

ARCHITECTURE
CBRT FOR THE POST OF DEPUTY ARCHITECT
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1.

A safety nosing in a staircase is

- (A) the least thickness of a stanchion
- (B) a non-slip surface flush with the riser surface
- (C) a non-slip surface flush with the tread surface
- (D) the least thickness of a reinforced concrete slab

2.

Sumerian units of measurement were based on

- (A) parts of an ancient buildings
- (B) parts of animals' body
- (C) parts of trees and plants
- (D) parts of the human body

3.

Which one of the following statements is NOT fit for ambient luminescence in the context of interior lighting?

- (A) It is shadowless
- (B) It maximizes form and bulk
- (C) It reduces the importance of things and people
- (D) It fills people with a sense of freedom of space

4.

Which one of the following enhances the perception of depth by emphasizing the natural texture and sculptural relief of the surface?

- (A) Diffuse light
- (B) Grazing light
- (C) Contrast light
- (D) Sparkle light

5.

Consider the following statements regarding different types of design:

1. Semi-circular arched opening was the hallmark of the Romanesque style of Architecture.
2. Gothic style of Architecture is characterized by the use of pointed arch, groined vault and tracery.
3. The Cathedral of Notre-Dame is a prime example of Renaissance Architecture.
4. The emphasis during the Rococo period was on interior application rather than the exterior façade.

Which of the above statements are correct?

- (A) 1, 2 and 4
- (B) 2, 3 and 4
- (C) 1, 2 and 3
- (D) 1, 3 and 4

6.

The art of inserting a part of one plant into another plant by exposing the actively growing tissue so that they will unite and continue their growth as one plant is called

- (A) Budding
- (B) Stooling
- (C) Layering
- (D) Grafting

7.

Albert Atterberg, a Swedish soil scientist defined the boundaries between different consistency states for soil that are referred to as the Atterberg limits. Of which, what comprises the plastic limit?

- (A) Boundary between the plastic and liquid states
- (B) Boundary between the semisolid and solid states
- (C) Boundary between the plastic and semisolid states
- (D) Boundary between the liquid and semisolid states

8.

As far back as 1887, the Gazetteer of Delhi described Delhi district as having 4 'natural divisions', which are still useful descriptive labels for Delhi microhabitats of which the sandy riverain of the Yamuna is called

- (A) khadar
- (B) bangar
- (C) kohi
- (D) dabar

9.

'Solum' is a term which describes one of the following elements of landscape:

- (A) Soil
- (B) Water
- (C) Trees
- (D) Shrubs

10.

What is the maximum angle of repose for strong bedrock at which it can be safely inclined and beyond which it will fail?

- (A) 90°
- (B) 60°
- (C) 45°
- (D) 30°

11.

Consider the following statements with regard to deciding the performance of masonry buildings in earthquakes:

1. The masonry courses from the walls meeting at corners must have good interlocking.
2. Openings too close to wall corners hamper the flow of forces from one wall to another.
3. It is best to keep all openings as small and far away from the corners as possible.

Which of the above statements are correct?

- (A) 1 and 2 only
- (B) 2 and 3 only
- (C) 1 and 3 only
- (D) 1, 2 and 3

12.

For minimizing the impact of earth quake, which of the following solutions are proposed for L-shape building?

1. Separate the wings
2. Add collector walls
3. Join the wings
4. Stiffen the ends

Select the correct answer using the code given below:

- (A) 1, 2 and 3
- (B) 2, 3 and 4
- (C) 1, 3 and 4
- (D) 1, 2 and 4

13.

In the purview of earthquake engineering, the effect of internal friction, imperfect elasticity of material, slipping, sliding, etc in reducing the amplitude of vibration, is called

- (A) Floor Response Spectra
- (B) Liquefaction
- (C) Damping
- (D) Ductility

14.

Which one of the following is NOT suitable building construction method in earthquake-prone areas?

- (A) Roof with tiles or stone plates
- (B) Wattle and daub wall system
- (C) Textile walls filled with earth
- (D) Adobe walls

15.

Modified Mercalli Intensity (MMI) scale is used for measuring

- (A) temperature for volcano lava
- (B) the intensity of shaking produced by an earthquake
- (C) sound intensity of thunder storm
- (D) the intensity of flood

16.

In world design conference, 1960, Fumihiko Maki described three specific modes of urban design as:

- (A) Core, Periphery, Suburban
- (B) Lattice, Megastructures, Networks
- (C) Homogeneous, Lattice, Heterogeneous
- (D) Composition, Megastructures, Group form

17.

Constantinos A Doxiadis, prepared the master plan of which one of the following cities?

- (A) Baghdad
- (B) Karachi
- (C) Gandhinagar
- (D) Kuwait

18.

Jane Jacobs argued for repressed minorities and neighborhood protection against the large scaled development of cross-island highway through lower Manhattan to serve the suburbs, was proposed by

- (A) Robert Moses
- (B) J.L.Sert
- (C) Edward Soja
- (D) Rudyard Gulliani

19.

In Chandigarh, Le Corbusier and his associates designed many of the buildings in sector 17 based on the prototype of

- (A) Maison Domino
- (B) Terrace Garden
- (C) Maison Arch
- (D) Human Body

20.

Urban actor in a city is defined as

- (A) urban ecological system of city for critical and sustainable survival
- (B) urban transport which connects the fragmented city together through complex network
- (C) large buildings in the city which influence the growth and future patterns of the city
- (D) individuals or small or large groups who are active and organized to use and manipulate space in the city

21.

In cement manufacturing process, gypsum is added to the clinker to

- (A) soften the mixture
- (B) retard setting
- (C) solidify the mixture
- (D) keep moisture

22.

Which one of the following statements is NOT correct in PERT network?

- (A) PERT is event based
- (B) PERT is frequently used in research and development projects
- (C) PERT is preferred for those projects which are of repetitive nature
- (D) Probabilistic approach is used by PERT planner

23.

Under the Indian Contract Act-1872, which section states that “when a contract consists of reciprocal promises to be simultaneously performed, no promiser need perform his promise unless the promisee is ready and willing to perform his reciprocal promise”?

- (A) Section – 37
- (B) Section – 51
- (C) Section – 53
- (D) Section – 54

24.

In tender documents, under a security deposit subhead, which clause is related to “Payment due to variation in prices of materials after receipt of tenders”?

- (A) Clause – 10
- (B) Clause – 10 C
- (C) Clause – 10 CA
- (D) Clause – 10 CC

25.

Breach of contract means the failure or refusal to perform the promises that a party has made or deemed to have made under a contract. In this context, which section of the Contract Act provides payment of only reasonable compensation not exceeding the amount named or penalty stipulated?

- (A) Section 52
- (B) Section 70
- (C) Section 20
- (D) Section 74

26.

The establishment of Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) are done under

- (A) River Boards Act, 1956
- (B) The Water (Prevention and Control of Pollution) Act, 1974
- (C) Environment Protection Act, 1986
- (D) National Environmental Tribunal Act, 1995

27.

Resources like oxygen, water, food, which constitutes life support comes under

- (A) Ecological Services
- (B) Government and Public Services
- (C) Climate Change Services
- (D) International Standard Services

28.

If the outside temperature is 10°C and the inside temperature is 22°C over a 10 m^2 brick wall, having transmittance value of $1.5\text{ Wm}^{-2}\text{K}^{-1}$, what is the heat flow rate?

- (A) -120 W
- (B) +120 W
- (C) +180 W
- (D) -180 W

29.

Which one of the following statements is NOT correct for designing shelter for hot-dry climate?

- (A) Buildings should have open elongated plan shapes.
- (B) Shading of roofs, wall and out-door spaces is critical.
- (C) The larger dimensions of a building should preferably face north and south.
- (D) An enclosed, compactly planned and essentially inward-looking building is the most suitable.

30.

The process of conversion of NO_3^- into N_2 by anaerobic bacteria is called

- (A) Nitrification
- (B) Ammonification
- (C) Denitrification
- (D) Anammox

31.

Consider the following statements:

1. HUDCO is public sector undertaking under Ministry of Housing and Urban Affairs.
2. RERA scheme is for promoting and regulating the real estate sector.
3. PMGSY is launched for the mission of 'Housing for All'.
4. BSUP scheme is for providing "Houses for Urban Poor".

Which of the above statements are correct?

- (A) 1, 2 and 4
- (B) 2, 3 and 4
- (C) 3 and 4 only
- (D) 1 and 2 only

32.

Identify the first sky-scraper building:

- (A) Home Insurance Building, Chicago
- (B) The Empire State Building, New York
- (C) Burj Khalifa, Dubai
- (D) Chrysler Building, New York

33.

Consider the following statements:

1. Housing demand is the total requirement while housing need is associated with the affordability.
2. TDR means achieving additional FAR in lieu of the area surrendered by the owner of the land.
3. Housing need is not standard across cultures and other societal groups.

Which of the above statements are correct?

- (A) 1 and 2 only
- (B) 1 and 3 only
- (C) 2 and 3 only
- (D) 1, 2 and 3

34.

The housing trend of 'Expandable Dwelling' is associated with

- (A) Row Housing
- (B) Apartment Housing
- (C) Core Housing
- (D) Detached Housing

35.

As per Kenneth Frampton, which one of the following built-up forms of urban settlement is assumed to be cost effective in terms of land-use and also has many social advantages in terms of services?

- (A) high-rise, high-density
- (B) high-rise, low-density
- (C) low-rise, high-density
- (D) low-rise, low-density

36.

The antique statue of 'Herkulanerin' was first discovered by

- (A) Alcubierre
- (B) Camillo Paderni
- (C) Prince d'Elboeuf
- (D) Maria Amalia

37.

The famous treatise '*De Architectura*' of classical architecture is written by

- (A) Domenico Fantana
- (B) Marcus Vitruvius Pollio
- (C) Michelangelo
- (D) Giuliano da Sangallo

38.

Which one of the following International organizations is NOT associated with protection of cultural heritage?

- (A) ICCROM
- (B) ICOMOS
- (C) UNESCO
- (D) IRCOM

39.

The famous slogan “Conserve, do not store” is given by

- (A) Mynors Charles
- (B) Georg Dehio
- (C) Robert Garland
- (D) David Lowenthal

40.

A master piece of Roman architecture ‘Montecitorio obelisk’ was restored by using

- (A) Plain Egyptian red granite of huge monolithic column of Roman Emperor
- (B) Reintegrating hieroglyphs
- (C) Roman soil with gravels
- (D) Egyptian sand and nearby conservation

41.

Which one of the following is a good example of a successful application of thin film technology in a design context?

- (A) Anti-reflection glass
- (B) Holographically pattern glass
- (C) Dichroic glass
- (D) Electro-optical glass

42.

The airflow of a fan operating at 9000 cfm and 1 inch of water gauge static pressure must be increased to 10500 cfm. The fan operates at 1500 rpm and requires 5 brake horsepower at the rated conditions. What is the new operating speed?

- (A) 1450 rpm
- (B) 1550 rpm
- (C) 1650 rpm
- (D) 1750 rpm

43.

In Building Automation System, ‘Smart Window’ possesses which of the following functions?

1. Control of optical transmittance
2. Control of thermal transmittance
3. Control of thermal absorption

Select the correct answer using the code given below:

- (A) 1 and 2 only
- (B) 1 and 3 only
- (C) 1, 2 and 3
- (D) 2 and 3 only

44.

In modern Building Automation System, most of the equipments are based on the technology of

- (A) Light amplification by simulation of energy reflection
- (B) Light amplification of solar energy and radiation
- (C) Layer application for simulation energy and radiation
- (D) Light amplification by stimulated emission of radiation

45.

Ventilation cooling (100 percent untreated outdoor air) can be provided in locations where summer design temperatures are at least

- (A) 20°F cooler than the required outdoor temperature
- (B) 10°F cooler than the required outdoor temperature
- (C) 20°F cooler than the required water temperature
- (D) 10°F cooler than the required indoor ambient temperature

46.

As per NBC-2016 norms for roads and paths in hilly areas, the street orientation shall preferably be

- (A) north – south
- (B) north east – south west
- (C) east – west
- (D) north west – south east

47.

As per NBC-2016 in case of single room tenements, the carpet area of the multipurpose single room should be at least

- (A) 9 m²
- (B) 10 m²
- (C) 12.5 m²
- (D) 15 m²

48.

As per National Building Code, for group housing development in an area with a density of 250 Persons per hectare, maximum allowable ground coverage in percentage (%) is

- (A) 25
- (B) $33\frac{1}{3}$
- (C) 30
- (D) 35

49.

For new buildings, structures which rise to 30 m or more in height need 'No-objection-certificate' from the Directorate General of Civil Aviation as per NBC, if the proposed location lies within how much distance of the aerodrome reference point?

- (A) 15 km
- (B) 20 km
- (C) 10 km
- (D) 5 km

50.

As per National Building Code, the ceiling height of the industrial buildings (except when air conditioned) should be

- (A) 3.0 m
- (B) 3.6 m
- (C) 4.0 m
- (D) 4.6 m

51.

Victor Gruen is famously referred to as

- (A) inventor of the passenger lift
- (B) early designer of 'mall' as building type
- (C) inventor of H.V.A.C.
- (D) inventor of fire safety system in building

52.

Durga temple at Aihole, built by Chalukyan builders adopted a plan of

- (A) Buddhist chaitya hall
- (B) Sanchi stupa
- (C) Islamic mosque
- (D) Christian church

53.

One of the distinctive architectural characters of the Hoysalas of Karnataka is

- (A) Chaitya style plan
- (B) Star-Shaped plan
- (C) Greek style plan
- (D) Roman style plan

54.

Which one of the definitions correctly defines the centralized organization in architectural design?

- (A) A central space from which linear organizations of space extend in a radial manner.
- (B) Spaces grouped by proximity or the sharing of a common visual trait or relationship.
- (C) A central, dominant space about which a number of secondary spaces are grouped.
- (D) Spaces organized within the field of a structural grid or other three-dimensional framework.

55.

Le Corbusier developed his proportioning system, the Modulor, to order "the dimensions of that which contains and that which is contained". The basic grid consists of three measures proportioned according to the Golden Section. They are

- (A) 114 cm, 71 cm, 44 cm
- (B) 113 cm, 70 cm, 43 cm
- (C) 112 cm, 89 cm, 42 cm
- (D) 111 cm, 88 cm, 41 cm

56.

Which one of the following does NOT represent a visual art movement?

- (A) Impressionism
- (B) Cezanne
- (C) Minimalism
- (D) Prism

57.

Who wrote the book “DeColoribus” and established that all colors were derived from different mixtures of sunlight, firelight, air and water?

- (A) Newton
- (B) Da Vinci
- (C) Aristotle
- (D) Le Blen & Harris

58.

Which one of the following is NOT an example of basic design ordering principles?

- (A) Symmetry
- (B) Datum
- (C) Rhythm
- (D) Scale

59.

The study of the symbolic and communicative role of the spatial separation individuals maintain in various social and interpersonal situations, and how the nature and degree of this spatial arrangement relates to environmental and cultural factor is called

- (A) pylon
- (B) propylon
- (C) proxemics
- (D) propylaeum

60.

Who developed one of the first full-color circles, which spaced the primaries at equal distances from one another?

- (A) Munsell
- (B) Moses Harris
- (C) Goethe
- (D) Le Blon

61.

Radiance software can be used for

- (A) thermal comfort in a building
- (B) structural design for high rise building
- (C) acoustical measurement for a building
- (D) lighting simulation of interior spaces

62.

Which commands are NOT used in AutoCAD?

- (A) UCSICON and MATCHPROP
- (B) DXFOUT and MLEADER
- (C) TURNOVER and DRAWORDER
- (D) DRAWORDER and DXFIN

63.

In ‘Sketch up’, moving the time slider back and forth, for shadow setting indicates

- (A) moving sun and moon around in the sky
- (B) moving sun around in the sky
- (C) moving moon around in the sky
- (D) moving artificial lights around in the sky

64.

To display one or more scaled views of your design on a standard-size drawing sheet is called

- (A) layers
- (B) layouts
- (C) blocks
- (D) geometry

65.

In AutoCAD, Precision feature which specifies a location by its Cartesian, either absolute or relative is

- (A) Polar tracking
- (B) Locking angles
- (C) Grid snaps
- (D) Coordinate entry

66.

Difference between the readings of wet-bulb thermometer and dry-bulb thermometer is called

- (A) Variable depression
- (B) Wet-bulb depression
- (C) Dry-bulb depression
- (D) Atmospheric depression

67.

Operative temperature scale was developed by

- (A) Bedford, Harris
- (B) C G Webb, Givoni
- (C) Winslow, Herrington, Gagge
- (D) Missenard, Otto Koenisberger

68.

The amount of moisture actually present in unit mass or unit volume of air, in terms of gramme per kilogramme (g/kg) or gramme per cubic meter (g/m^3) is called

- (A) atmospheric humidity
- (B) absolute humidity
- (C) relative humidity
- (D) saturation point humidity

69.

Assume that the outdoor temperature is 18°C , the indoor temperature has risen to 28°C and there is an internal heat gain of 5 kW, which would cause a further increase of indoor temperature. What is the rate of ventilation? (Assume the specific heat of air as $1300 \text{ J}/\text{m}^3 \text{ degC}$)

- (A) $0.485 \text{ m}^2/\text{s}$
- (B) $0.385 \text{ m}^2/\text{s}$
- (C) $0.285 \text{ m}^2/\text{s}$
- (D) $0.185 \text{ m}^2/\text{s}$

70.

The intensity of radiation reaching the upper surface of the atmosphere is taken as the Solar Constant 1395 W/m^2 , but it actually varies due to variations in the output of the sun itself and also due to changes in the earth-sun distance. What is the percentage variation in both cases respectively?

- (A) $\pm 3.5 \%$, $\pm 2 \%$
- (B) $\pm 3.5 \%$, $\pm 1 \%$
- (C) $\pm 2 \%$, $\pm 1 \%$
- (D) $\pm 2 \%$, $\pm 3.5 \%$

71.

A mixing of Romano-Greek and Indian motifs in architecture/sculpture is called

- (A) Gandhara style
- (B) Ashoka style
- (C) Islamic style
- (D) Mauryan style

72.

In architectural design theory, synectics is referred to as

- (A) a study of synergy between various building materials
- (B) a study of creative processes involving free use of metaphor and analogy
- (C) a study of visual aesthetics of a building
- (D) a study of processes in sequence to understand the construction techniques in buildings

73.

In the purview of social comprehension and assimilation architecture, who said this “A society can be defined as a group of individuals competing for conventional prizes by conventional means”?

- (A) V.C. Wynne - Edwards
- (B) Stuart Altmann
- (C) Manfredo Tafuri
- (D) Terence Hawkes

74.

The Angkor Vat in Cambodia, is culmination of which one of the following concepts of the Buddhist planning?

- (A) Dwiratna
- (B) Charbagh
- (C) Nagara
- (D) Pancharatna

75.

Who authored “The Seven Lamps of Architecture”?

- (A) John Ruskin
- (B) Le Corbusier
- (C) Paul Horwich
- (D) William James

76.

In building acoustics, the function of an acoustical cloud is

- (A) reflecting the sound from ceiling for improving the acoustic quality of music
- (B) absorbing the white noise from the source
- (C) creating the echo within the given space
- (D) creating a new sound by absorbing the noise from surrounding

77.

The time in seconds required for a sound made in an enclosed space to diminish by 60 dB is called

- (A) Decay rate
- (B) Interference
- (C) Reverberation time
- (D) Metric sabin

78.

If two sounds differ by 20 dB, the louder of them is 100 times more intense and when they differ by 30 dB, the louder of them would be

- (A) 20 times more intense
- (B) 150 times more intense
- (C) 1000 times more intense
- (D) 200 times more intense

79.

The sound which is transmitted first through the structure is called

- (A) Structure sound
- (B) Airborne sound
- (C) Impact sound
- (D) Transfer sound

80.

The ratio of transmitted sound power and the power incident on the surface is called

- (A) Transmission index
- (B) Transmission factor
- (C) Sound incident index
- (D) Sound incident factor

81.

The Town Hall, Leeds is a classical master piece of

- (A) Edwardien Era
- (B) High Victorian Classicism
- (C) Historical Anachronism
- (D) Norwich Classicism

82.

The White House, Washington D.C., was designed by

- (A) Charles Bulfinch
- (B) Thomas Jefferson
- (C) James Hoban
- (D) Sir John Soane

83.

Who wrote the book “Complexity and Contradiction” in Architecture?

- (A) Robert Venturi
- (B) Bernhard Tschumi
- (C) Bruno Zevi
- (D) Gordon Cullen

84.

Radburn city in USA was planned by

- (A) Clarence Stein
- (B) Ebenezer Howard
- (C) Patrick Geddes
- (D) Patrick Abercrombie

85.

Which one of the following terms was used by Dutch architectural group ‘MVRDV’ to describe a city formed from information?

- (A) Megacity
- (B) Metacity
- (C) Beta city
- (D) Invisible city

86.

What is the cost of brickwork and plastering work on both sides, respectively for the wall of 4 m long, 3 m high and 30 cm thick, if the rate of brickwork is Rs. 320 per cubic metre and plastering Rs. 8.50 per square metre?

- (A) Rs. 1150, Rs. 200
- (B) Rs. 1152, Rs. 204
- (C) Rs. 1150, Rs. 204
- (D) Rs. 1152, Rs. 200

87.

Which of the following methods are predominantly used for the detailed estimation of quantities of various items of a building in the construction process?

- (A) Long & short wall method and Centre line method
- (B) Centre line method and Plinth area method
- (C) Plinth area method and Cubical method
- (D) Long & short wall method and Cubical method

88.

Which valuation method out of the following options can be adopted when the rental value is not available from the property concerned, but there are evidences of sale price of the property as a whole for fixing the capitalized value?

- (A) Valuation based on profit
- (B) Valuation based on cost
- (C) Valuation based on depreciation
- (D) Direct comparison with the capital value

89.

If the brick size is 20 cm × 10 cm × 10 cm, how many bricks required for brick floor to cover 100 sqm floor area?

- (A) 5000
- (B) 4000
- (C) 3500
- (D) 5500

90.

The fund which is gradually accumulated by way of periodic deposit for the replacement of a building at the end of its useful life is called

- (A) Life cycle fund
- (B) Salvage fund
- (C) Sinking fund
- (D) Capitalized fund

91.

Central Place Theory was proposed by

- (A) Walter Miles
- (B) Walter Gropius
- (C) Walter Christaller
- (D) Walter Benjamin

92.

In physical planning, the Concept of Saturation Flow is associated with

- (A) Temperature flow
- (B) Traffic flow
- (C) Wind flow
- (D) Electricity flow

93.

In alternative systems for sanitation and sewage, UASB (Dutch Technology) stands for

- (A) Urban Anaerobic Sludge Blanket
- (B) Urban Aerobic Sludge Blanket
- (C) Up-flow Anaerobic Sludge Blanket
- (D) Up-flow Aerobic Sludge Blanket

94.

According to WHO standards, the number of hospital beds recommended for per 1000 population in urban areas is

- (A) 3 hospital beds
- (B) 4 hospital beds
- (C) 5 hospital beds
- (D) 6 hospital beds

95.

Cul-de-sac is associated with

- (A) Dead end
- (B) Central Island
- (C) Sectoral Planning
- (D) Intersection

96.

The Council of Architecture has adopted nine 'Conditions of Engagement' to maintain the highest standards of practice and conduct. Indicate which factor out of the following does NOT come under the Conditions of Engagement.

- (A) Remuneration
- (B) Interpretation
- (C) Responsibilities
- (D) Indemnification

97.

Consider the following circumstances with regard to Architects Professional Guidelines:

1. Use of building for the purposes other than for which it has been designed.
2. Modifications to the building carried out by the owner without the consent of the Architect who designed.
3. Damages caused due to any reasons arising out of specialized consultants, who were engaged in consultation with client.
4. Any compromise with the safety norms by the architect.

In which of the above circumstances Architect is NOT liable?

- (A) 1, 2 and 4 only
- (B) 2, 3 and 4 only
- (C) 1, 3 and 4 only
- (D) 1, 2 and 3 only

98.

Under which section of the Architects Act 1972, if an architect is found guilty of professional misconduct, he/she is liable for disciplinary action by the Council of Architecture?

- (A) Section – 30
- (B) Section – 53
- (C) Section – 35
- (D) Section – 20

99.

As per the Architects Regulation (Professional Conduct) 1989, an architect may exhibit his name outside his/her office and on a building either under construction or completed, for which he/she is/was an Architect, provided the lettering does not exceed in height more than

- (A) 15 cm
- (B) 20 cm
- (C) 5 cm
- (D) 10 cm

100.

For conducting an Architectural competition, the guidelines are framed by Council of Architecture based on Architecture Competition Rule formed by International Union of Architects on behalf of

- (A) UNESCO
- (B) ASI
- (C) INTACH
- (D) WHO