs; operationalizes; participates; predicts; prepares; preserves; produces; projects; provides; relates; reports; shows; solves; teaches; transfers; uses; utilizes.

Taxonomy of educational objectives : the classification of educational goals ; / by a committee of college and university examiners ; Benjamin S. Bloom, editor [and others] IMPRINT New York : D. McKay Co., Inc., c1956-1964 (1971-72 printing) DESCRIPT. 2 v. in 1 : ill. ; 22 cm. NOTE Vol.2 by D.R. Krathwohl and others.

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See last page for explanation of question levels.