SI A&P - Full Discipline Demo - Digital

Urinalysis - No Materials

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Digital
Course	SI A&P - Full Discipline Demo - Digital
Instructor	Sales SI Demo

Test Your Knowledge

Order the steps of urine formation from first to last.

≡ Secretion

1 **Correct answer:** Filtration

≡ Reabsorption

2 **Correct answer:** Reabsorption

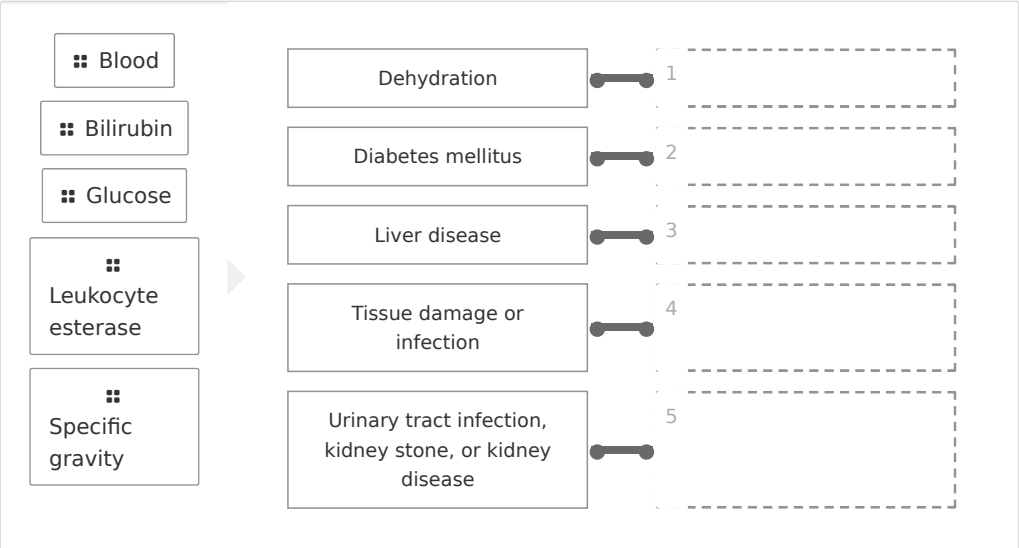
≡ Excretion

3 **Correct answer:** Secretion

≡ Filtration

4 **Correct answer:** Excretion

Match each urinalysis parameter to the corresponding health indicator.



Correct answers:

1 Specific gravity 2 Glucose 3 Bilirubin 4 Leukocyte esterase

5 Blood

Exploration

In step 2 of urine production, the blood vessels reabsorb any ____ that the body may require.

- water
- essential nutrients
- ions
- All of the above ✔

Hydration level, certain foods, medications, and disease may change the color of urine.

- True ✔
- False

Specific gravity is a reflection of the _____ content of urine.

- sugar
- ion ✔
- protein
- cellular

Exercise 1

Why is urinalysis useful in determining the health of an individual?

Urinalysis analyzes the composition of urine, which reflects the health and function of both the urinary system and the human body. A malfunctioning urinary system may be unable to filter or reabsorb specific compounds and ions. Additionally, dysfunction in another body system may result in high levels of compounds within the blood stream that cannot be successfully regulated by a properly functioning urinary system. The contents of urine can indicate an individual's hormone levels, drug use, presence of disease, and possible indications of organ dysfunction.

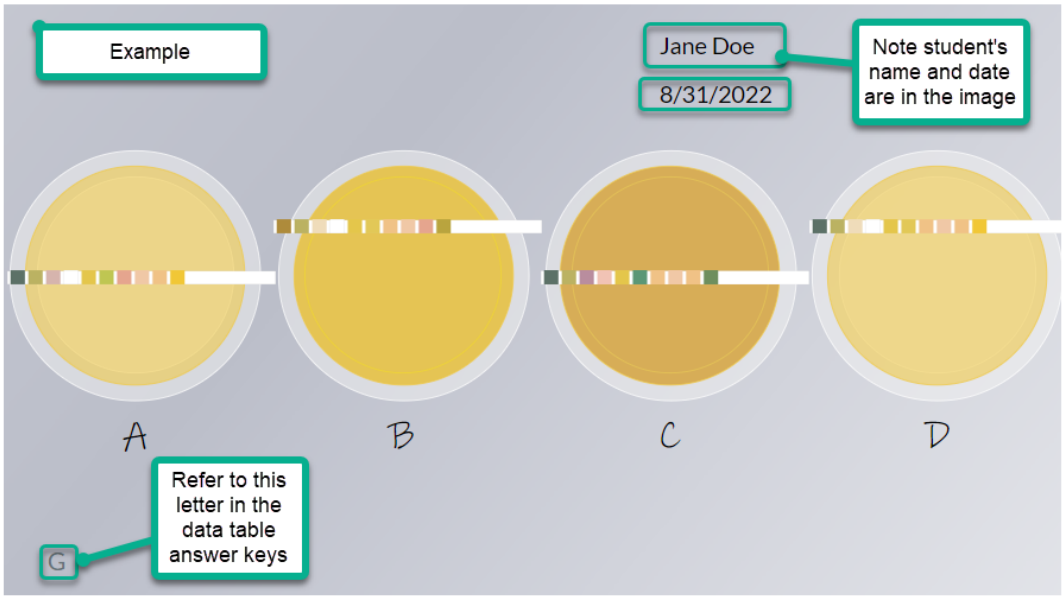
What were the effects of drinking distilled water on urinalysis test results? Reference the results in Data Tables 5-6 and urine production in the kidneys in your explanation.

The specific gravity of the urine decreased after ingesting distilled water as recorded in Data Table 6, compared to the results recorded in Data Table 5. This occurred due to an increase of filtration of water out of the blood and less resorption of water by the capillaries. When specific gravity decreases, the ion concentration of the urine also decreases, indicating a higher water percentage in the urine.

What conditions (if any) would patients be suffering from that submitted urine samples A-D? Reference your results in Data Tables 1-4 in your explanation.

Photo 1: Simulated Urine Sample

(SAMPLE ANSWER BELOW)



Data Table 1: Simulated Urine Sample A

(SAMPLE ANSWER BELOW)

Test	Test Results	Interpretation
Visual Test	(Example completed Table)Clear	(Refer to Sample answer chart)Hydrated
Specific Gravity	1.000	Potentially over hydrated/Low
pH	9	High
Leukocytes	Negative	Normal
Nitrites	Negative	Normal
Protein	100 mg/dL	High
Glucose	Negative	Normal
Ketones	Negative	Normal
Urobilinogen	Normal	Normal
Bilirubin	Negative	Normal
Blood	Negative	Normal

Data Table 2: Simulated Urine Sample B

(SAMPLE ANSWER BELOW)

Test	Test Results	Interpretation
Visual Test	(example completed data table)Clear	(Refer to sample answer chart) Hydrated
Specific Gravity	1.010	Hydrated/Normal
pH	5	Low
Leukocytes	Negative	Normal
Nitrites	Negative	Normal
Protein	Negative	Normal
Glucose	1000 mg/dL	High
Ketones	Negative	Normal
Urobilinogen	Normal	Normal
Bilirubin	Negative	Normal
Blood	Negative	Normal

Data Table 3: Simulated Urine Sample C

(SAMPLE ANSWER BELOW)

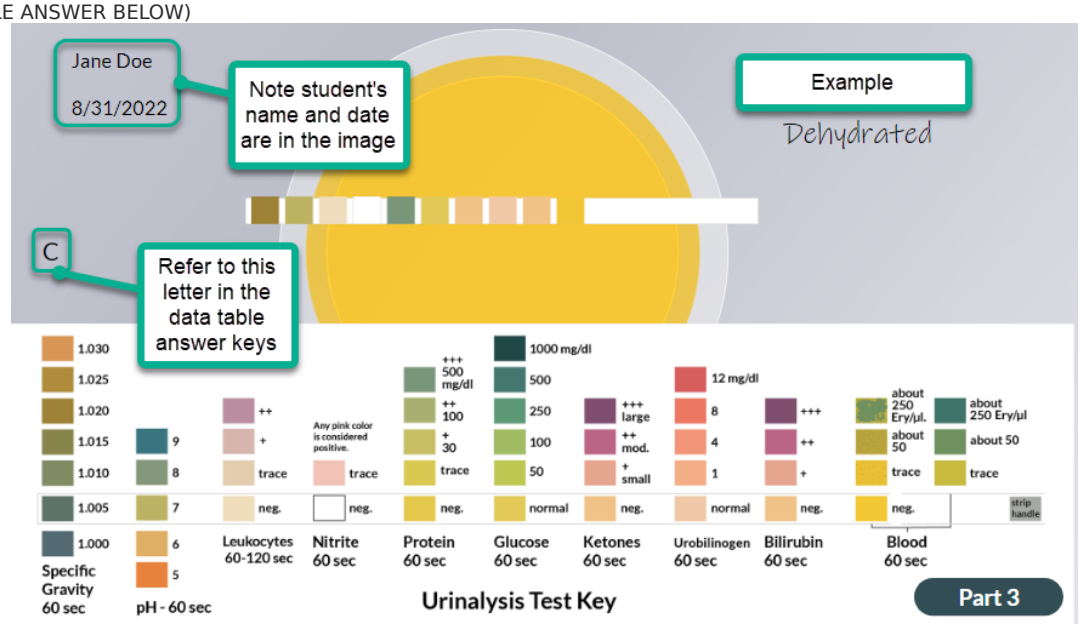
Test	Test Results	Interpretation
Visual Test	(Example of completed data table) Clear	(refer to sample answer chart) Hydrated
Specific Gravity	1.000	Potentially over hydrated/Low
pH	9	High
Leukocytes	Negative	Normal
Nitrites	Negative	Normal
Protein	100 mg/dL	High
Glucose	500 mg/dL	High

Ketones	Negative	Normal
Urobilinogen	Normal	Normal
Bilirubin	Negative	Normal
Blood	Negative	Normal

Data Table 4: Simulated Urine Sample D
(SAMPLE ANSWER BELOW)

Test	Test Results	Interpretation
Visual Test	(example of completed data table) Yellow	(Refer to sample answer chart) Possibly dehydrated
Specific Gravity	1.005	Hydrated/Normal
pH	5-6	Low
Leukocytes	Negative	Normal
Nitrites	Negative	Normal
Protein	Negative - Trace	Normal
Glucose	Negative	Normal
Ketones	Negative	Normal
Urobilinogen	Normal	Normal
Bilirubin	Negative	Normal
Blood	Negative	Normal

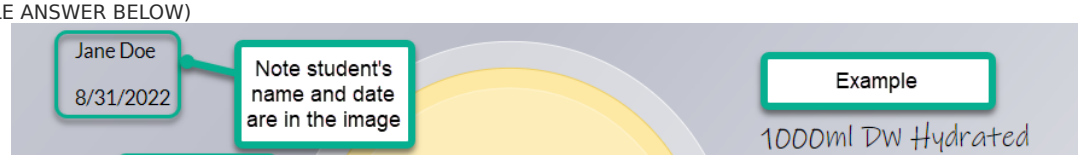
Photo 2: Dehydrated Urine Sample
(SAMPLE ANSWER BELOW)

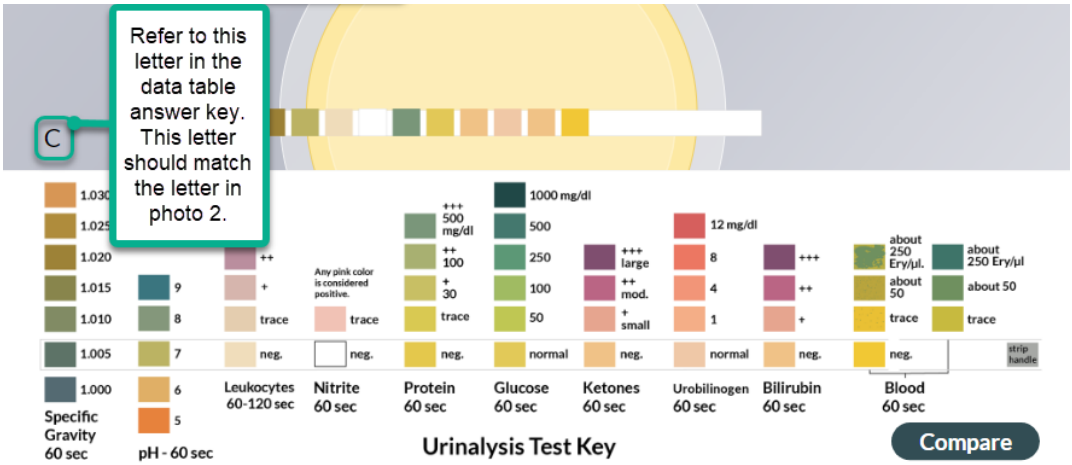


Data Table 5: No Food or Drink for at least 2 Hours
(SAMPLE ANSWER BELOW)

Test	Test Results	Interpretation
Visual Test	(Example of completed data table) Dark yellow and clear. (Student responses to all results may vary)	(refer to sample answer chart) Possible dehydration
Specific Gravity	1.010-1.030	Mild dehydration/Normal
pH	7	Normal
Leukocytes	Negative	Normal
Nitrites	Negative	Normal
Protein	Negative/Trace	Normal
Glucose	Negative	Normal
Ketones	Negative	Normal
Urobilinogen	Normal	Normal
Bilirubin	Negative	Normal
Blood	Negative	Normal

Photo 3: Distilled Water Hyrdated Urine Sample
(SAMPLE ANSWER BELOW)





Data Table 6: 60 minutes after Distilled Water Ingestion

(SAMPLE ANSWER BELOW)

Test	Prediction	Test Results	Interpretation
Visual Test	Student predictions will vary	(Example of completed data table)Light yellow and clear. (Student responses to all results may vary)	(refer to sample answer chart) Hydration improved after drinking a lot of water.
Specific Gravity	Student predictions	1.005	Hydrated/Normal

	will vary		
pH	Student predictions will vary	8	Normal
Leukocytes	Student predictions will vary	Negative	Normal
Nitrites	Student predictions will vary	Negative	Normal
Protein	Student predictions will vary	Negative/Trace	Normal
Glucose	Student predictions will vary	Negative	Normal
Ketones	Student predictions will vary	Negative	Normal
Urobilinogen	Student predictions will vary	Normal	Normal
Bilirubin	Student predictions will vary	Negative	Normal
Blood	Student predictions will vary	Negative	Negative

Competency Review

Blood is filtered and urine is produced in the nephrons of the kidneys in a ___-step process.

- two
- three
- four ✔
- five

The final step of urine production involves the _____ of urine from the kidneys.

- excretion ✔
- secretion
- resorption
- filtration

Urine is a mixture of _____ and other dissolved compounds.

- water
- urea
- ions
- All of the above ✔

The visual assessment of urinalysis involves observing the color and clarity of urine.

- True ✔
- False

Ketones should be detectable in a healthy person's urine.

- True
- False ✔

Urine pH of a healthy individual is between _____.

- 2.4 - 4.5
- 3.7 - 5.8
- 4.5 - 7.5 ✔
- 8.2 - 10.6

A urine sample with high pH and protein levels is indicative of _____.

- a healthy individual
- kidney disease ✔
- liver disease
- diabetes mellitus

Drinking 1000 mL of distilled water produces urinalysis results with decreased values for specific gravity.

- True ✔
- False

Extension Questions

The keto diet aims to induce a metabolic condition known as ketosis, a metabolic state that occurs when the body burns fat for energy instead of glucose. Individuals on the keto diet sometimes use urinalysis test strips to confirm their body is in ketosis. Apply your knowledge of urinalysis test parameters to predict urine test results for someone in ketosis? (SAMPLE ANSWER BELOW)

Individuals whose body is in ketosis would have an elevated level of ketones in their urine. All other parameters should be within normal ranges assuming the individual is in good health.