

Examination Subject
Landscape Architecture

Answer Sheets

Examinee’s number

(1) Basilica

A type of public building used for multipurpose use, including courtrooms, meetings, and commercial transactions in ancient Roman cities. The interior space is usually rectangular plane and surrounded by columns. It became one of the prototypes for later Christian church architecture.

(2) Sick building syndrome

Sick building syndrome is a term used to describe symptoms such as fatigue, dizziness, headaches, eczema, sore throats and respiratory illnesses caused by volatile organic compounds (VOCs) in building materials. As a countermeasure, use building materials that emit low levels of VOCs, such as formaldehyde, and ventilate the room at all times to reduce the concentration of VOCs in the room.

(3) Cooperative house

Cooperative housing is a housing supply method where multiple prospective residents jointly acquire land and work with a construction company to build housing. The unique feature of this method is that it enables the prospective residents to create a home that reflects their own preferences.

(4) Carbon negative concrete

Since a large amount of CO2 is emitted during cement production, this concrete reduces CO2 emissions by replacing some of the cement with blast furnace slag or other materials, or by fixing CO2 in the concrete.

(5) Nature-based Solutions

Nature-based Solutions refers to sustainable approaches that utilize the power of nature and ecosystem functions to effectively and adaptively address social challenges such as climate change, disasters, water scarcity, and biodiversity loss. It refers to solutions in harmony with nature, such as forest restoration, wetland conservation, and urban greening.

(6) Tatsuno Kingo

Japanese architect. After studying architecture at Imperial College of Engineering he trained future architects at the Imperial University of Tokyo while also operating architectural firms. His masterpieces include the head office of the Bank of Japan and Tokyo Station.

(7) Chemical weapon

A chemical weapon is made of toxic chemical substances such as poisonous gases used as weapons. Well-known examples include sarin, mustard, and VX gases, and these gases may be used not only as gases but also by adsorbing them on solids and liquids. Under the Chemical Weapons Convention, the use of chemical weapons in war and similar situations is prohibited. However, in reality, some countries are not signatories to the treaty, and chemical weapons continue to be used. The chemical weapons are also used in terrorist attacks as reported in the news.

(8) The Limits to Growth

A report published by the Club of Rome in 1972. Computer simulations showed that if population growth and economic growth continued at the current rate, the supply of food and resources would not keep pace and would come to a standstill, sounding a warning to the world.

(9) COVID-19

A new type of coronavirus infection appeared in 2019 is referred to as COVID-19, and the symptoms include high fever and sore throat. Symptoms range from asymptomatic to severe cases, leading to fatal death in the worst case. This infection spread in 2020 and became a pandemic in 2022, but the WHO declared the end of emergency in 2023. However, many cases of infection are still being reported to date.

(10) Mies van der Rohe

Architect from Germany. After teaching at the Bauhaus, he moved to the U.S., where he used steel and glass to create universal spaces without limitation of use. His representative works include the National Gallery in Berlin.

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(11) Ecosystem service

Ecosystem services are the benefits humans derive from the natural environment, classified into four categories: provisioning services such as food and water; regulating services such as climate regulation and water purification; cultural services such as recreation and spiritual fulfillment; and supporting services such as nutrient cycling and photosynthesis. These represent important natural capital that supports human well-being and economic activities.

(12) Vibration control of buildings

Vibration control of buildings is a structural system designed to reduce the building's response to earthquakes and strong winds by preventing resonance, adding damping forces, or absorbing input energy from external forces. In this system, dampers and other devices are incorporated into the structural frame, which supports constant loads.

(13) Cross laminated timber (CLT)

A material made by gluing planks of wood together so that the grain runs parallel to each other, then laminating and gluing them together to make the wood grain run at almost right angles to each other, resulting in a structure of three or more layers. The use of this material is growing rapidly in many countries around the world, for example, as large panels for floors and walls in buildings.

(14) Specialization of environmental design

Using a building as an example, in primitive societies, house building itself was done by the dwellers themselves, and any dissatisfaction was to be given up as a limitation of their own abilities. In medieval society, although carpenters and other professionals were established from among those who excelled at house building, there was no significant friction between professional craftsmen and dwellers because of the implicit cultural norms shared about building. Today, as people's values and lifestyles diversify and as the uses of buildings become more specialized, specialists such as architects have emerged, and the gap between specialists and users has become increasingly problematic. Communication between designers and users is therefore becoming increasingly important.

(15) Shinden-zukuri style

It is a type of Japanese residence based on the aristocratic residences of the Heian period. The building layout is centered on the main building (shinden) with an open space to the south, surrounded by eastern or western building (tai) and chumonro corridor. Inside of the building are not partitioned like rooms, but spaces are arranged by movable furniture and partitions.

(16) Park system

Park system refers to a planning method in urban design that connects multiple parks and green spaces into a network using roads, waterways, and greenways. It was developed in 19th century America by landscape architects such as Olmsted and Cleveland. The approach creates a multifunctional green network that improves urban environments, provides recreational opportunities, and preserves ecosystems.

(17) Metabolism (architectural movement)

An architectural movement of the 1960s by young Japanese architects such as Kisho Kurokawa and Kiyonori Kikutake. They advocated that architecture should change like the metabolism of a cell. Part of this movement was realized in the pavilion at the Osaka Expo and the Nakagin Capsule Tower Building.

(18) Curtain wall

A wall that does not have a load-bearing function but is provided to demarcate space. By distinguishing it from the structural framework, it has become possible to build high-rise buildings with all-glass walls.

(19) Area classification system

The Area Classification System is a framework based on Japan's City Planning Act that divides urban planning areas into Urbanization Promotion Areas and Urbanization Control Areas to prevent disorderly urban sprawl. In Urbanization Promotion Areas, development is actively encouraged, while in Urbanization Control Areas, urbanization is restricted. This provides a fundamental mechanism for land use control that promotes planned urban development while preserving natural environments and agricultural land.

(20) World Heritage Convention

It is a Convention adopted by UNESCO in 1972 to protect and preserve cultural and natural heritage of outstanding universal value. Based on the Convention, the sites are registered as World Heritage sites, and international assistance is provided.



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Question 2-1.

"Substitutional vegetation refers to vegetation that is established after natural vegetation has been destroyed due to human intervention of maintenance and management. It is used as an antonym to natural vegetation. Examples include grasslands (kayaba) that are regularly mowed to secure materials for thatched roofs, and coppice forests that are repeatedly harvested on a 15-20 year cycle for firewood and charcoal production. Other examples include agricultural lands and artificial forests. Such substitutional vegetation affected by human influence is also called *satochi-satoyama*, and most of the existing vegetation in Japan is substitutional vegetation. When human influence ceases, grasslands develop into forests of sun-tolerant trees, and later the composition of tree species changes to shade-tolerant forests, transitioning toward natural vegetation."

Question 2-2.

The term 'biodiversity' began to be used in the 1970s, and in 1992, the Convention on Biological Diversity was adopted at the United Nations Conference on Environment and Development (Earth Summit) in Rio de Janeiro. In Japan, the National Biodiversity Strategy was established in 1995, and in 2008, the Basic Act on Biodiversity was enacted, making the concept widely recognized and outlining the responsibilities of the national government, local governments, businesses, and citizens.

Biodiversity is said to be facing crises, and the following three are identified: The first crisis is the extinction of species and destruction of ecosystems due to human development activities. The second crisis is the degradation of *satoyama* and similar areas due to the reduction of human activities resulting from socioeconomic changes. The third crisis is the disruption of ecosystems caused by invasive species. Additionally, recent climate change due to global warming is also pointed out as potentially having a significant impact on biodiversity, sometimes referred to as the fourth crisis.

Question 2-3.

The Ministry of Agriculture, Forestry and Fisheries has established laws to promote the conservation of the multifunctional roles of farmland and forests. These multifunctional roles include land conservation, water source recharge, natural environment conservation, formation of favorable landscapes, cultural heritage preservation, and prevention of global warming.

Farmland has the function of temporarily storing rainfall, delaying water runoff into rivers, and reducing the risk of flooding. Forests, meanwhile, allow soil to recharge groundwater from rainfall, and tree roots reduce the risk of landslides.

However, as seen in recent severe disasters, when faced with unprecedented heavy rainfall that exceeds expectations, the water storage capacity of farmland and the soil retention capability of forests prove insufficient, resulting in floods and landslides. Additionally, in the case of forests, the level of disaster risk varies depending on management conditions, tree species composition, topography, and the degree of bedrock weathering. While farmland and forests have these disaster prevention functions, they alone cannot prevent disasters.

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Question 3-1

Ebenezer Howard proposed the "Garden City" concept in his 1898 book "Garden Cities of Tomorrow" to simultaneously solve the problems of overcrowding in urban areas and depopulation in rural areas following the Industrial Revolution. This concept was based on the idea of a "marriage between town and country," envisioning self-sufficient communities with populations limited to approximately 32,000 people.

The Garden City was characterized by efficient urban design with a concentric circular structure, greenbelts to prevent urban sprawl, public land ownership, and a self-sufficient economic structure. Howard also presented an overall vision of these cities surrounding a central city, forming a "Social City."

In actual implementation, the concept faced challenges including economic feasibility issues and political barriers related to land ownership. Even in experimental cities like Letchworth, public land ownership was not realized.

For future possibilities, this concept offers potential as a model for sustainable urban development, compatibility with compact city concepts, pioneering of polycentric distributed urban networks, community-oriented urban design, and integration with smart cities.

Howard's vision, with its emphasis on environmentally harmonious distributed cities, holds promise as an effective solution to contemporary urban problems and rural depopulation.

Question 3-2.

The Landscape Act, established in 2004, is Japan's first comprehensive law concerning landscape. Based on the principle that "good landscapes are common property of the people," this law aims to promote landscape formation that leverages regional characteristics. It marked a shift from landscape preservation based on independent municipal ordinances to a nationwide framework with legal binding power.

The fundamental concept of the Landscape Act emphasizes collaborative landscape development involving local residents, businesses, and government, adopting a comprehensive approach that combines regulation and guidance. It designates "Landscape Administrative Bodies" with authority to formulate landscape plans, enabling initiatives that respect local autonomy.

Kyoto City is a notable example of a Landscape Administrative Body. It has established the "Kyoto City Landscape Plan," dividing the city into multiple zones and implementing regulations according to each area's characteristics. Particularly in historical urban areas, the city limits building heights (reduced from a maximum of 45m to 31m) and sets standards for design and color schemes to preserve traditional townscape. The city has also strengthened regulations on signage through coordination with outdoor advertisement ordinances.

Yokohama City's initiatives are also noteworthy. The "Yokohama City Landscape Plan" focuses on preserving and utilizing the city's characteristic port landscape. In areas such as "Minato Mirai 21 District," detailed standards for building placement, form, and color have successfully created an attractive urban landscape.

Question 3-3.

In Japan's era of urban shrinkage, strategic management of vacant land increasing due to population decline and aging is an urgent issue.

First, understanding and classifying vacant land is essential. Creating a vacant land database using Geographic Information Systems (GIS) and categorizing sites based on location characteristics, surrounding environment, and ownership patterns enables the development of effective utilization strategies.

For vacant land utilization, the concept of "selection and concentration" to promote urban compactification is important. A zoning approach that encourages high-density redevelopment in central urban areas while planning for lower density and natural restoration in peripheral areas is effective.

Specific utilization measures include conversion to urban and community gardens, renewable energy production sites, green infrastructure with rainwater retention and infiltration functions, and disaster prevention spaces. Particularly important is the formation of green networks for enhancing urban biodiversity and addressing climate change.

For vacant land management stakeholders, collaboration between local residents, NPOs, and private companies is essential, not just government leadership. Along with addressing issues of land with unknown ownership, expanding vacant land bank systems, regulatory relaxation to promote temporary use, and tax incentives to stimulate private sector involvement are necessary.

In the long term, a social system transition from emphasizing land "ownership" to "utilization" is needed, along with developing new land use systems based on joint ownership and community management. Urban shrinkage should be viewed not simply as decline but as a transition period toward higher quality urban environments, aiming for sustainable urban development through strategic vacant land management.

Question 3-4.

In the context of increasingly severe natural disasters due to climate change, Ecosystem-based Disaster Risk Reduction (Eco-DRR) has been garnering attention. This sustainable approach complements conventional disaster prevention methods that depend on hard infrastructure by actively utilizing the disaster prevention functions inherent in natural ecosystems.

A concrete example is the "Midorikawa and Shirakawa River Basin Flood Retention Area Development Project" in Kumamoto Prefecture. Following the 2016 Kumamoto earthquake and recent heavy rainfall disasters, efforts have been made to enhance floodwater retention functions by utilizing paddy fields and wetlands around rivers. Particularly in the Shirakawa River basin, restoration of former wetlands has been undertaken to function as temporary water storage areas during floods, protecting urban areas downstream from water damage.

Among the challenges of Eco-DRR is the difficulty of quantifying its effectiveness. Compared to conventional structural disaster prevention measures, the protective functions of ecosystems vary with weather conditions and seasonal changes, making it difficult to evaluate them using uniform standards.

Additionally, building consensus among diverse stakeholders is a significant challenge. Since Eco-DRR serves multiple purposes beyond disaster prevention, including ecosystem conservation and regional revitalization, it requires coordination of interests among stakeholders regarding land use and management methods.

On the other hand, the potential benefits include synergistic effects from the dual achievement of disaster prevention and mitigation, and biodiversity conservation, as well as economic benefits from utilizing regional resources. In addition, long-term sustainability through nature's resilience is another advantage.

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Question 4-1.

Cases have emerged where degraded *satoyama* (traditional rural landscapes) preserved in suburban areas are being managed and utilized by local residents. Activities include using fallen leaves and branches for compost, and wood for firewood and crafts. Through these activities, sunlight reaches the forest floor, enabling coppice regeneration, which maintains healthier and more diverse ecosystems. Furthermore, *satoyama* activities provide opportunities for community building through ecosystem learning, harvesting, and seasonal events, not just agriculture. As these experiences are valuable in urban settings, they can effectively foster sustainable community formation among typically disconnected urban residents.

Additionally, the agricultural environment of *satoyama* represents the history, culture, and landscape that Japan cultivated for over a thousand years until about half a century ago. Management and utilization by urban residents represent attempts to sustainably preserve these traditions. As described above, the management and utilization of *satoyama* by urban residents contributes to the sustainability of traditional ecosystems and environments while providing opportunities for community formation in the context of modern society, making it highly significant.

Question 4-2.

In a Japanese traditional pond garden, a path is set around a pond, and viewpoints are set up at various places along the path, with elements such as water features, bridges, islands, architecture, artificial hills and plants intended to be seen beautifully from various angles. The enjoyment of moving around rather than having a fixed viewpoint, and the enjoyment of the detailed and diverse changes in the landscape, are universal characteristics that can be applied even in the present day. These qualities can be applied, for example, when designing a square in front of a station where many people come and go and stay, as a space for walking and staying mixed with rich greenery where people can feel at ease in the city.

Question 4-3.

The coffee shop Abeki is located at the Hirao 1-chome intersection. It is a very narrow, glass-walled building on a corner with a lot of traffic, both cars and people. Furthermore, it is usually crowded due to its popularity. Perhaps because of this, the people sitting next to each other and the hustle and bustle of the town feel like an interior. The reason these feel like ‘interiors’ rather than noise is that the scale of the smaller-than-usual furniture and unreliable wooden sashes is in harmony with the hustle and bustle, while the interior is white and serves as a backdrop to the bustle, giving the impression of urban liveliness, like a painting or a film.

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