МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

Харківська національна академія міського господарства

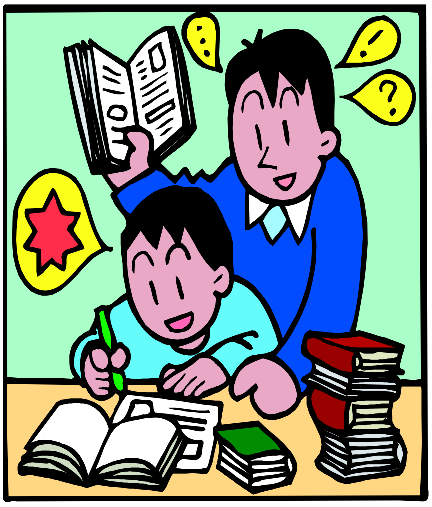
Н. В. МАМАТОВА

ТЕКСТИ І ТЕСТОВІ ЗАВДАННЯ

з дисципліни “Іноземна мова ”

(англійська мова) для організації самостійної роботи студентів 1-2 курсів денної форми навчання напряму підготовки 6.060102 –

“Архітектура”



Харків

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Тексти і тестові завдання с дисципліни **“Іноземна мова”** (англійська мова) для організації самостійної роботи студентів 1-2 курсів денної форми навчання напряму підготовки 6.060102 – “**Архітектура”.** /Харк. нац. акад. міськ. госп-ва; уклад.: Н.В. Маматова– Х.: ХНАМГ, 2010. – 60 с.

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Рецензент: О.Л. Ільєнко

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INTRODUCTION

These **tests for self-study** have been specially designed to provide essential practice for students specializing in **Architecture.**

The course consists of **7 tests for self-study**. Each test contains the following:

* The test in Modern English Grammar.
* The text followed by a number of questions.

The specific benefits of this method of presentation are as follows:

1. It provides the reader with a quick, efficient, and effective means of grasping the essential subject matter.
2. It keeps the reader *active* in the learning process and increases comprehension level.

These tests can be used for self-study, to check language and to offer a diagnostic for the students' language development.

When teachers use texts for reading, they are often too concerned with what was written at the expense of *how*. Reading in any language is an affective as well as a cognitive process. The teacher's role is not that of corrector or judge, but rather that of enabler. The teacher assists with language, error, but should not replace the student's perceptions with his or her own.

The teacher who brings these tests into the study is not depriving the students of language practice, but is, instead, providing a richer context for such practice.

To facilitate the students' self-study, a comprehensive **list of references** has been appended.

All the students can be directed to **Texts for Reading.**

Section 1

TEST 1

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence.
Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. **Architecture** is the art and science of designing and building structures, or ensembles ….. aesthetic and functional criteria.

(A) according to

(B) in accord

(C) in concord

(D) in harmony

2. The ….. creates order in the picturesque variety of nature. (*Auguste Perret*)

(A) ecologist

(B) biologist

(C) architect

(D) physician

3. The architect is a person trained and experienced in the design of buildings and the coordination and supervision of all ….. of the construction of buildings.

(A) parts

(B) aspects

(C) perspectives

(D) vistas

4. Town planning or urbanism is the preparation of plans for the regulated growth and improvement of towns, or the organization of land and buildings for group ….. .

(A) study

(B) living

(C) practice

(D) work

5. It is a cooperative process in which architects, economists, engineers, lawyers, landscape architects, doctors, sociologists, surveyors or topographers and other specialists take ….. .

(A) part

(B) notes

(C) letters

(D) lessons

6. In town planning there are different street ….. : gridiron, radial, ring and functional (or organic).

(A) drawings

(B) patterns

(C) samples

(D) models

7. ….. main problem facing the architect today is to avoid any conflict with nature and the landmarks of by-gone days.

(A) A

(B) An

(C) The

(D) –

8. Frank Lloyd Wright (1869?-1959) is the greatest ….. architect to date.

(A) British

(B) Welsh

(C) American

(D) German

9. Le Corbusier, Charles-Edouard (Jeanneret) (1887-1966) was the most influential and

the most brilliant of ….. century architects.

(A) 20^{th}

(B) 19^{th}

(C) 21^{st}

(D) 18^{th}

10. Walter Gropius was one of the first to use the elements of the International ….. style: glass curtain walling, unrelieved cubic blocks, corners left free of visible supports.

(A) New

(B) Old

(C) Southern

(D) Modern

Part B

TEXT 1

ORDERS OF ARCHITECTURE

Read and translate the text using a dictionary

Keywords: classical, architecture, capital, entablature, beam, **Doric**, **Ionic**, **Corinthian**, **Tuscan**, **Composite**, **Colossal**, **Grand, Dwarf, order**, architrave, frieze, cornice, volute, abacus, acanthus, column, convex, side, pilaster, canopy, niche, pillar

The orders are the highest accomplishment of the pillar and beam construction. In classical architecture, the order is a column with base, shaft, and capital, and entablature, decorated and proportioned according to one of the accepted modes. The Greeks developed the Doric, Ionic, and Corinthian orders. The Romans added the Tuscan and Composite.

The entablature is the upper part of a classical order, between columns and pediment, consisting of architrave (the lowermost part), frieze (in the middle), and cornice (the uppermost part).

The columns have entasis or the slight swelling towards their centres. Its object is to correct the optical illusion that the column is thinner in the middle if its sides were straight or parallel.

The Doric is the oldest order subdivided into Greek Doric and Roman Doric. The former is the simplest and the most massive, it has no base, as on the Parthenon. Its stylobate usually has three high steps. The columns are about five and a half diameters high. They have 20 elliptical flutes, separated only by sharp edges. The intercolumniation or clear space between the columns is about one diameter and a third. The height of the entablature is rather more than twice the diameter of the column. Roman Doric was like Greek Doric; but it did have a base, and was less massive.

The Ionic order originated in Asia Minor in the mid 6^{th} century BC. It is characterized by a moulded base; tall, slim column shafts with 24 semi-circular flutes separated by flat fillets. The columns are between eight and nine diameters high and a little more than two diameters apart. Its capitals have large volutes, or spiral scrolls. Its fascinating entablature has continuous frieze, usually dentils in the cornice. It was less heavy than the Doric and less elaborate than the Corinthian.

The Corinthian order was an Athenian invention of the 5^{th} century BC. It is the slenderest and most ornate of the three Greek orders. In its general proportions it is very like the Ionic. It is characterized by a high base, sometimes a pedestal; slim, fluted column shaft with fillets; bell-shaped capital with 8 volutes and two rows of acanthus leaves. It has an elaborate cornice. At first it was used for interiors only. Generally speaking, there are very few Greek examples. It was much used by the Romans for its showiness. The Roman abacus was sometimes enriched with egg-and-dart, as were also parts of the architrave. The Roman cornice was very richly treated and often has modillions carved with acanthus.

The Tuscan order is a simplified version of the Roman Doric, having a plain frieze and no mutules in the cornice. The columns are unfluted. The mouldings are fewer and bolder.

The Composite order is a late Roman combination of elements from the Ionic and Corinthian orders. This order is really a variety of the Corinthian. Its abacus has the plan of the Corinthian abacus – a square with convex sides. Under the projecting angles there are large volutes placed diagonally and, in some cases, springing from behind the band of egg-and-dart borrowed from the Ionic.

Any order whose columns or pilasters rise through two or more storeys of a building is called **the Colossal order**. Sometimes it is also named **the Giant** or **Grand order**. Its opposite is **the Miniature** or **Dwarf order**. The Romans applied it to windows or tabernacles (= decorative niches often topped by canopies and housing statues).

Indicate whether each of the following is true or false by writing 'T' or 'F' in the space provided.

….. 1. Its object is to correct the optical illusion that the column is thinner in the middle if its sides were straight or parallel.

….. 2. Under the projecting angles there are small volutes placed diagonally and, in some cases, springing from behind the band of egg-and-dart borrowed from the Ionic.

….. 3. It is characterized by a high base, sometimes a pedestal; slim, fluted column shaft with fillets; bell-shaped capital with 8 volutes and four rows of acanthus leaves.

TEST 2

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence. Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. **The ancient Greek house** varied ….. design according to the period and the wealth of the owner, but there were common features.

(A) at

(B) with

(C) of

(D) in

2. The house was divided into ….. parts: the men’s apartments (andron) and the women’s apartments (gynaeceum or gynaekonitis).

(A) two

(B) three

(C) three and a half

(D) two and a half

3. The ….. door of the house opened into a vestibule (prothyron); on both sides of the vestibule, in the interior, were the doorkeeper’s room and shops for business and work.

(A) street

(B) front

(C) entrance

(D) back

4. The vestibule led to an open court (aula) which was surrounded ….. three sides by columns, in the middle of which was the altar of Zeus Herkeios, the patron deity of domestic life.

(A) on

(B) within

(C) by

(D) for

5. Large houses usually ….. a second court entirely (= wholly, = completely) surrounded by columns.

(A) have

(B) had

(C) has

(D) having

6. At the sides of the aula were rooms for eating, sleeping, and storage, ….. cells for the slaves.

(A) as well as

(B) too

(C) so as to

(D) as to

7. On the sides of the court opposite the vestibule there were no columns, but two pilasters which marked the entrance to ….. open room or vestibule called the prostas or parastas.

(A) an

(B) the

(C) a

(D) –

8. ….. of the parastas was the sleeping room of the master and mistress of the house (thalamus).

(A) On all sides

(B) On either sides

(C) On one side

(D) On both sides

9. The roof of the Greek house was ….. .

(A) flat

(B) sloping

(C) mansard

(D) convex

10. The rooms usually were lighted through doors which opened ….. a court.

(A) at

(B) into

(C) behind

(D) from

Part B

TEXT 2

EGYPTIAN ARCHITECTURE

Read and translate the text using a dictionary

Keywords: millennium, post-and-lintel, vault, **Egyptian architecture**, Roman, obelisk, necropolis, c. = circa, pharaoh, mummy, dynasty, colonnade, sarcophagus, arch, massive, ancient, pylon, lotus, decoration, colossal, hypostyle, sphinx, throne, elegant

The architecture of Egypt developed from the third millennium BC to the Roman period. Its most outstanding achievements are its massive funerary monuments and temples built of stone for permanence, featuring only post-and-lintel construction, corbel vaults without arches or vaulting, and pyramids. This architecture gave the world the earliest buildings in dressed stone, invented the column, capital and cornice. Features peculiar to (= characteristic of) **the ancient Egyptian architecture** also include the obelisk, the steeply battered pylon, the symbolical lotus column, and incised relief decoration without any structural relevance.

The pyramids of the Old Kingdom, 2700-2300 BC, majestically planted on the desert edge, are the most spectacular of all funerary works. They were built to contain the burial chamber and the mummy of the pharaoh. The world’s first large-scale monument in stone is Zoser’s necropolis at Sakkara (= Saqqara) built c. 2760 BC by Imhotep, the earliest named architect. The six great steps of the Step Pyramid indicate how the pyramidal form evolved as a brilliant inspiration from the simple mastabas, or (= that is) rectangular tombs of the earliest Egyptian dynasties.

In the Middle Kingdom, 2134-1650 BC, the gigantic pyramid gave place to smaller-scale pyramid tombs. Earlier styles were slightly simplified and less durable materials were used (as in the pyramid of Sesostris I at Lisht). But the sarcophagus in the tomb chamber assumed vast dimensions and might weigh as much as 150 tons.

Great buildings began to be erected once again in the New Kingdom, c. 1570-1085 BC. The most notable monuments are the mortuary temple of Queen Hatshepsut (the only woman-pharaoh) at Deir el Bahari (c. 1480 BC), with its pillared halls, colonnades, and gigantic ramps connecting the different levels; the magnificent Great Temple at Karnak devoted to Amon as the universal god of Egypt. The main glory of the Great Temple is the colossal hypostyle hall, started by Amenhotep III. This temple was linked with the Temple of Mut and the large Temple of Amum at Luxor by processional ways flanked by sphinxes.

The final revival took place under the rule of the Ptolemies, whom Alexander the Great had established on the Egyptian throne. Numerous temples survive from this period (323-30 BC), still built in the traditional manner but slightly more elegant and less crushingly inhuman; e.g. (= for example) the temple of Horus at Edfu and the temples on the island of Philae.

Indicate whether each of the following is true or false by writing 'T' or 'F' in the space provided.

….. 1. But the sarcophagus in the tomb chamber assumed vast dimensions and might weigh as much as 100 tons.

….. 2. The seven great steps of the Step Pyramid indicate how the pyramidal form evolved as a brilliant inspiration from the simple mastabas, or (= that is) rectangular tombs of the earliest Egyptian dynasties.

….. 3. Features peculiar to (= characteristic of) the ancient Egyptian architecture also include the obelisk, the steeply battered pylon, the symbolical lotus column, and incised relief decoration without any structural relevance.

….. 4. Numerous temples survive from this period (323-30 BC), still built in the traditional manner but slightly more elegant and less crushingly inhuman; e.g. (= for example) the temple of Horus at Edfu and the temples on the island of Crete.

….. 5. Its most outstanding achievements are its massive funerary monuments and temples built of stone for permanence, featuring only post-and-lintel construction, corbel vaults without arches or vaulting, and pyramids.

TEST 3

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence. Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. **The ancient Roman dwelling** consisted of a quadrangular court (atrium) which ….. by the door of the house and which served as the common meeting place for the family.

(A) is entered

(B) was entered

(C) will be entered

(D) are entered

2. An opening (compluvium) to the sky provided light and served as a chimney and as an inlet for rain which fell ….. the impluvium, a tank sunk in the floor beneath.

(A) of

(B) over

(C) off

(D) into

3. The tablinum served ….. the master’s office.

(A) as

(B) as yet

(C) just as

(D) as if

4. In some homes a garden surrounded by side buildings and covered colonnades was added ..... of the house; it was called the peristylum and usually was entered through corridors (fauces) located near the tablinum.

(A) at the back

(B) in front

(C) on one side

(D) from the bottom

5. Great houses had a kind of entrance hall (= vestibulum) ….. above the street and approached by stairs.

(A) raising

(B) risen

(C) raised

(D) rising

6. In the ….. house, there was only an indication of one (= vestibulum); the door led directly into the ostium, which opened directly into the atrium.

(A) ordinary

(B) posh

(C) luxurious

(D) poor

7. In later Roman houses, a ….. storey became usual.

(A) first

(B) second

(C) third

(D) fourth

8. As the dining room was generally ….. the upper storey, all the rooms in the upper storey were called coenacula.

(A) on

(B) in

(C) at

(D) under

9. There were …..-….. houses in Rome as early as the end of the republic.

(A) three-storey

(B) two-storey

(C) one-storey

(D) four-storey

10. The Romans were great builders and engineers, famous for their concrete vaults, public baths, bridges, and aqueducts, ….. temples.

(A) as well as

(B) as soon as

(C) so as to

(D) as to

Part B

TEXT 3

ROMAN ARCHITECTURE

Read and translate the text using a dictionary

Keywords: tectonic, arch, dome, **Roman architecture**, decorative, predilection, pseudo-peripteral, entablature, ornamentation, greatness, interior, space, domestic, insula, inward-looking, decree, portico, colonnade, theme, precursor, primarily

Whereas Greek architecture is tectonic, built up from logical series of horizontals and verticals, **Roman architecture** is plastic with much use of rounded forms (arch, vault, and dome) so that buildings tend to look as if they had been made of concrete poured into a mould. In Greek and Hellenistic architecture the column was the most important member; in Rome the column was often degraded to merely decorative uses, while the wall became the essential element.

Hence the Roman predilection for pseudo-peripteral temple, and for elaborately carved entablatures and other ornamentation. But the true greatness of the Romans lay in the creation of interior space.

In domestic architecture three types were developed; the domus or town-house; the insula or multi-storey apartment house or tenement block, and the villa or suburban or country house. The domus derived from the Greek and Hellenistic house and was usually of one storey only and inward-looking, the rooms being grouped axially and symmetrically around the atrium (a quadrangular court) and one or more peristyle courts. The street facade was plain and defenestrated. The insula had several identical but separate floors and was often vaulted throughout with concrete construction. A decree of Augustus limited their height in Rome to 75 ft. The villa was derived from the traditional farm-house and was more casual and straggling in plan than the domus. Their exteriors were enlivened with porticos and colonnades, rooms were designed to catch the view, or the sun in winter or the shade in summer.

The final phase of Roman architecture from the 4^{th} to the 6^{th} centuries, primarily in church building, is called Early Christian architecture. It gave rise to Byzantine architecture.

A purely utilitarian theme in Roman architecture, which produced quantities of houses, apartment buildings, factories, roads, bridges – all those amenities which have returned to the world of architecture only in recent times – gives the Romans a claim to be the only true precursors of the modern architect.

Indicate whether each of the following is true or false by writing ’T’ or ‘F’ in the space provided.

….. 1. In domestic architecture three types were developed; the domus or town-house; the insula or multi-storey apartment house or tenement block, and the villa or suburban or country house.

….. 2. A decree of Augustus limited their height in Rome to 70 ft.

….. 3. But the true greatness of the Romans lay in the creation of exterior space.

..... 4. Their exteriors were enlivened with porticos and colonnades, rooms were designed to catch the view, or the sun in winter or the shade in summer.

TEST 4

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence. Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. The architecture of the Indian subcontinent was originally ….. timber and mud-brick of which nothing survives.

(A) of

(B) from

(C) out of

(D) on

2. Early Buddhist monuments, chaitya halls, stupa rails, and toranas clearly imitate ….. construction, and timber buildings appear on relief representations.

(A) stone

(B) steel

(C) wood

(D) iron

3. All surviving architecture is of stone, ….. exclusively a structural system of post and lintel, brackets, and corbels.

(A) used

(B) having been used

(C) being used

(D) using

4. The basically simple Indian architectural forms ….. generally ….. and overwhelmed by a rhythmical multiplication of pilasters, cornices, mouldings, aediculae, roofs, and finials, and an exuberant and sensuous overgrowth of sculptural decoration.

(A) are ….. obscured

(B) were ….. obscured

(C) was ….. obscured

(D) is ….. obscured

5. **Taj Mahal** ….. **Indian Buddhist architecture** (Indian Muslim architecture).

(A) exemplify

(B) exemplifies

(C) exemplifying

(D) exemplified

6. This highly homogeneous traditional architecture repeated throughout the centuries established types of ….. rectangular, low-silhouetted buildings constructed according to canons of proportions and construction methods which varied with each dynasty and period and varied from one region to another.

(A) simple

(B) complicated

(C) complex

(D) intricate

7. Stone and brick were used for structures demanding strength and permanence, ….. fortifications, enclosure walls, tombs, pagodas, and bridges.

(A) such as

(B) such and such

(C) as such

(D) such

8. ….. buildings were mostly constructed in a wooden framework of columns and beams supported by a platform, with non-bearing curtain or screen walls.

(A) In any event

(B) In either event

(C) At all events

(D) Otherwise

9. The most prominent feature of the Chinese house was the tile-covered gabled roof, high-pitched and upward-curving with widely overhanging eaves resting on ….. brackets.

(A) multiple

(B) inappropriate

(C) inadequate

(D) incommensurate

10. Separate roofs ….. porches surrounding the main buildings or, in the case of pagodas, articulating each floor created a distinctive rhythmical horizontal effect.

(A) under

(B) over

(C) at

(D) from

Part B **TEXT 4**

BYZANTINE ART OF BUILDING

Read and translate the text using a dictionary

Keywords: culmination, richness, **Byzantine architecture**, elaborate, climax, reign, mosque, masterpiece, throughout, conquest, narthex, exedra (pl.-rae), interior, mosaic, octagonal, widely, contribution, radical, precedent, decorative, style, exterior, cruciform, bulbous, basilica, apsis, arcading

The architecture of Byzantium, or Eastern Roman Empire, was the culmination of Early Christian architecture. This style developed after 330 BC, spread widely, and lasted throughout the Middle Ages until the fall of Constantinople to the Turks in 1453. **Byzantine architecture** is characterized by large pendentive-supported domes (pendentives being the chief contribution of the Byzantine style to the architecture of the world), round arches and elaborate columns, richness in decorative elements, and colour.

The Byzantine style reached its climax in the reign of the Emperor Justinian (527-65). He built and rebuilt 26 churches, many hospitals, bridges, aqueducts, and fortresses.

The outstanding masterpiece of Byzantine church architecture is Hagia or Saint Sophia in Constantinople (now Istanbul). Originally built as a church by Emperor Constantine in AD 360; rebuilt 532-7 by Anthemius of Tralles (assisted by Isidore of Miletus) and then again in 563 in a form very nearly as it is today; became a mosque in 1453 with the Turkish conquest of the city. Its plan may be defined as a Greek cross inscribed in a square (typically Byzantine), with a narthex at the west end. The chief feature is the huge dome, approximately 32.6 m in diameter, rising 56 m above the floor. It is carried on pendentives. There are half-domes at two ends which are, in turn, carried by smaller semidomed exedrae. The interior surface of the edifice is richly decorated.

As early as the 5th century the Byzantine style began to influence architecture in Italy, especially Ravenna, city of mosaics (St Giovanni Battista, St Croce, and the so-called

Mausoleum of Galla Placidia). The basilican St Apollinare in Classe, Ravenna (c. 536-50), and the octagonal St Vitale, Ravenna (c. 526-47), are among the greatest and least altered of all Byzantine buildings. Later, Western buildings began to show more radical departures from Byzantine precedents – e.g. St Marco, Venice, with its very rich marble-clad exterior.

The first phase of Russian architecture was Russo-Byzantine style from the 11th to the 16 th centuries. It was derived from the Byzantine architecture of Greece. It is represented mainly by stone churches characterized by cruciform plans and multiple bulbous domes. Kiev was Russia's first Christian centre. The domed Cathedral of St Sophia, begun 1037, was the country's first great Byzantine church. This brick-domed basilica had 5 aisles, terminating at the east end in semicircular apses, with open arcading around the other three sides. A striking Russian feature was the construction and arrangement of the 13 domes, representing Christ and the 12 Apostles. In Moscow the Cathedral of St Basil the Blessed, in Red Square, is as fantastic in form as in decoration. It represents the culmination of the Russian Byzantine style.

Indicate whether each of the following is true or false by writing 'T' or 'F' in the space provided.

….. 1. This style developed after 330 BC, spread widely, and lasted throughout the Middle Ages until the fall of Constantinople to the Turks in 1553.

….. 2. As early as the 6th century the Byzantine style began to influence architecture in Italy, especially Ravenna, city of mosaics (St Giovanni Battista, St Croce, and the so-called Mausoleum of Galla Placidia).

….. 3. The basilican St Apollinare in Classe, Ravenna (c. 536-50), and the octagonal St Vitale, Ravenna (c. 526-47), are among the greatest and least altered of all Byzantine buildings.

….. 4. This brick-domed basilica had 6 aisles, terminating at the east end in semicircular apses, with open arcading around the other three sides.

TEST 5

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence. Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. **The Baroque** is ….. European style of architecture and decoration.

(A) a

(B) an

(C) the

(D) –

2. The word 'baroque' means irregular or imperfect, especially with reference to ….. .

(A) silver

(B) gold

(C) pearl

(D) amber

3. Being a reaction against Palladian formality, the Baroque developed in the 17th century in ….. from late Renaissance and Mannerist forms.

(A) Italy

(B) France

(C) Germany

(D) Austria

4. The term applies fully to the 17th century in Italy and to the 17th and part of the 18th centuries in Spain, Germany, and Austria, but with limitations to the 17th century in France (Le Vau, Versailles), the 18th century in Italy (Fontana, Juvarra), and the late the 17th and early 18th centuries in England (….., Hawksmoor, Vanbrugh, Archer).

(A) Wren

(B) Imhotep

(C) Wright

(D) Gropius

5. The Baroque style is characterized by spatially complex compositions, interpenetration of ….. spaces, curved surfaces, and conspicuous use of decoration (broken pediments, paired or coupled columns or pilasters), sculpture and colour.

(A) rectangular

(B) round

(C) oval

(D) square

6. ….. an exuberant profusion of motifs – festoons of flowers and fruits, masks, scrolls, wreaths, and trophies of weapons.

(A) There was

(B) There were

(C) There is

(D) There are

7. Baroque ….. exploited effects of illusionism and made one art imitate the methods of the other.

(A) artists

(B) architects

(C) sculptors

(D) designers

8. Sculptors introduced colour into their works in the spirit of a painter, architects used sculpture to support the members of a building and painters decorated the walls and vaults of churches with ….. architectural perspectives.

(A) true

(B) correct

(C) false

(D) right

9. The Baroque culminated in the churches, monasteries and palaces of southern Germany and Austria ….. 18th century.

(A) in the early

(B) in the middle of

(C) at the end of

(D) in the course of

10. The style prevailing in the restrained architectural climate of England ….. Baroque classicism, since the swelling forms of Baroque plans and elevations were never favoured in England.

(A) must be called

(B) should be called

(C) may be called

(D) can be called

Part B

TEXT 5

THE ROMANESQUE STYLE

Read and translate the text using a dictionary

Keywords: principal, flourish, **Romanesque architecture**, resemble, elevation, nave, transept, chancel, span, tunnel, pointed, rib, groin, facade, fret, chevron, lozenge

The Romanesque style was a compound of many influences – Roman, Byzantine, Carolingian, Ottonian, Viking, Celtic, and Muslim. The principal countries in which Romanesque architecture flourished were France, England, Italy, Germany and Spain. This style must have appeared first in Italy, in Lombardy, late in the 9th century.

Architecturally, it was an age of unceasing experiment, so that, despite affinities of detail, few buildings of this period resemble one another very closely as a whole.

The Romanesque is characterized by clear easily comprehended schemes of planning and elevation, the plan with staggered apses at the east end of churches, the plan with an ambulatory and radiating chapels, plans (mainly in Germany) with square bays in nave, transepts, and chancel, and square bays in the aisles one quarter the area. The compositions of the walls also stress clearly marked compartments.

The early Romanesque had not yet the skill to vault major spans. After 1050 various systems were developed which differentiate regional groups: tunnel vaults in France, often pointed (Burgundy, Provence), and also in Spain; groin vaults in Germany; domes in the South-West of France; rib vaults at Durham and in Italy.

In the exteriors the two-tower facade plus a tower over the crossing is most typical of England and Normandy, whereas screen facades with no towers are characteristic of the South of France, and a multitude of towers over the west as well as the east parts is typical of Germany.

The Norman style was a development of Romanesque architecture that came to England from Lombardy and France in the 10^{th} century. It was widely adopted until the end of the 12^{th} century; characterized at first by plain surfaces, massive circular pillars, round-headed arches and an almost complete lack (= absence) of ornamentation. It later became less ponderous (= less massive), and mouldings were enriched by such decorative devices as the fret, chevron, and lozenge. The Romanesque lasted until the advent (= coming) of Gothic architecture in the middle of the 12^{th} century.

Indicate whether each of the following is true or false by writing 'T' or 'F' in the space provided.

….. 1. The principal countries in which Romanesque architecture flourished were France, England, Italy, Germany and Spain.

….. 2. The Romanesque is characterized by clear easily comprehended schemes of planning and elevation, the plan with staggered apses at the east end of churches, the plan with an ambulatory and radiating chapels, plans (mainly in Germany) with square bays in nave, transepts, and chancel, and rectangular bays in the aisles one quarter the area.

….. 3. The Norman style was a development of Romanesque architecture that came to England from Lombardy and France in the 11th century.

TEST 6

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence. Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. The Industrial Revolution, which ….. new materials and techniques, made the 19th century the time of the vast expansion of cities or urbanization in Europe and America.

(A) introduced

(B) has introduced

(C) had introduced

(D) introduces

2. The total effect of all this on European towns and cities was, ….., to replace the wonderful unity of the street by a chaotic miscellany of buildings, each asserting its own individuality.

(A) however

(B) sometimes

(C) therefore

(D) somewhat

3. The role of the architect was ….. confined to decorating the building’s facades.

(A) merely

(B) simply

(C) ordinarily

(D) extremely

4. Styles began ….. not just for fashion but for their associative qualities: Roman for justice, Gothic for learning and churches, Byzantine mainly for churches, the Italian Renaissance for palaces and ministries, Greek for government, Venetian for commerce, Oriental for leisure, Hansetic for housing, the Baroque for theatres and opera houses, Romanesque for public architecture, Colonial for bank buildings, churches and suburban homes.

(A) to be chosen

(B) to have chosen

(C) to have been choosing

(D) to be choosing

5. Nevertheless, the 19th century revival architecture ….. by **the Classic Revival**, or Neo-Classicism, and the Gothic Revival, or Neo-Gothic.

(A) is dominated

(B) is being dominated

(C) was dominated

(D) was being dominated

6. It, too, was concerned with decoration ….. than construction, and aimed at creating a style – especially a style of ornament – that owed nothing to the past.

(A) most

(B) more

(C) less

(D) much

7. ….. emerged as Art Nouveau in France and Belgium, a little later as Jugendstil in

Germany, and spread throughout Europe and reached the USA.

(A) It

(B) He

(C) She

(D) They

8. Behind this picturesque play-acting glittered the iron and glass architecture of the engineer-experimentalist, ….. created the impressive array of simple, dignified and refreshingly functional buildings, the viaducts, dockyards, textile mills and railway stations.

(A) which

(B) who

(C) that

(D) what

9. There was Paxton's Crystal Palace (…..), one of the most revolutionary buildings in the history of world architecture, and the daring towers or skyscrapers of the Chicago School (1880-1900).

(A) 1848

(B) 1849

(C) 1850

(D) 1851

10. The 'Japonism' of the Aesthetic Movement, the Arts and Crafts Movement, the preachings of William Morris against opulence and the tyranny of the machine (to lead, ironically, to its ….. idealization), the stirrings of Art Nouveau and the folksy aspirations of the garden city movement can now be seen to have been the ancestors of modern architecture.

(A) 18th century

(B) 19th century

(C) 20th century

(D) 21^{st} century

Part B

TEXT 6

THE GOTHIC STYLE

Read and translate the text using a dictionary

Keywords: represent, emerge, form, **Gothic architecture**, flying buttress, fenestration, refer to, phase, antecedent, lancet, tracery, transept, multiple lierne, ogee arch, advent, connote, originate, stained glass

Let us consider **Gothic architecture**. This style represented the High Middle Ages in Western Europe. It emerged from Romanesque and Byzantine forms in France during the later 12^{th} century. Its great works are cathedrals, characterized by the pointed arch, the rib vault, the development of the exterior flying buttress, and the gradual reduction of the walls to a system of richly decorated fenestration. Gothic cathedrals depended for their enrichment chiefly upon sculpture and stained glass. Gothic architecture lasted until the 16^{th} century, when it was succeeded by the classical forms of the Renaissance.

In France and Germany one speaks of the Early, High, and Late Gothic. The French middle phase is referred to as Rayonnant, the late phase as Flamboyant. It is of interest to note that in English architecture the usual divisions are Early English, Decorated, and Perpendicular.

Early English Gothic was based on Norman and French antecedents. An old term for it was Lancet architecture. Early English Gothic was often characterized by lancet windows without tracery. Among its most important buildings are Wells, Lincoln, and Salisbury Cathedrals, Westminster Abbey, and the east transept of Durham Cathedral.

The Decorated style was characterized by rich decoration and tracery. There were multiple liernes, and often ogee arches. The Curvilinear style evolved in the 2^{nd} half of the 14^{th} century and represented the richer period of the Decorated style. An old term for the later phases of the English Decorated and the French Flamboyant style was Flowing style. The principal works of the Decorated style are the east parts of Bristol Cathedral and Wells Cathedral, the Lady Chapel at Ely.

The Perpendicular, or Rectilinear, style was the last and longest phase of English Gothic architecture. It was developing in c. 1350-1550, and was characterized by vertical emphasis in structure, and frequently by elaborate fan vaults. The most important works of the Perpendicular style are the chancel of Glouster Cathedral, the naves of Canterbury and of Winchester. Gothic architecture flourished in France, England, Germany, Italy, Netherlands, as well as in Spain, Sweden, Czechia, Poland, Estonia, Latvia, and Lithuania.

Gothic Survival connotes the survival of Gothic forms, particularly in provincial traditional building, after the advent of the Renaissance and into the 17th century, as distinct from Gothic Revival that originated in the 18th and culminated in the 19th century.

Indicate whether each of the following is true or false by writing 'T' or 'F' in the space provided.

….. 1. Gothic architecture lasted until the 17th century, when it was succeeded by the classical forms of the Renaissance.

….. 2. Gothic Survival connotes the survival of Gothic forms, particularly in provincial traditional building, after the advent of the Renaissance and into the 16th century, as distinct from Gothic Revival that originated in the 18th and culminated in the 19th century.

….. 3. An old term for the later phases of the English Decorated and the French Flamboyant style was Flowing style.

….. 4. The Decorated style was characterized by rich decoration and tracery.

TEST 7

Part A

STRUCTURE AND WRITTEN EXPRESSION

Directions: In this part each problem consists of an incomplete sentence. Below the sentence are four choices marked (A), (B), (C), and (D). You should find the one choice which best completes the sentence.

1. **Modern architecture** is the term universally applied to the style of building, which evolved in a number of countries ….. the First World War as the International Style, or Functionalism, and which has culminated in the current designs of glass, concrete and steel based on module construction presently being erected all over the world.

(A) after

(B) before

(C) up to

(D) till

2. The development of the International Style was reinforced by two events: a series of exhibitions at which architects from different countries saw and were influenced by each other's experiments, and the formation of an international organization through which ideas ….. and mutual support enjoyed.

(A) must be exchanged

(B) can be exchanged

(C) could be exchanged

(D) might be exchanged

3. Exhibitions provided opportunities to explore ..... environment created wholly by modern buildings; they had been experienced only as single structures against an alien background.

(A) a

(B) an

(C) the

(D) –

4. Until the 1930s, Germany was the main centre of the new architecture because of the presence there of another unifying institution, the Bauhaus, a college of design, established ….. Weimar by Walter Gropius in 1919.

(A) into

(B) near

(C) in

(D) at

5. The Bauhaus became synonymous with modern teaching methods in architecture and the ….., and with a functional aesthetic for the industrial age.

(A) applied arts

(B) fine arts

(C) Art Deco

(D) Art Nouveau

6. The closure of the Bauhaus, persecuted by the Nazi regime, which disliked all forms of internationalism, in 1933 increased its influence, because many of its members ….. to Britain or to America, the USA becoming a place of remarkable architectural energy.

(A) flee

(B) fled

(C) have fled

(D) are fleeing

7. In the years after 1945 the emphasis ….. on town-planning and housing, and in most countries also on legislation to control building in the public interest, in which activities Britain set the lead.

(A) is

(B) had been

(C) has been

(D) was

8. This was the era of new towns, vast housing estates and attempts – too often abortive – to gear building programmes both to social ….. and to industrialized systems and techniques.

(A) want

(B) needs

(C) requirements

(D) necessities

9. It was also the era of population explosions and the comprehensive redevelopment of town centres by property companies, for whom social priorities were irrelevant, resulting in the disruption, functionally and visually of their age-old ….. .

(A) model

(B) sample

(C) specimen

(D) pattern

10. In matters of architectural style, it ….. less a question of conflict between period revival and modern design than between buildings designed for effect and those that aimed at the creation of a modern vernacular and a humane and harmonious environment.

(A) becomes

(B) became

(C) has become

(D) had become

Part B TEXT 7

THE RENAISSANCE

Read and translate the text using a dictionary

Keywords: classicism, **Renaissance,** symmetrical composition, motif, adoption, perspective, pilaster, entablature, austere, facade, altar, transept, masterpiece, courtyard, encrust, diamond studding, prismatic rustication, loggia, terrace, phase

This architectural style developed in early 15th century Italy during the rebirth (or Rinascimento) of classical art and learning. It succeeded the Gothic as the style dominant in all of Europe after the mid 16th century, and evolved through the Mannerist phase into Baroque and in the early 17th century into classicism. Initially it was characterized by the use of the classical orders, round arches, and symmetrical composition.

In countries other than Italy **the Renaissance** started with the adoption of Italian Renaissance motifs, but the resulting styles (in Belgium, Czecho-Slovakia, Holland, France, Germany, Hungary, Poland, Russia, Switzerland, partly in England) have little in common with the qualities of the Italian Renaissance.

Churches, palaces, gardens, and well-organized open, urban spaces are the architectural works most often associated with this time. Great skill was exercised in ordering the interior of buildings, frequently using the same motifs as had been traditionally associated with the exterior.

Filippo Brunelleschi (1377-1446) is said to have created the Renaissance and he was the first to work out and demonstrate the Renaissance system of perspective. His basic vocabulary – fluted pilasters carrying entablatures, columns supporting arches, unribbed vaults which are portions of the surface of a sphere – appears in the Ospedale degli Innocenti (Florence), the first Renaissance building.

The austere Tuscan Doric facade of Donato Bramante’s (1444-1514) Tempietto San

Pietro signalled the beginning of the early 16^{th} century High Renaissance or Cinquecento in Rome. The Italian Renaissance is assumed to have achieved the highest degree of perfection at that time.

In Rome Old St Peter’s was demolished to build St Peter’s Cathedral, the work of many architects, beginning with Bramante, whose ground plan was later changed from a Greek cross to a Latin cross. It is the largest church in the Christian World; has 29 altars in addition to the high altar; interior length, 187 m; width at front, 26.5 m; length of transept, 137 m. The dome (diameter, 42 m; height, 123 m to the top of the lantern) built by Michelangelo, looks down on the wide expanse of St Peter’s Square (the Baroque masterpiece), laid out by Bernini and flanked by the Vatican, for which Bramante designed the main courtyards.

The Renaissance came to Russia remarkably early. On Kremlin Hill in the Cathedral of the Assumption (1475) an Italian, Fioravanti, combined in a five-domed cube the traditional Russian style with Italian Renaissance decoration and construction methods. The Cathedral of the Archangel Michael was designed in 1505 by Alevisio Novi, another Italian. Within the Kremlin walls is the Faceted Palace, its facades encrusted with diamond studding or prismatic rustication, built c. 1490.

In the 1620s it was Inigo Jones who brought the Italian Renaissance to Britain. His Queen’s House (its foundations were laid in 1616, but the elevations and interior date from 1632-5) at Greenwich is an Italian villa sympathetically reinterpreted. The upper-floor loggia is very Palladian, as is also the two-armed, curved open staircase to the terrace. The proportions, though, have been slightly altered and the general effect is long and low and very un-Italian. Inside, the hall is a perfect cube and symmetry prevails throughout. The Banqueting Hall (1619-22) in Whitehall is Jones’s masterpiece. His work set a pattern which provided the basis for the creations of Christopher Wren and the golden age of 19^{th} century British classicism.

Indicate whether each of the following is true or false by writing ‘T’ or ‘F’ in the

space provided.

….. 1. In Rome Old St Peter’s was demolished to build St Peter’s Cathedral, the work of many architects, beginning with Bramante, whose ground plan was later changed from a Greek cross to a Latin cross.

….. 2. This architectural style developed in early 16th century Italy during the rebirth (or Rinascimento) of classical art and learning.

….. 3. In countries other than Italy the Renaissance started with the adoption of Italian Renaissance motifs, but the resulting styles (in Belgium, Czecho-Slovakia, Holland, France, Germany, Hungary, Poland, Russia, Switzerland, partly in England) have little in common with the qualities of the Italian Renaissance.

….. 4. Within the Kremlin walls is the Faceted Palace, its facades encrusted with diamond studding or prismatic rustication, built c. 1492.

..... 5. The austere Tuscan Doric facade of Donato Bramante’s (1444-1514) Tempietto San Pietro signalled the end of the early 16th century High Renaissance or Cinquecento in Rome.

Section 2. Texts for Reading

Man, Natural Environment, and Architecture

The properties of matter and energy must be considered in order to fully understand climatic phenomena. Heat, radiation, pressure, humidity, and wind, among other factors, interact mutually to establish climate conditions near the Earth's surface.

In this environment of continuously changing pressure, wind movement, temperature, humidity, and cloud cover, an architect places a fixed building. Such a rigid structure is intended to provide a comfortable internal environment over a wide range of these external variables. Two factors facilitate this task: first, in temperate and subtropical zones, ordinary buildings offer fair protection from climatic extremes, and, second, the human body has a considerable margin of tolerance for these variables. However, special treatment is required, particularly in tropical zones.

When considering the architectural design of a building, as well as in town and regional planning, other elements should be considered. The continuous daily motion of the population, which has properties analogous to the humidity concepts of saturation, evaporation, and condensation, must be accommodated in houses, towns, and regions.

Any living organism continuously adapts itself to the flux of its environment. Once constructed, however, a man-made object can no longer adjust itself. This inflexibility of human creation is at once its weakness and its strength. A design can succeed in uniting the particular and permanent with the universal and continuously changing. Yet another design, by failing to sense the forces at work or to create a harmonious union, can isolate and alienate human life.

Before considering the application of scientific concepts to architectural design and town planning, it is useful to briefly examine some basic concepts of architectural thermodynamics and human comfort.

Temperature

The concept of temperature describes the degree of heat contained in a body or a fluid medium or some region thereof, but a clear definition usually is a description of the operations performed in its measurement. Since heat flows from hotter to colder bodies or substances, temperatures can be measured by bringing a thermometer into intimate contact with the body or substance. The thermometer is then assumed to acquire the same temperature.

Scientists use two conveniently reproducible temperatures, the freezing and boiling points of water, to establish temperature scales. On the Celsius scale, the first was taken to be 0° and the second 100°. On the Fahrenheit scale, these values are 32° and 212°, respectively. The temperature of a body is so cold that it is incapable of giving up any heat. It is called absolute zero, - 273.15 °C or - 459.67 °F. However, no limit for maximum temperature is known to exist.

The air temperature range of interest here is that of the extremes in the usual human habitats. Meteorologists have observed air temperatures of - 93 °C (- 135 °F) and 57 °C (135 °F) at the Earth’s surface, a range of merely 150 C° or 270 F°. But narrow though this range may be it is enormous in comparison with the variation of temperature that the human body can endure within itself. The body maintains a constant temperature of about 36 °C (98.6 °F) at the mouth, increasing to about 37.2 °C (99 °F) in the deep tissues, and can rarely survive if this temperature varies even by 1 C° (about 2 F°) for prolonged periods.

Thermal Conduction and Resistance

The concepts of thermal conduction and resistance are important in attempting to provide a comfortable environment for the inhabitants of hot, arid regions. These heat-flow concepts are based on the movement of a quantity of heat.

The specific heat of a substance is the quantity of heat energy required to raise the temperature of one unit mass of the substance by one degree of temperature.

When considering heat-flow concepts, the notion of rate of heat flow is useful. It equals the rate of displacement of a quantity of heat.

Conduction is the process by which heat flows through a material, or from one material to another with which it is in contact. Some materials, such as metals, are good thermal conductors, while others, like air, are poor thermal conductors. Thermal conductivity is a specific property of a material and is a measure of the rate at which heat will flow through a material when a difference in temperature exists between its surfaces. It is defined as the quantity of heat that will flow through a unit area in a unit time, or equivalently, as the rate of heat flow through a unit area, when a unit of temperature difference exists between the faces of the material of unit thickness, such as the wall. The thermal conductivity varies with the density, porosity, and moisture content of the material and also with the absolute temperature. The quantity of moisture contained in a material can have a considerable affect on the thermal conductivity of the material; the higher the moisture content, the greater the thermal conductivity. This is important because rain penetration, high humidity within a building, and condensation may result in an appreciable amount of moisture in the building structure. The average temperature of a material is another factor influencing the rate of heat flow; the thermal conductivity may be considerably greater at high than at low temperatures. However, the variation of the thermal conductivity over the range of temperatures commonly occurring in buildings is comparatively small, and thus the thermal-conductivity values measured at normal atmospheric temperature are generally used when considering structural insulation.

In calculations, it is often convenient to use the reciprocal of the thermal conductivity which is called the thermal resistivity. The thermal resistivity may be regarded as either the time required for the transmission of one unit of quantity of heat through one unit area of a rectangular solid material of unit thickness, when the difference between the temperatures of the surfaces perpendicular to the direction of heat flow is one degree of temperature; or the number of degrees difference between these surfaces of the material of unit thickness when one unit of quantity of heat flows through one unit area in one unit of time. Thus resistivity, like conductivity, is a property inherent to a material and is independent of its thickness.

The thermal resistance is a measure of the resistance to heat flow of a material or a combination of materials. The thermal resistance may be regarded as either the time required for the transmission of one unit of quantity of heat through one unit area of material when the temperature difference between surfaces perpendicular to the direction of heat flow is one degree of temperature; or the number of degrees difference in temperature between these surfaces when one unit of quantity of heat flows through one unit area in one unit time. If the thickness of the material is increased there is a corresponding proportional increase in its thermal resistance. If several materials are placed together in layers, as, e.g., in a plastered and rendered solid brick wall, the total thermal resistance of the wall may be obtained by adding the resistances for each component, i.e., of the plastering, rendering, and brick masonry.

The thermal conductance is the rate of heat flow through a material or a combination of materials and is therefore the reciprocal of the thermal resistances. The thermal conductance is the quantity of heat that will flow per unit time per unit area of a material for a one degree temperature difference between its surfaces. If the thickness of the material is increased, its conductance decreases proportionately.

The thermal conductance and resistance and thermal conductivity and resistibility already considered have been related to the temperatures at the material surfaces. The surface temperatures of a building usually are not known. For purposes of heat-loss calculations, therefore, the inside and outside air temperatures are used. In this situation, heat transfer from the warmer to the cooler air mass occurs in three steps: first from the warmer air to the structure, then through the structure, and finally from the structure to the cooler air. Both the inside and outside air-surface interfaces provide some resistance to heat flow.

The thermal transmittance includes these surface resistances and is the rate per unit area at which heat will flow from the air on one side of the structure to the air on the other side. It may be defined as the quantity of heat that will flow per unit time per unit area through the material when one unit of temperature difference exists in the air on each side. In fact, the thermal transmittance may be regarded as the overall air-to-air conductance, which is the reciprocal of the overall air-to-air resistance. The thermal transmittance is of considerable practical importance. It provides a basis both for comparing the insulating capabilities of different wall, floor, and room constructions; and for calculating heat loss from a building for heating purposes in cold climates, and heat gain for cooling purposes in hot climates.

Radiation

All matter emits electromagnetic waves which are generated by the thermal motion of molecules composing the material. Such radiation is called thermal radiation. The intensity and wavelength distribution of this radiation depend on the nature and temperature of the material.

A perfectly opaque material with a totally absorbing and therefore totally non-reflecting surface, which is usually called a black body, emits radiation at the maximum possible rate for any given temperature. This black body is a convenient concept used as an idealized standard, but which should not be confused with an actual object with a black-coloured surface. For such an object, the rate of radiation emission depends only on the fourth power of its absolute temperature.

As the temperature of the radiating object increases, the wavelength of maximum radiation intensity becomes shorter, and the distribution changes so that a greater proportion of the energy is radiated at shorter wavelengths (i.e., with higher energy). At temperatures below about 500 °C (about 900 °F), the emission consists almost entirely of wavelengths too long to be observed as light. At about 700°C (about 1300°F), the object glows with a dull red colour. As the temperature increases further, the wavelength of maximum emission decreases, and the colour shifts successively to bright red, yellow, and white.

The energy emitted by a radiating body ultimately impinges on other matter, which absorbs it, reconverting the energy into heat. In this way heat is transferred from one place to another by radiation.

At ordinary temperatures, most non-metallic surfaces, including painted surfaces, radiate virtually as black bodies – their emissivity is high, and they are good absorbers for long wavelength radiation. Thus, various paints ranging from black to white are found to be indistinguishable as regards heat radiation at temperatures up to 100 °C (212 °F). However, whereas dark paints absorb most of the short wavelength radiation received from the Sun, white pigments reflect most of it. And, at temperatures up to 100 °C (212 °F) aluminium and other metallic paints have an emissivity only about one-half that of a black surface. On the other hand, highly polished metals are strong reflectors of radiation, and many such surfaces are almost perfect reflectors of the long wavelength (low-energy thermal) radiation emitted by bodies at ordinary room temperature.

Emissivity, Absorptivity, and Reflectivity

Reference has been made to the importance of surfaces for heat transfer by radiation. To evaluate their emissive, absorptive, and reflective properties, surfaces can be compared with the properties of a black body, which absorbs all radiation falling on its surface and therefore reflects none.

The emissivity of a surface at a given temperature is equivalent to its absorptivity for radiation from another body at the same temperature, since two bodies at the same temperature will remain in thermal equilibrium with each other. The emissivity, and hence the absorptivity, of a black body has by definition, a value of unity, with the values of all real surfaces being in practice less than this value. Radiation falling on an opaque surface is partly absorbed, and the remainder is reflected. Since the incoming radiation can only be absorbed or reflected, the sum of the absorptivity and reflectivity must equal unity. For example, at normal temperatures, an aluminium foil may have an emissivity of 0.05, and thus its absorptivity will also be 0.05, but its reflectivity will be 0.95. This means that it emits by radiation only 5% of the amount a black body emits at normal temperatures. Also, it absorbs only 5% of the radiant energy falling on it (from another body at normal temperatures), and it reflects the other 95%.

The emissivity of a surface at normal temperatures (10-38 °C or 50-100 °F) is not necessarily the same as its absorptivity for radiation received from the Sun. Emissivities at normal temperatures are important when considering heat losses from buildings through cavity-wall, floor, or roof constructions. For external surfaces, the absorptivity for solar radiation is important when considering heat gain from the Sun. Table 1 gives these characteristics for some common surfaces.

Table 1 shows that the emissivities of white and dark paints are about equal at normal temperatures but that white paint has a much lower absorptivity for solar radiation. A roof coated externally with white paint gains less heat from the Sun than if it were a dark colour.

Table 1. Average Emissivities and Absorptivities for Some Common Building Surfaces under Relevant Conditions

Surface	**Emissivity or Thermal Absorptivity at 10-38 °C (50-100 °F)**	**Absorptivity for Solar Radiation**
Black non-metallic surfaces	0.90-0.98	0.85-0.98

Red brick, concrete, and stone, dark paints	0.85-0.95	0.65-0.80
Yellow brick and stone	0.85-0.95	0.95-0.70
White brick, tile, paint, whitewash	0.85-0.95	0.30-0.50
Window glass	0.90-0.95	Transparent
Gilt, bronze, or bright aluminium paint	0.40-0.60	0.30-0.50
Dull copper, aluminium, galvanized steel	0.20-0.30	0.40-0.65
Polished copper	0.02-0.05	0.30-0.50
Highly polished aluminium	0.02-0.04	0.10-0.40

Source: Heating and Air Conditioning Guide, American Society of Heating and Ventilating Engineers.

Table 2. Reflectivities of Various Materials and Paints

Material or Paint	**Reflectivity (%)**
Red brick or stone	30-50
Slate	10-20
Asphalt bituminous felt	10-20
Galvanized metals (new)	36
Dark paints	10-20
Aluminium paints	40-50
Polished metals	60-90
Whitewash or white paints	80-90

Source: N. S. Billington, *Journal of the Institute of Heating and Ventilating Engineers* 19, No. 190 (June 1957).

Table 2 gives the reflectivities of various materials and paints.

Transparency

Some substances, such as glass, rock-salt, liquids, and gases, are more or less transparent to radiation of certain wavelengths. Glass is transparent to wavelengths within the visible range of the spectrum, but absorbs radiation in the infrared or thermal region, while rock-salt transmits a high percentage of infrared radiation. Most solids, however, are opaque to thermal radiation, and in such cases the emission and absorption of radiation are surface phenomena. Thus, the low emissivity of a burnished metal surface depends on the cleanliness of the surface. A very thin film of non-metallic material, e.g., transparent varnish or grease, will increase the emissivity of the metal surface almost to that of a black body.

Clothing and human skin radiate virtually as black surfaces. For radiation at the wavelengths encountered in buildings and other living spaces, the absorption of clothing and skin approximates that of a black object. Indoors, white clothing has no advantage over black. But outdoors in the sun, although both materials radiate heat freely, white clothing reflects most of the solar radiation, while black clothing absorbs the Sun's rays.

If the human body emits more radiant energy than it receives from its surroundings, it is, on balance, losing heat by radiation. If, on the other hand, the radiation received exceeds that emitted, there is a net heat gain by the body.

Thermal Convection

Natural or free convection is the process whereby a fluid moves because of differences in its density resulting from temperature changes. If the fluid is moved by mechanical means, e.g., by pumps, fans, or wind, the process is called forced convection. Heat may be transferred by convection between a surface and a liquid or a gas.

Discussions of thermal comfort involve the heat transfer between a surface and the neighbouring air. When the surface is at a temperature above that of the air, heat is transferred from the surface to the adjacent air by conduction, thereby changing the density of the heated air. Then, even in otherwise still air, air currents result from the gravitational effects due to the differences in density. These natural convection currents cause much greater heat transfer from the surface than would result from conduction in a perfectly still atmosphere. Obviously, the rate of heat transfer by natural convection depends on the temperature difference between the surface and the neighbouring air.

Perfectly still air is rare. Even in a closed compartment, variations in the temperature of the walls and other surfaces set up air currents, so that there is some air movement. If fans are employed or if there are openings to the outside, the air movement may be considerable. These currents increase heat transfer by convection. The speed of the air current and the temperature difference affect the rate of heat transfer by convection.

Air is a gaseous fluid containing by volume (excluding the water vapour content) 21% oxygen, 78% nitrogen, and a remaining 1% consisting of traces of rare gases (argon, neon, and krypton), carbon dioxide (from 0.3 to 0.4 litres per mi), and carbon monoxide (about 0.03 litres per mi in urban areas and much less in the countryside). Air also contains water vapour from four parts per thousand to two parts per hundred. Dust and soot particles in air are visible as motes in a sunbeam. The oxygen, nitrogen, and other rarer gases are called permanent gases because they only become liquids at temperatures approaching absolute zero, whereas water undergoes continuous change between its gaseous and liquid states within the common range of air temperatures encountered in human climatic zones.

Atmospheric Pressure

Air exerts pressure on any surface in the atmosphere which corresponds to the weight of the column of air that it supports. Every surface in the neighbourhood of sea level carries a load of about 1 kg per cmI, or 1 ton per ftI. As the altitude increases above sea level, the atmosphere below no longer contributes to the pressure, which is correspondingly reduced.

Using this concept, atmospheric pressure can be expressed as the height of a column of mercury in a barometer, in millimetres or inches, with the pressure at sea level being 760 mm or 29.9 inches of mercury at a standard temperature of 0 °C (32 °F). The barometer reading must be corrected for the temperature of the mercury as well as for the latitude.

The bar is the unit of pressure in an absolute system of measurement adopted for scientific use to replace the arbitrarily chosen column of mercury. Atmospheric-pressure measurements in meteorological work are normally expressed in units of one millibar. One bar corresponds very nearly to 750 mm or 29.5 inches of mercury at 0 °C (32 °F), or 1019 cm or 401 inches of water, which is the atmospheric pressure a little above sea level.

Water Vapour

At temperatures throughout the climatic range of the normal human habitat, water can exist as solid ice, liquid water, and gaseous water vapour. At the freezing point, ice and water can exist together. Above this temperature ice is completely converted to water, and below it, only ice exists. However, regardless of whether the water is solid or liquid, the air above it contains a certain amount of water vapour.

Generally speaking, the permanent gases in the air produce the pressure indicated by a barometer. However, if water is present at the base of the column of air, that water partially evaporates (becomes water vapour) and contributes to the atmospheric pressure. This share depends on the temperature. Air containing the maximum possible amount of water vapour for its temperature is said to be saturated. The temperature at which condensation begins in a mixture of air and water is termed the dew point.

There are several ways to express the relation between humidity and temperature. The amount of water vapour that a volume of air can support at saturation can be expressed as grams or grains of vapour per volume of air, or as the portion of the total atmospheric pressure that the water vapour contributes. Similarly, the water-vapour content of unsaturated air can always be expressed as the portion of the total pressure that the water vapour contributes, called the vapour pressure, or as the amount of atmospheric water vapour in grams per mi or grains per fti. These values can also be determined with respect to the dew point, which is the temperature to which air must be reduced, without altering its barometric pressure, to reach saturation. In this way, the water vapour content of air at a given temperature can be expressed as the ratio of the portion of the total atmospheric pressure contributed by water vapour to the portion necessary to cause saturation at that air temperature. This ratio, most often expressed as a percentage, is called the relative humidity.

A given volume of water vapour is lighter than the same volume of air at the same temperature and pressure. In the atmosphere, therefore, saturated air is lighter than dry air of the same temperature and pressure. When water evaporates, the vapour simply rises into the air. If this process occurs in open air where there is freedom of motion, the water vapour can displace the equivalent volume of dry air without affecting the atmospheric pressure. Near water surfaces, therefore, rising water vapour is continuously replaced by dry air, which in its turn dampens and rises into the air. This water vapour eventually reaches a certain height, condenses on the floating particles always present in air, and becomes visible as clouds.

The processes involved in weather phenomena are not so simple. Such factors as heat, radiation, pressure, and wind interact to establish relative balances in the atmosphere, resulting in the constant recycling of water by evaporation, cloud formation, cloud motion, and precipitation.

Water vapour and temperature, pressure, and air movement are very important to the study of the climate and the microclimate both outside and inside buildings. They are the key to an understanding of the formation of clouds, rain, dew, frost, and nearly all other meteorological phenomena. The behaviour of water vapour must be understood to comprehend the physical and physiological processes of cooling by evaporation – phenomenon upon which thermal comfort in hot climates largely depends. If air in a room is saturated with water vapour and its temperature decreases, then some water vapour will condense, leaving in the air only the amount that can be accommodated at the new temperature. However, if the air temperature rises, the air can accommodate additional water vapour and is called ‘dry air.’ This air can be described as ‘thirsty’ until its temperature falls or it encounters water from which it can absorb vapour.

In winter, a dry feeling in the throat can result when moisture from the human body evaporates in a room overheated by a stove. A heated kettle of evaporating water can re-establish the moisture content of the air, corresponding to its increased temperature. The same feeling of dryness occurs in hot weather when evaporation of perspiration is necessary to lower body temperature. Here a parched throat indicates the need to drink water to maintain the supply of perspiration.

When air temperature drops below the saturation point, water collects in droplets on the dust particles always floating in the air. Or, if the air is in contact with a sufficiently cold surface, water vapour will condense on that surface. Thus water condenses on cold walls just as on a drinking glass containing a liquid cooled by ice. Similarly, when an amount of water vapour exceeding the saturation limit is introduced into air in an enclosed space, the excess vapour will condense, as on a bathroom mirror in winter or on the inner surfaces of the windows of a closed automobile with many people.

Cooling by Evaporation

Water will evaporate from a wet surface if it is exposed to air with a dew point lower than the surface temperature. The rate at which water evaporates from the surface depends on the relative humidity of the neighbouring air, the surface temperature, and the velocity of air movement. Thus, for a wet surface at a given temperature, a reduction in relative humidity or an increase in air velocity both increase evaporation.

Energy is needed to convert water from liquid to vapour. This latent heat of evaporation must be supplied by the wet surface, which thus loses heat or is cooled. This process is called adiabatic cooling, because it does not involve a transfer of heat to or from the air participating in the process. Therefore, the air is allowed to cool as it expands and to heat as it contracts, and the temperature, pressure, and relative humidity of the air change without varying the total heat content.

This phenomenon is used for cooling in hot dry areas such as in Iraq, where the people place against the windows panels of dried desert plants, which are kept moist by water dripping from perforated pipes positioned above them. In the grasslands of Australia, where farmers cannot obtain ice, butter is kept cool in food chests with sides of chicken-wire netting filled with charcoal. When the chests are placed in the shade outside and their sides are kept moist with occasional sprinkles, a sufficiently cool environment is maintained in the chest.

Thermal Gain

The various ways in which the interior of a building can gain heat without recourse to internal heating devices can be examined. Solar radiation is the principal source of heat in hot arid zones, and this heat can be transmitted during the day to the building interior in a number of ways.

The most important one is by conduction of the absorbed solar radiation through the walls or roof at a rate determined by the thermal conductance (or thermal resistivity) of the building material used, the surface area receiving solar radiation, and the properties of the surface, principally its colour and texture. The relationship involving the incoming and reflected solar radiation, absorbed and re-emitted heat and heat gain is shown for the case of a typical white painted surface. In this case, it is seen that 3% of the incident energy is transformed into heating the structure. Obviously, shading can be used to prevent solar radiation from directly falling on building surfaces.

If any openings permit the solar radiation to penetrate into the interior, then heat gain results from the direct heating of internal air, surfaces, and objects. The heat gain is proportional to the area of insolated internal surfaces. This mode of heat gain can be easily avoided by obstructing the passage of light.

Heat gain can also be caused by ventilation, which results when warm outside air flows into the building replacing the cooler interior air that escapes to the outside and by external air exchanging heat with the internal air. The rate of gain is dependent on the ventilation rate. Ventilation heat gain can be avoided by restricting the size of openings, especially during the heat of the day.

The other sources of heat gain are the inhabitants of the building themselves and household equipment such as electric lights and appliances. These sources, unlike the solar radiation, can contribute heat even at night.

Thermal Loss

The difference between diurnal and nocturnal heat losses in a building when not considering artificial cooling devices, is not marked as in the case of heat gain. Heat is lost by conduction through the walls, by exactly the same process that it is gained from the direct solar radiation once it has been absorbed by the surface, or through the roof by a combination of convection and conduction.

Ventilation is also another mode of heat loss which occurs when hot air escapes through an opening in the roof or a wall to be replaced by cooler air from outside. Nocturnal heat losses can be retarded by closing vents.

Evaporation from the surface of the building or from objects within the interior can produce a cooling effect on the building which acts as a source of heat loss. In hot arid climates, this can be a particularly effective cooling mechanism since the rate of evaporation in dry air is very high.

Dynamic Thermal Equilibrium

At any particular time, the heat gained by the building can be expected to be balanced by the heat lost and an internal temperature distribution thus established. These temperatures are dependent on the outside (ambient) temperature and the ratio of the heat gained to the heat lost and can be adjusted by regulating the sources of heat gain and loss. For example, if one were to reduce to a minimum the heat losses of an insolated building, the internal temperature would rise, much as in the case of an automobile left in the sun with its windows closed. This is called greenhouse gain. On the other hand, a very cool internal temperature could be obtained by shading the insolated surface, obstructing direct penetration of solar radiation, enhancing a flow of cool air, using thick light-coloured walls made of a low thermal-conductivity material, using high ceilings provided with roof ventilation, and providing sources of evaporation including possibly a roofed pond and an internal fountain.

However, in fact, the temperature situation within a building changes slowly throughout the day for two important reasons. First, the solar radiation and external temperatures vary slowly, and the internal temperatures are constantly adjusting to the changing rates of heat gain and loss. Second, the mass of the building structure does not react instantaneously to external changes but has a thermal inertia requiring from many minutes to hours to adjust to a temperature change. The principle of thermal inertia can be used advantageously to provide dynamic heating and cooling of a building by selecting the wall material and its thickness such that the warmth of the day penetrates the building only after nightfall when it would be welcomed and is dissipated before morning.

Thus, it is seen that the microclimatic situation of a building is in a constant state of flux and that the equilibrium that is established is a dynamic one. When providing a comfortable microclimate, it is necessary to reduce the extreme fluctuations to within the range of human comfort by regulating the various parameters that govern heat gain and loss.

Before examining the systems and devices that have been developed to do this in the hot arid zones, it is first necessary to have an idea of the heat-regulating mechanism of the human body and the microclimatic conditions for human comfort.

Heat-Regulating Mechanisms of the Human Body

As discussed earlier, the human body must maintain a fairly constant temperature over a considerable range of external air temperatures. The human body is subject to the same laws of physics as other objects, gaining and losing heat by the processes described above, namely: radiation through space; conduction between bodies and/or substances in contact; convection involving the transfer of heat from a warm body to a body of air above it, which then rises to be replaced by cooler air; and evaporation, which requires that the evaporating surface gives up some heat. However, the human body is not simply a passive object warmed or cooled like metal or water. Its metabolic processes generate its own heat as well, similar to a heat-producing engine. Like any other engine, it burns fuel, in the form of food, and converts this into heat and work. As with an engine, work cannot be generated without producing some heat even if unwanted–which must be dissipated just as for an automobile.

In a hot environment, the heat generated by the human body must be dissipated. Body heat regulation is essentially the maintenance of a balance between heat gains and losses. The body has an excellent heat-regulating mechanism, which under normal conditions can adjust its temperature to maintain the appropriate heat balance. Only when it is exposed to prolonged severe conditions do serious difficulties arise.

The metabolic processes of the living human body continuously generate heat. Even at complete rest, an important quantity of heat is produced. This basal heat production amounts to 73 kcal/h (290 Btu/h) for an average adult male. For a short time he can increase this rate eight-fold through violent exercise, although over 24 hours the average heat production would not amount to more than 130 % of the basal rate for sedentary work and 300% for heavy manual labour.

Table 3. Heat Gain and Loss Processes for the Human Body

Mechanism	**Gain Process**	**Loss Process**
Metabolism	Basal heat production	
	Digestion	
	Activity	
	Muscle tensing and shivering in response to cold	
Radiation	From solar radiation-direct and reflected	To surrounding air
	From radiation by radiators	
Conduction	From air above skin temperature (increased by air movement)	To air below skin temperature
	From warmer bodies in contact	To cooler bodies in contact

Evaporation		From respiratory tract
		From skin covered with perspiration or applied water

Table 3 shows the modes of heat gain and loss between the human body and its surroundings for the metabolic activities and three mechanisms of physical heat exchange, namely, radiation, conduction, and evaporation.

Air movement has a significant influence on the heat transfer between the skin and air and will increase the transfer rate in whichever direction it is proceeding, i.e., either to or from the body. Air movement increases the rate of heat loss by evaporation. For continued heat loss, the evaporated water vapour must be free to move away from the site of evaporation. Thus the difference between the vapour pressure at the skin surface and that of the surrounding air controls the ease with which evaporation cools the skin. The vapour pressure at the skin surface results largely from the extent, to which a water film covers the skin, which may vary from less than 10% of the skin area on a cool, dry day, to 100% when the skin is bathed in perspiration.

The consequences of heat stress can be important. When the human body has difficulty losing heat, the blood vessels of the skin dilate, allowing much more blood to circulate and cooling by heat loss through any of the processes discussed above. But this increase in blood-vessel volume may exceed the body's ability to provide a corresponding amount of blood. To compensate, other blood vessels in the internal organs may receive less blood, although this still may not yield sufficient blood. During such a relative blood shortage, the brain, located at the highest part of the body, may be deprived of an adequate supply. Brain tissue is most sensitive to the shortage of oxygen and quickly produces the characteristic symptoms of 'heat exhaustion': lassitude, headache, nausea, dizziness, uneasiness, and ultimately fainting. However, a wide range of lesser disturbances probably interfere with efficiency without resulting in total exhaustion. In addition, the human body has a remarkable sweating capability. With moderately hard work under hot dry conditions, a man can produce about 1.5 litres (3 pt.) of perspiration per hour. Although he probably would not keep this up for more than two or three hours, he could lose as much as 8 litres (4 gal.) in one day, which must be compensated for by drinking water. Eight litres is a large quantity of water for the body to handle, and even at lower sweating rates there probably will be periods when water loss exceeds supply. Then the already precarious blood supply is depleted still further and the risk of heat exhaustion is increased. Further indirect consequences of heat stress are lowered alimentary activity due to the insufficient blood supply, discomfort from hot and moist skin, the risk of skin disturbances when moist skin is chafed, possible salt deficiencies due to sweat loss, and perhaps urinary stones from reduced urine flow.

Thus, it is important to avoid conditions that stress human heat-regulatory processes until they interfere with normal body functions or health. A permanent state of human comfort need not be guaranteed, but there is a range of microclimatic conditions that can be maintained with an effort that is more than recovered by the saving in human efficiency. Securing this degree of climatic improvement should be the aim of tropical architecture.

REFERENCES

1. A Biographical Dictionary of British Architects. / Comp.: H.Colvin. L.: Murray, 1978.
2. AJ Handbook of Building Enclosure / Ed.: M. Vandenberg. L.: Archit. Press, 1975.
3. American Architects Directory. 3rd ed. / Ed.: J. F. Gane. N.Y.; L.: Bowker, 1970.
4. Andrew Littlejohn & Diana Hicks. Cambridge English Worldwide. Cambridge University Press, 1999.
5. Architectural Practice and Management. 3rd ed. L., 1973.
6. Architectural Keywords. L.: RIBA, 1982.
7. Boyne C., Wright L. Best of Architects' Working Details. Vol. 1-2 L.: The Architect. Press, 1982.
8. Burden E. Visual Presentation. A Practical Manual for Architects and Engineers. N.Y.: Mc Graw-Hill, 1977.
9. Burke A.E., Dalzell J.R., Townsend G. Architectural and Building Trades Dictionary. 2nd ed. Chi.: Amer. techn. society, 1963.
10. Business English Exercises http://www.better-english.com\exerciselist.html.
11. Butler R.B. Architectural and Engineering Calculations Manual. N.Y., etc.: McGraw-Hill, 1984.
12. Collins COBUILD, Student's Grammar. Harper Collins Publishers Ltd. 1991.
13. Contemporary Architects / Ed.: M. Emmanuel, Macmillan, 1980.
14. Cowan H.J., Smith P. R. Dictionary of Architectural and Building Technology. L.; N.Y.: Elsevier appl. science, 1986.
15. Curl J. S. English Architecture: An Illustrated Glossary. 2nd ed. Newton Abbot et al.: David and Charles, 1986.
16. Designer's Guide to Colour.: 2 Pt. L.: Angus and Robertson Publishers, 1987.
17. Dictionary of Architectural Science / Ed.: H.J. Cowan. L.: Applied science publ., 1973.
18. Encyclopaedia of Modern Architecture / Ed.: G. Hatje. Trans. from Ger., Fr., Span.,

It., Dan., Dutch. L.: Thames, 1963.

19. English for Science and Technology http://www.wfi.fr\est\estl.html.

20. English for Science Links http://www.hut.fi\~rvilmi\EST\.

21. Longman. Dictionary of Contemporary English. New Edition. Pearson Education Limited, 2003.

22. The Japan Journal No. 2, Kosei Bldg. (4F), Uchikanda. Japan, 2008.

23. The Japan Journal No. 3, Kosei Bldg. (4F), Uchikanda. Japan, 2008.

CONTENTS

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Маматова Ніна Василівна

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