

Arizona State University (ASU) GIS205 Geographic Information Science I Final Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 - 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

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- 1. Which satellite has a panchromatic sensor with a spatial resolution of 0.5 meters?**
 - A. IKONOS**
 - B. QuickBird**
 - C. WorldView-1**
 - D. WorldView-2**

- 2. What defines panchromatic imagery?**
 - A. Imagery formed by viewing the entire infrared spectrum**
 - B. Colored imagery taken from multiple wavelengths**
 - C. Black and white imagery from the entire visible spectrum**
 - D. Multispectral imagery collected at high resolution**

- 3. What is the purpose of the MSI onboard the Sentinel satellite?**
 - A. To capture high-resolution panchromatic data**
 - B. To measure atmospheric conditions**
 - C. To collect multispectral imagery**
 - D. To provide real-time data to ground stations**

- 4. Which of the following is an SBAS that covers Japan?**
 - A. EGNOS**
 - B. MSAS**
 - C. WAAS**
 - D. CORS**

- 5. What is the primary function of the panchromatic sensor on the satellites mentioned?**
 - A. To capture high-resolution color images**
 - B. To monitor weather patterns**
 - C. To analyze soil samples**
 - D. To measure ocean depth**

- 6. What advantage does Landsat provide regarding Earth observation?**
- A. It captures images every day**
 - B. It can photograph the entire Earth in 16 days**
 - C. It utilizes only a single spectral band**
 - D. It covers only urban areas for detailed analysis**
- 7. What is temporal resolution?**
- A. The spatial detail between pixels in an image**
 - B. The length of time a sensor takes to return and image the same location**
 - C. The variation in sensor sensitivity across different wavelengths**
 - D. The ability of a satellite to image multiple spectral bands simultaneously**
- 8. What does DRG stand for in geographic information systems?**
- A. Digital Raster Graphic**
 - B. Data Resource Guide**
 - C. Digital Reading Grid**
 - D. Dual Raster Geometry**
- 9. Which function allows satellites to avoid direct overhead imaging?**
- A. Radiometric resolution**
 - B. Off-nadir viewing**
 - C. Temporal resolution**
 - D. Spatial analysis**
- 10. Non-selective scattering involves scattering caused by what type of particles?**
- A. Particles smaller than the wavelength**
 - B. Particles the same size as the wavelength**
 - C. Particles larger than the wavelength**
 - D. Electromagnetic waves**

Answers

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1. C
2. C
3. C
4. B
5. A
6. B
7. B
8. A
9. B
10. C

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Explanations

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1. Which satellite has a panchromatic sensor with a spatial resolution of 0.5 meters?

- A. IKONOS**
- B. QuickBird**
- C. WorldView-1**
- D. WorldView-2**

The correct answer identifies WorldView-1 as the satellite that features a panchromatic sensor with a spatial resolution of 0.5 meters. WorldView-1 was launched in 2007 and is known for its high-resolution imagery capabilities. The panchromatic sensor allows for capturing detailed grayscale images, which is particularly useful for applications requiring precise spatial analysis, such as urban planning and land use mapping. This high level of detail can significantly enhance the accuracy of geographic information systems (GIS) analyses and the visual interpretation of the data. In the context of this question, while other satellites such as IKONOS, QuickBird, and WorldView-2 also provide high-resolution imagery, they differ in terms of their spatial resolution and the types of sensors they employ. For instance, QuickBird has a panchromatic resolution of 0.61 meters, and WorldView-2 offers both panchromatic imagery at 0.46 meters and multispectral imagery at slightly lower resolutions. These differences highlight WorldView-1's distinct capability of achieving 0.5 meters specifically with its panchromatic sensor, making it the correct choice for this question.

2. What defines panchromatic imagery?

- A. Imagery formed by viewing the entire infrared spectrum**
- B. Colored imagery taken from multiple wavelengths**
- C. Black and white imagery from the entire visible spectrum**
- D. Multispectral imagery collected at high resolution**

Panchromatic imagery is characterized by capturing black and white images that encompass the entire visible spectrum. This type of imagery is sensitive to a wide range of wavelengths in the visible light spectrum, allowing for detailed representation of the features in the captured scenes while maintaining a high spatial resolution. Panchromatic images are often used in various applications such as cartography, land use planning, and environmental monitoring due to their ability to provide a clear and comprehensive view of the terrain. The other options describe different types of imagery that don't align with the definition of panchromatic imagery. For example, options discussing colored imagery or multispectral captures pertain to images that utilize specific bands or wavelengths rather than the full spectrum of visible light. Option A focuses on the infrared spectrum, which isn't relevant to the typical definition of panchromatic images within the context of visible light. Therefore, the choice that accurately defines panchromatic imagery is the one indicating black and white images derived from the entire visible spectrum.

3. What is the purpose of the MSI onboard the Sentinel satellite?

- A. To capture high-resolution panchromatic data
- B. To measure atmospheric conditions
- C. To collect multispectral imagery**
- D. To provide real-time data to ground stations

The Multispectral Instrument (MSI) onboard the Sentinel satellite is specifically designed to collect multispectral imagery. This capability allows the satellite to capture data across multiple wavelengths of light, which is essential for various applications in environmental monitoring, agriculture, forestry, land use, and climate change studies. Multispectral imagery enhances the ability to differentiate between various land cover types and to assess vegetation health, making it a vital tool for researchers and policymakers. In multispectral imaging, sensors capture data at different specific wavelengths, which can include visible light (red, green, blue) as well as near-infrared and other ranges. This rich dataset enables more detailed analysis than single-band data, offering insights into phenomena that are not visible to the naked eye. Other options pertain to different functionalities not directly related to the core role of the MSI. For instance, capturing high-resolution panchromatic data is typically done with a different type of sensor, measuring atmospheric conditions requires specialized instruments designed for that purpose, and providing real-time data to ground stations usually entails communication systems rather than imaging instruments. Therefore, collecting multispectral imagery is the accurate description of the MSI's purpose.

4. Which of the following is an SBAS that covers Japan?

- A. EGNOS
- B. MSAS**
- C. WAAS
- D. CORS

The choice of MSAS as the correct answer is accurate because it specifically refers to the Multi-functional Satellite Augmentation System, which is designed to enhance the accuracy of GPS signals in Japan. MSAS provides critical corrections and reliability to satellite-based navigation systems, improving the positioning performance for users across the country. In contrast, EGNOS (the European Geostationary Navigation Overlay Service) primarily serves Europe, while WAAS (the Wide Area Augmentation System) is designed for the United States and does not extend its coverage to Japan. CORS (Continuously Operating Reference Stations) is not an SBAS but rather a network of GPS reference stations providing differential correction data and is used mainly for surveying and geodesy. Understanding that MSAS is uniquely tailored for Japan underscores its role and the importance of regional satellite augmentation systems in providing localized navigation accuracy.

5. What is the primary function of the panchromatic sensor on the satellites mentioned?

- A. To capture high-resolution color images**
- B. To monitor weather patterns**
- C. To analyze soil samples**
- D. To measure ocean depth**

The primary function of a panchromatic sensor on satellites is to capture high-resolution grayscale images, often used for detailed analysis in various applications such as urban planning, land use mapping, and environmental monitoring. Panchromatic sensors have the capability to capture more detail than color sensors because they gather data across a wide range of wavelengths, typically in the visible spectrum. This results in higher spatial resolution images that can identify fine features on the Earth's surface. While capturing images in color could be a function of other sensor types, the distinguishing factor for panchromatic sensors lies in their ability to produce sharp, detailed images in monochrome, which can then be used in a variety of analyses that require high detail. Other choices like monitoring weather patterns, analyzing soil samples, and measuring ocean depth pertain to functions served by different types of sensors or methodologies as panchromatic sensors are primarily focused on imaging rather than atmospheric or subsurface analysis.

6. What advantage does Landsat provide regarding Earth observation?

- A. It captures images every day**
- B. It can photograph the entire Earth in 16 days**
- C. It utilizes only a single spectral band**
- D. It covers only urban areas for detailed analysis**

Landsat provides a significant advantage by being able to photograph the entire Earth approximately every 16 days. This capability is crucial for monitoring changes in land use, vegetation cover, and other environmental factors over time. The 16-day revisit cycle allows researchers and scientists to develop a comprehensive understanding of temporal changes in the Earth's surface. This regular acquisition of images is particularly valuable for long-term studies, such as tracking the impacts of climate change, urban development, and natural disasters. In contrast to the other options, the daily capture of images is not a feature of Landsat satellites; they have a longer revisit time. The claim about utilizing only a single spectral band is incorrect, as Landsat satellites capture data across multiple spectral bands, enabling diverse analysis from visible to infrared ranges. Additionally, focusing solely on urban areas limits the broader ecological and environmental analysis that Landsat supports, as it is designed to monitor various land cover types, including rural and natural landscapes. Thus, the 16-day coverage enables an effective balance between temporal resolution and coverage, making it a powerful tool in Earth observation.

7. What is temporal resolution?

- A. The spatial detail between pixels in an image
- B. The length of time a sensor takes to return and image the same location**
- C. The variation in sensor sensitivity across different wavelengths
- D. The ability of a satellite to image multiple spectral bands simultaneously

Temporal resolution refers to the frequency at which a satellite or sensor can capture images of the same area over time. Therefore, the correct choice focuses on the length of time a sensor takes to revisit and image the same location, which is crucial for monitoring changes in land use, vegetation growth, or any dynamic features on the Earth's surface. Understanding temporal resolution is vital in applications such as environmental monitoring, agriculture, and disaster response, where tracking changes over time is essential for making informed decisions. Higher temporal resolution means that more frequent images are available for analysis, allowing for better detection of changes and events as they unfold. The other choices address different aspects of remote sensing. For instance, spatial detail between pixels relates to spatial resolution, which concerns the level of detail visible in an image based on the size of the pixels. The variation in sensor sensitivity across wavelengths pertains to spectral resolution, which affects the sensor's ability to distinguish between different land cover types or materials by analyzing various wavelengths of light. The ability of a satellite to image multiple spectral bands simultaneously relates to the sensor's capability to capture images in various spectral regions at once, which is important for obtaining comprehensive data on surface materials or vegetation health.

8. What does DRG stand for in geographic information systems?

- A. Digital Raster Graphic**
- B. Data Resource Guide
- C. Digital Reading Grid
- D. Dual Raster Geometry

The acronym DRG stands for Digital Raster Graphic in the context of geographic information systems. A Digital Raster Graphic is a scanned image of a topographic map or other kind of map that is georeferenced, meaning it is aligned with spatial coordinate systems. This allows for the image to be overlaid and analyzed with other geographic data layers within a GIS environment. DRGs are essential for preserving historical cartographic data and for integrating it with contemporary GIS applications, enabling users to perform various spatial analyses and map visualizations. This answer highlights the importance of DRGs in GIS, emphasizing their role in maintaining the integrity of existing maps while allowing for advanced geospatial analysis. Other interpretations of the acronym would not accurately reflect its established usage in the field of geographic information systems.

9. Which function allows satellites to avoid direct overhead imaging?

- A. Radiometric resolution**
- B. Off-nadir viewing**
- C. Temporal resolution**
- D. Spatial analysis**

Off-nadir viewing is the function that allows satellites to capture images at angles other than directly overhead, or nadir. This capability is significant because it enables satellites to gather data about areas that might otherwise be obscured or less accessible when viewed from directly above. By tilting the imaging sensor during data collection, satellites can acquire information from a broader area and at different perspectives, leading to enhanced data for applications like monitoring natural disasters, urban development, and environmental changes. This method is particularly useful in minimizing shadows and identifying features that may not be as clearly visible from a nadir perspective. Radiometric resolution pertains to the sensitivity of a sensor to different wavelengths of light and refers to how well a sensor can capture the differences in the intensity of radiation. Temporal resolution refers to how frequently a satellite can revisit the same area to capture data over time. Spatial analysis involves the techniques and methods used to examine spatial data once it has been collected but does not pertain to how the satellite positions itself for imaging.

10. Non-selective scattering involves scattering caused by what type of particles?

- A. Particles smaller than the wavelength**
- B. Particles the same size as the wavelength**
- C. Particles larger than the wavelength**
- D. Electromagnetic waves**

Non-selective scattering is a phenomenon that occurs when particles are larger than the wavelength of incoming electromagnetic radiation, such as light. This type of scattering happens because the size of the particles significantly influences how they interact with the incoming waves. When particles are larger than the wavelength, they scatter all wavelengths of light rather uniformly, leading to a scattering effect that does not preferentially favor certain wavelengths over others. This is in contrast to selective scattering, which occurs when particles are comparable in size to the wavelength or smaller, resulting in different wavelengths being scattered by different amounts. For example, Rayleigh scattering, which explains why the sky appears blue, happens due to smaller particles and affects shorter wavelengths more than longer ones. In the case of non-selective scattering, such as that produced by large particles (like those found in fog or certain aerosols), the particles will scatter light across the spectrum in a relatively uniform manner, leading to a different visual effect, such as a whitish or gray appearance. This principle is important in various fields, including meteorology and environmental science, as it relates to how different atmospheric conditions influence visibility and color in the environment.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

<https://asu-gis205final.examzify.com>

We wish you the very best on your exam journey. You've got this!

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