

Urban and Architectural Design

Example Answers or Intent of Questions

Question 1

(1) Short-term load

The design load consisting of the long-term load (such as dead and live loads) that acts continuously, combined with one of the following variable actions: snow load, wind pressure, or seismic force. It is used for allowable stress design. The snow load, wind pressure, and seismic force are assumed to represent a heavy snowfall, strong wind, or moderate earthquake that is likely to occur at least once during the building's service life (typically 50 years).

(2) Zenshuyo Style

An architectural style established in medieval Japan under the influence of Chinese architecture. Characteristic features include securing pillars with nuki, techniques such as intermediate bracket complexes and ougi-daruki (fan rafters), and the use of components like taiheizuka (bottle-shaped strut), ebi-koryo (s-shaped tie beam), and soban (footing stone). Representative examples include the Shari-den Hall at Engaku-ji Temple. It was also widely used in architecture other than Zen temples.

(3) Garden city

Ebenezer Howard (UK) authored "Garden Cities of Tomorrow" in 1898, the Garden City concept he proposed there became one of the most influential urban planning philosophies of the 20th century. As a response to the overcrowding of large cities, the idea of building "Garden Cities" that combined the strengths of both urban and rural areas had a significant impact on urban policies worldwide, leading to the construction of suburban housing areas and new towns around major cities.

(4) Cross rib vault

A type of ceiling generalized in Gothic architecture. Its basic form is a cross vault created by intersecting two pairs of semi-cylindrical (tunnel) vaults at right angles, reinforced along its ridgeline with linear members called ribs. Because the load concentrates on the four corner pillars supporting the ribs, large openings can be created in the walls between the pillars.

(5) Territory

Unlike "personal space", "territory" refers to a non-moving area that belongs to the environment in which someone has certain rights. A territory does not disappear even when its owner is not present, and is often marked by the placement of possessions.

(6) Asbestos

Asbestos is a fibrous mineral formed through the alteration of serpentine and amphibole rocks. It possesses excellent heat, chemical, and wear resistance. Because of its high tensile strength and low cost, it was widely used as a spray-on material for fireproofing, thermal insulation, and sound absorption. However, since inhalation into the lungs causes severe health hazards, its import, manufacture, and use are currently prohibited.

(7) Landscape Act in Japan

The Landscape Act is a law enacted in 2004 (Heisei 16) that establishes a system to promote the good landscapes in cities, agricultural areas, mountain villages, and fishing villages. This law enables the formulation of landscape plans, the designation of landscape districts, and regulations on the form and color of buildings. Local governments can enact ordinances and give legal effect to residents' agreements, thereby aiming to form a beautiful national land that harmonizes with the region's nature, culture, and history.

Urban and Architectural Design

Example Answers or Intent of Questions

(8) Plane (tool)

A type of woodworking tool used to shave thin layers from the surface of wood to achieve a smooth finish. In Japan, yari-ganna, a tool with a spear-like blade used to shave surfaces, was used in ancient times, while the dai-ganna, which fixes the blade to a base, appeared around the 16th century. While most planes worldwide are pushed to shave, Japanese planes are pulled.

(9) Law for the Protection of Cultural Properties (Japan)

The Law for the Protection of Cultural Properties was enacted in 1950. It was newly established through the integration of three earlier laws: the Historic Sites, Places of Scenic Beauty, and Natural Monuments Preservation Law of 1919, the National Treasures Preservation Law of 1929, and the Law Concerning the Preservation of Important Works of Fine Arts of 1933. Under the current law, the following categories of cultural properties are defined: tangible cultural properties, intangible cultural properties, folk cultural properties, treasure trove (buried cultural properties), monuments, cultural landscapes, groups of traditional buildings preservation districts, and techniques for the conservation of cultural properties. Based on this law, important cultural properties may be designated or selected. The law also provides for the establishment of local councils for the protection of cultural properties.

(10) Marine pollutant

Substances that are released into the ocean primarily as a result of human activity and cause pollution. These cause the problems that include the mass death of farmed fish due to eutrophication, the impact on ecosystems of crude oil spills due to tanker accidents, damage caused by the accumulation of toxic chemicals in living organisms, and, more recently, the adverse effects of trace amounts of plastic.

(11) City park

City parks are public green spaces, including park facilities such as pathways, plazas, playground equipment, and sports facilities, that are established and managed by local governments or the national government within city planning areas based on the Urban Park Act. These facilities serve diverse purposes, including providing citizens with places for relaxation, recreation, disaster prevention, and environmental conservation. There are also various types such as historical parks and athletic parks, and technical standards for their establishment and management are stipulated by government ordinances and local ordinances.

(12) Crowd

In architectural planning, a crowd refers to a condition in which a large number of people simultaneously occupy a space at a specific time or under particular circumstances, exhibiting patterns of movement, stay, and collective behavior. It is analyzed through indicators such as crowd density (degree of concentration) and crowd flow (speed, volume, and effective width of movement paths), and constitutes a fundamental concept in evaluating spatial safety, comfort, and evacuation planning.

(13) Conservation of satoyama

In its narrow sense, satoyama refers to secondary forests, mixed woodlands, and agricultural forests created by thinning and cutting natural forests and growing coppiced or planted trees to form mature forests. These areas have traditionally been used as sites for producing firewood, charcoal, green manure, shiitake mushrooms, and other products. In its broad sense, the term can also include coniferous plantations, residential lots, and farmland, referring

Urban and Architectural Design

Example Answers or Intent of Questions

to the entire system where material circulation takes place. Satoyama is a concept that involves achieving harmony with the natural environment through people's lifestyles and maintenance practices, conserving biodiversity, and preserving local culture in a sustainable manner.

(14) Brutalism

An architectural movement that spread internationally from the 1950s to the 1970s, characterized by the “raw” expression of materials and construction methods, particularly exposed concrete. It originated in the concept of “New Brutalism” proposed by Peter and Alison Smithson and was later theorized by the architectural historian Reyner Banham.

(15) Habitat 67

The residential complex designed by Moshe Safdie for the Montreal World Expo. Employing an industrialised construction method involving factory-produced precast reinforced concrete units. By combining and stacking these units, it overcame the weakness of industrialisation to achieve innovative architecture featuring diverse, independent dwellings with terraces.

(16) La Ville Radieuse

Le Corbusier's ideal urban model proposed in the 1930s. The city was divided into four functions: “residence,” “work,” “leisure,” and “transportation.” Emphasis was placed on creating a comfortable environment through high-rise construction and surrounding greenery, along with separating pedestrians and vehicles and improving traffic efficiency. Designed using the Modulor, a human-scale standard, it aimed to solve the challenges of modern cities. This concept significantly influenced urban planning worldwide, with the Unité d'Habitation serving as a representative example of its implementation.

(17) Art nouveau

Around 1900, An artistic style that flourished primarily in European cities such as Brussels and Paris. Characterized by organic forms modeled after nature, particularly plants, rather than historical styles. The architecture uses extensively decorative elements made from cast iron and glass. Representative architects include Victor Horta, Hector Guimard, and Antoni Gaudí.

(18) Other effective area-based conservation measures (OECM)

One of the targets adopted at the COP10 to the CBD in 2010. A means to achieve the conservation targets of 17% of terrestrial areas and 10% of marine areas. Areas outside current protected areas where ecosystem functions and services are maintained and managed over the long term. The Ministry of the Environment certifies these as Nationally Certified Sustainably Managed Natural Sites.

(19) Heat pump

A heat transfer device that utilizes a refrigerant cycle to transport heat from a low-temperature source to a high-temperature destination. It consists of a compressor, condenser, expansion valve, and evaporator. The refrigerant vapor condenses in the condenser, releasing heat, while the refrigerant liquid evaporates in the evaporator, absorbing heat. By switching the refrigerant circuit, this system can be used for both cooling and heating applications.

(20) Carbon negative

Carbon negative refers to a state in which the amount of greenhouse gases (CO₂, water vapor, etc.) absorbed by forests, oceans, etc. is greater than the amount emitted into the atmosphere through economic activity. In order to

Urban and Architectural Design

Example Answers or Intent of Questions

prevent global warming, which is a cause of abnormal weather, the development of technology to capture and fix CO₂ in the atmosphere and remove it is expected.

Question 2 Architectural planning

Questions aim to test the basic knowledge and understanding of architectural planning and problem-solving skills required for master's degree research.

1. Questions aim to test the basic knowledge and understanding of housing planning, which is one of the most important research fields in architectural planning. At the same time, it examines the ability to express knowledge in the form of concise sentences.
2. Questions aim to test the basic knowledge and understanding of “educational facility planning,” which is one of the important research areas in architectural planning. At the same time, it examines the ability to express knowledge in the form of concise sentences.
3. Questions aim to test the basic knowledge of “medical facility planning,” one of the important research areas in architectural planning. At the same time, it examines the ability to express knowledge in the form of concise sentences.
4. Questions aim to test the basic knowledge and understanding of “space” in architectural planning, and at the same time, to test the ability to apply and develop the architectural design.

Question 3 Urban planning and architectural Design

1.(1) Questions aim to test basic knowledge of urban planning necessary for master's degree research.

Sample answers

Kenzo Tange, Hiroshima Peace Memorial Park: This proposal symbolically commemorates peace by setting the atomic bomb dome as the focal point of the city axis and arranging buildings around it.

1.(2) Questioning the analytical and logical skills of urban design necessary for research in a master's program

Sample answers

There are a wide variety of correct answers as long as concrete evidence and logical development based on that evidence are provided.

2.(1) Purpose of the question: This question asks for fundamental knowledge about Geodesic Dome (also known as the Fuller Dome) by R. Buckminster Fuller, which is one of the important historical examples in architectural design studies. Using keywords such as large-span space; resource efficiency; industrialization; and “More with Less”, the question seeks to assess your understanding of the design philosophy behind Geodesic Dome. It also evaluates your ability to express your knowledge in written form.

2.(2) Purpose of the question: Focusing on architecture in tropical climates, this question tests knowledge, creativity, and logical thinking related to climate-responsive design, one of the key concepts in architectural design. It assesses the ability to express architectural thinking in logical written form and through diagrams, using climate-related keywords such as ventilation, cross-ventilation, solar shading, and air conditioning efficiency, as well as architectural strategies such as brise-soleil and double roof.

Urban and Architectural Design

Example Answers or Intent of Questions

Question 4. Architectural environmental planning

Questions aim to test basic knowledge of architectural environmental planning necessary for master's degree research.

1. Explain what you know about the mechanism and characteristics of how humans perceive color based on information obtained from the eyes. (10 points).

This question tests the basic knowledge of “vision”, one of the most important senses in architectural environmental planning studies. At the same time, the ability to express knowledge in the form of concise sentences will be examined.

2. Describe how each of the following items related to the acoustic environment should be considered in architectural design, using diagrams where appropriate. (20 points)

- Improving sound insulation and walls
- Quantity and quality of sound reverberation

This question tests basic knowledge related to the acoustic environment, which is important in architectural environmental planning studies. At the same time, it examines the ability to express knowledge in the form of sentences and diagrams.

3. Explain the thermal sensations of cold, hot, comfortably cool, and comfortably warm from the perspective of both the body and the environment thermal conditions. (10 points)

This question asks for basic knowledge related to the thermal environment, which is important in architectural environmental planning studies. At the same time, it looks at the ability to express knowledge in the form of concise sentences.

4. Explain what is known about the way people maintain distance from each other, the classification of such distances, and the factors that influence them. Give examples to explain how this knowledge is applied in environmental design. (10 points)

This question tests basic knowledge related to environmental psychology, which is the foundation of architectural environmental planning studies. The test will look at the ability to express knowledge in the form of concise sentences as well as the ability to apply it to environmental design.

Question 5. Building construction methods and architectural production

Purpose of the question: To assess the basic knowledge and understanding of building construction methods and architectural production that are necessary for research at master's level (industrialisation, optimisation of construction, temporary and permanent structures, new materials, the application of new architecture to existing architecture and cultural properties), as well as the ability to express this knowledge clearly and concisely in writing.

1. To assess basic knowledge of building construction methods and architectural production related to the Crystal Palace. At the same time, assess the ability to express this knowledge clearly and concisely.

2. This question assesses basic knowledge of architectural construction methods and production processes related to World Expo pavilions and legacy structures. It also evaluates the ability to express this knowledge in concise written form.

3. This question assesses basic knowledge of architectural construction methods and production processes related to World Expo pavilions and structures that are currently in use. It also evaluates the ability to express this knowledge concisely in writing.