MAH M Arch CET Current Architecture Practice

Sample Paper – 9

Duration: 12 Minutes **Maximum Marks: 20**

Instructions

- This paper contains **10 multiple-choice questions (MCQs)**.
- Each question carries **+2 marks** for the correct answer.
- There is **no negative marking**.
- Only **one** option is correct for each question.
- Click on the question number to jump to its solution; click **Go Back** in the solution to return to the question.

SECTION V — CURRENT ARCHITECTURE PRACTICE

Q1. Under the **Real Estate (Regulation and Development) Act 2016 (RERA)**, the term **"carpet area"** is defined as:

(A) The net usable floor area of an apartment, excluding the area covered by the external walls, areas under services shafts, exclusive balcony or verandah area, and exclusive open terrace area, but *including* the area covered by the internal partition walls of the apartment.

(B) The gross floor area of the apartment including all external walls, columns, and common staircases proportionately attributable to the unit.

(C) The plinth area of the apartment measured to the outer face of external walls, inclusive of all projections and service shafts.

(D) The super built-up area including a proportionate share of all common areas, lobbies, lift shafts, and stairwells of the building.

Q2. **NBC 2016 Part 11** establishes a framework for sustainable architecture and habitat in India. Which of the following *best* describes the **primary objective** of NBC 2016 Part 11?

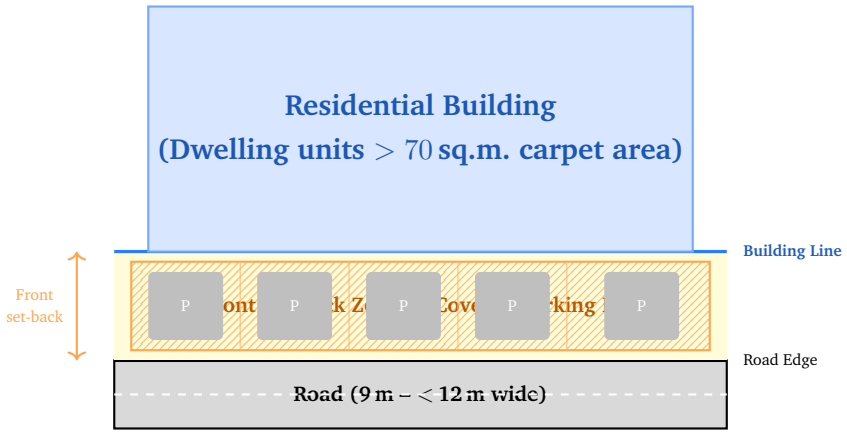
(A) To prescribe mandatory BEE star ratings for all new commercial buildings with a built-up area above 500 sq.m.

(B) To set binding national targets for carbon-neutral construction by 2030 in conformity with India's obligations under the Paris Agreement.

(C) To replace Part 3 (Development Control Rules) of NBC 2016 with an integrated sustainability-zoning regulation applicable to all local bodies.

(D) To provide guidelines for the planning, design, construction, and management of buildings and habitats in a manner that minimises adverse environmental impact, conserves natural resources, and ensures long-term sustainability over the entire life cycle of a building.

Q3. Under **UDCPR 2020**, for a **residential building** located on a road of width **9 m to less than 12 m** in a Municipal Corporation area (excluding MMR/PCMC), the minimum number of **covered car parking spaces** to be provided per dwelling unit whose carpet area *exceeds* **70 sq.m.** is:



UDCPR 2020: front set-back parking provision for residential building

(A) 0.5 car parking spaces per dwelling unit.

(B) 1 car parking space per dwelling unit.

(C) 1.5 car parking spaces per dwelling unit.

(D) 2 car parking spaces per dwelling unit.

Q4. As per the seismic zone map of India incorporated by reference in **NBC 2016 Part 6 (Structural Design)** via **IS 1893 (Part 1):2016**, the city of **Mumbai** falls in:

(A) Seismic Zone II (Low Damage Risk Zone).

(B) Seismic Zone IV (High Damage Risk Zone).

(C) Seismic Zone III (Moderate Damage Risk Zone).

(D) Seismic Zone V (Very High Damage Risk Zone).

Q5. The **Smart Cities Mission** was launched by the Government of India in June 2015 to drive economic growth and improve the quality of life of urban residents. The **total number of cities finally selected** under the Smart Cities Mission (across all selection rounds combined) is:

(A) 50 cities.

(B) 100 cities.

(C) 150 cities.

(D) 75 cities.

Q6. Under **Section 2 (Definitions)** of the **MRTP Act 1966**, the term **"Planning Authority"** means:

(A) Exclusively the Maharashtra Government's Town Planning Department, with no local body included within its scope.

(B) Only a Municipal Corporation with a population exceeding 3 lakh, as specified in the Bombay Municipal Corporations Act.

(C) The MMRDA (Mumbai Metropolitan Region Development Authority) acting as the sole planning authority for the entire State of Maharashtra.

(D) A Municipal Corporation, Municipal Council, Nagar Panchayat, or any other authority specified or constituted as such under the MRTP Act 1966 for the purposes of preparing and implementing development plans within its jurisdiction.

Q7. Under the **Architects Act 1972**, an architect's name may be **removed from the Register of Architects** by the **Council of Architecture (CoA)** in which of the following circumstances?

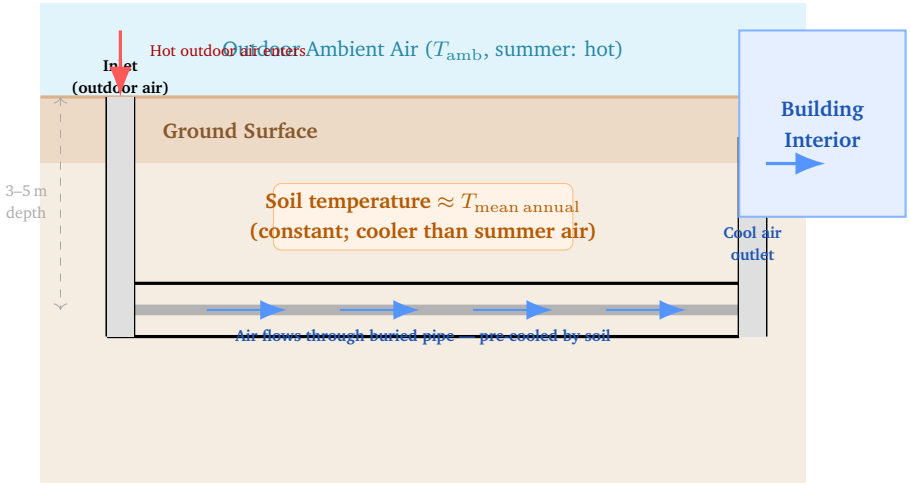
(A) On the recommendation of the Disciplinary Committee following an inquiry where the architect is found guilty of "infamous conduct in any professional respect" or of a criminal offence involving moral turpitude.

(B) Solely on a written request from the State Government of the state in which the architect is practising, without any CoA inquiry or hearing.

(C) Automatically upon the architect attaining the age of 65 years, as specified in Section 25 of the Architects Act 1972.

(D) Only upon non-payment of the renewal fee for three consecutive years, as a purely administrative action under Section 18 of the Act.

Q8. The passive cooling strategy known as an **"earth air tunnel" (EAT)** or **"earth pipe cooling"** exploits which of the following physical principles?



Cross-section: Earth Air Tunnel (EAT) — passive pre-cooling of outdoor air via buried pipe

(A) The negative pressure created by wind blowing over a building roof, which draws hot outdoor air down through pipes buried in the soil.

(B) The radiant heat exchange between the buried pipe surfaces and the surrounding soil in winter only, functioning solely as a passive heating strategy.

(C) The near-constant sub-surface soil temperature (typically equal to the mean annual surface air temperature at a depth of about 3–5 m),

which is cooler than the outdoor air in summer and warmer in winter; outdoor air drawn through buried pipes is pre-cooled in summer (or pre-heated in winter) before entering the building, thereby reducing HVAC loads.

(D) Solar gain stored in a Trombe wall, which is then discharged underground at night through conduction paths in the foundation soil.

Q9. Under the **Energy Conservation Building Code 2017 (ECBC 2017)**, the Bureau of Energy Efficiency (BEE) has defined tiered performance labels for commercial buildings. A commercial building that **exceeds ECBC 2017 energy performance norms by 50% or more** (i.e., consumes at most 50% of the energy permitted under the ECBC 2017 baseline) is eligible for which designation?

(A) The **"Super ECBC"** (also referred to as "ECBC+" or the 5-Star ECBC label) designation, recognising exceptional energy efficiency that significantly surpasses the standard ECBC compliance level.

(B) The standard "ECBC Compliant" label, with no distinction made between buildings that merely meet and those that substantially exceed the code.

(C) The GRIHA 5-Star rating, which is awarded by TERI and is a separate voluntary green building rating system unrelated to ECBC energy performance tiers.

(D) LEED Platinum certification, administered by IGBC, which uses a different point-based scoring methodology from the ECBC energy performance tiers.

Q10. A site in India is inscribed on the **UNESCO World Heritage List** following a formal nomination process. Which body in India is responsible for **preparing and submitting the nomination dossier** to UNESCO for Indian properties?

(A) The Indian National Trust for Art and Cultural Heritage (INTACH),

an autonomous non-governmental organisation, which submits nominations independently to UNESCO on behalf of India.

(B) The National Monuments Authority (NMA) under the Ministry of Culture, which directly corresponds with UNESCO's World Heritage Centre for all Indian nominations.

(C) The State Government of the state in which the nominated property is located, through its State Archaeology Department, which submits the dossier directly to UNESCO.

(D) The **Archaeological Survey of India (ASI)** under the Ministry of Culture, which is the nodal agency for UNESCO World Heritage nominations on behalf of the Government of India.

SOLUTIONS

Q1.

Solution

Concept: RERA 2016 introduced a standardised and transparent definition of "carpet area" to protect home buyers from ambiguous area representations used by developers. Before RERA, developers used various metrics (carpet area, built-up area, super built-up area) inconsistently. RERA mandates that all sale agreements quote price on the basis of carpet area only.

Step 1 — Statutory definition under RERA 2016, Section 2(k): "Carpet area" means *the net usable floor area of an apartment, excluding the area covered by the external walls, areas under services shafts, exclusive balcony or verandah area, and exclusive open terrace area, but including the area covered by the internal partition walls of the apartment.* This definition ensures that buyers pay only for the actual usable area within the apartment's four walls (including the partition walls inside it), and not for the thickness of external walls, common shafts, or exclusive outdoor areas.

Step 2 — Why other options are wrong:

- **(B)** "Gross floor area including all walls and columns" describes a built-up area or covered area concept, not RERA's carpet area definition.
- **(C)** "Plinth area measured to the outer face of external walls" is the built-up/plinth area concept used in NBC and UDCPR, not the RERA carpet area definition.
- **(D)** "Super built-up area including proportionate share of common areas" is the super built-up area concept, which RERA specifically prohibits as the basis for pricing, replacing it with carpet area.

Final Answer: $\boxed{A}$

Answer: (A) Go Back to Q1

Q2.

Solution

Concept: NBC 2016 Part 11 (Approach to Sustainability) is a comprehensive guidance document appended to the National Building Code 2016 that addresses the sustainability of the built environment across the entire life cycle of buildings and habitats in India.

Step 1 — Primary objective of NBC 2016 Part 11: Part 11 is explicitly framed

as a *guidance* (not a mandatory code section) for the **planning, design, construction, and management** of buildings and habitats that minimise adverse environmental impact, conserve natural resources (energy, water, land, materials), and ensure long-term sustainability across the entire building life cycle — from site selection and design through construction, operation and maintenance, renovation, and eventual demolition or adaptive reuse. The framework covers energy, water, indoor environment quality, materials, waste management, site ecology, and social dimensions of sustainability.

Step 2 — Why other options are wrong:

- **(A)** BEE star ratings are a separate voluntary labelling programme administered by the Bureau of Energy Efficiency under the EC Act 2001; NBC 2016 Part 11 does not prescribe mandatory BEE star ratings.
- **(B)** NBC 2016 Part 11 does not set legally binding national carbon-neutral construction targets; India's Paris Agreement obligations are tracked through nationally determined contributions (NDCs), not through NBC Part 11.
- **(C)** NBC 2016 Part 3 covers Development Control Rules for buildings; Part 11 does not replace or subsume Part 3 and has no zoning regulatory function.

Final Answer: $\boxed{D}$

Answer: (D) Go Back to Q2

Q3.

Solution

Concept: UDCPR 2020 (Unified Development Control and Promotion Rules for Maharashtra 2020) consolidates parking norms for various use types. For residential buildings, parking requirements are graduated by road width and dwelling unit carpet area size.

Step 1 — UDCPR 2020 parking norm for the stated condition: For a residential building on a road of **9 m to less than 12 m** width in a Municipal Corporation area (outside MMR/PCMC), UDCPR 2020 requires **1 covered car parking space per dwelling unit** whose carpet area exceeds 70 sq.m. This is a minimum statutory provision; the developer may provide more. For dwelling units of carpet area 45–70 sq.m. on the same road width, the norm is typically 1 parking space per 2 dwelling units. For units below 45 sq.m. carpet area, parking may be waived depending on plot and road conditions.

Step 2 — Why other options are wrong:

- **(A)** 0.5 spaces per unit is the norm for smaller dwelling units (carpet area

$\leq$70 sq.m.) or narrower roads; it does not apply to units $>$ 70 sq.m. on 9–12 m roads.

- **(C)** 1.5 spaces per unit is not a standard UDCPR 2020 residential parking norm; it is not prescribed for Municipal Corporation areas on 9–12 m roads.
- **(D)** 2 spaces per unit is associated with premium or larger residential buildings on wider roads ($\geq$18 m) or in MMR, not the 9–12 m road width category.

Final Answer: $\boxed{B}$

Answer: (B) Go Back to Q3

Q4.

Solution

Concept: IS 1893 (Part 1):2016 ("Criteria for Earthquake Resistant Design of Structures — General Provisions and Buildings"), adopted by reference in NBC 2016 Part 6, classifies the Indian subcontinent into four seismic zones (II to V) based on expected peak ground acceleration and historical seismicity. Knowledge of a city's seismic zone is fundamental to structural design under NBC 2016.

Step 1 — Seismic zone of Mumbai: As per the revised IS 1893 (Part 1):2016 seismic zone map, **Mumbai falls in Seismic Zone III** (Moderate Damage Risk Zone), with a zone factor $Z = 0.16$. This reflects the city's moderate seismic hazard arising from its proximity to the Western Ghats fault system and the Koyna seismic zone. Zone III requires designs to account for moderate ground shaking and ductile detailing of structural elements.

Step 2 — Why other options are wrong:

- **(A)** Zone II ($Z = 0.10$) covers the lowest-hazard parts of India such as central and southern peninsular regions; Mumbai's moderate hazard places it in Zone III.
- **(B)** Zone IV ($Z = 0.24$) covers high-hazard cities such as Delhi, parts of Jammu & Kashmir, and Northeastern states; Mumbai is not in Zone IV.
- **(D)** Zone V ($Z = 0.36$) is the very high hazard zone covering the North-East states, Kashmir Valley, and parts of the Andaman Islands; Mumbai is not in Zone V.

Final Answer: $\boxed{C}$

Answer: (C) Go Back to Q4

Q5.

Solution

Concept: The Smart Cities Mission (SCM) is a flagship urban development initiative launched by the Government of India in June 2015 under the Ministry of Housing and Urban Affairs (MoHUA). It aims to promote cities that provide core infrastructure, a clean and sustainable environment, and a decent quality of life through smart solutions.

Step 1 — Total cities selected under SCM: The Smart Cities Mission set a target of selecting **100 cities** across India through a competitive "City Challenge" process conducted in multiple rounds. The selection rounds were: Round 1 (January 2016, 20 cities), Round 2 (May 2016, 13 cities), Round 3 (September 2016, 27 cities), Round 4 (June 2017, 30 cities), and Round 5 (January 2018, 9 cities) and a final round, bringing the total to **100 cities**. These cities receive central government funding and technical support to implement Area-Based Development (ABD) and Pan-City solutions.

Step 2 — Why other options are wrong:

- **(A)** 50 cities represents only half the Mission's target; the scheme was always designed for 100 cities as explicitly stated in the Mission guidelines.
- **(C)** 150 cities is the target of the related AMRUT (Atal Mission for Rejuvenation and Urban Transformation) scheme, not the Smart Cities Mission. The two are often confused; SCM targets 100 cities while AMRUT covers 500 cities.
- **(D)** 75 cities is not a figure associated with the Smart Cities Mission; this may be confused with other government schemes or milestones.

Final Answer: $\boxed{B}$

Answer: (B) Go Back to Q5

Q6.

Solution

Concept: The MRTP Act 1966 (Maharashtra Regional and Town Planning Act) establishes the legal framework for planning and development control in Maharashtra. Section 2 contains the statutory definitions that apply throughout the Act. Understanding these definitions is essential for professional practice in Maharashtra.

Step 1 — Definition of "Planning Authority" under MRTP Act 1966, Section 2: Section 2 of the MRTP Act 1966 defines "Planning Authority" to mean *a Municipal*

Corporation, Municipal Council, Nagar Panchayat, or any other authority specified or constituted as such under the Act for the purpose of preparing and implementing development plans within its jurisdictional area. This broad definition encompasses the full spectrum of urban local bodies in Maharashtra, from large Municipal Corporations (e.g., BMC, PMC) down to Nagar Panchayats, as well as any special authority constituted under the Act.

Step 2 — Why other options are wrong:

- **(A)** The Town Planning Department is a State Government advisory and supervisory body; it is not itself a "Planning Authority" under Section 2 of the MRTP Act.
- **(B)** The Section 2 definition is not restricted to Municipal Corporations above a population threshold; it includes Municipal Councils and Nagar Panchayats as well, covering all urban local bodies.
- **(C)** MMRDA is a Metropolitan Region Development Authority constituted under the MRTP Act for the Mumbai Metropolitan Region; it is one specific planning authority for one region, not the "sole planning authority for the entire State."

Final Answer: $\boxed{D}$

Answer: (D) Go Back to Q6

Q7.

Solution

Concept: The Architects Act 1972 regulates the profession of architecture in India, establishes the Council of Architecture (CoA), and provides for maintenance of the Register of Architects. Section 30 of the Act empowers the CoA to remove a name from the Register in specific, well-defined circumstances that protect the profession's integrity and public interest.

Step 1 — Grounds for removal under the Architects Act 1972: Under Sections 30 and 31 of the Architects Act 1972, the CoA may remove an architect's name from the Register on the **recommendation of the Disciplinary Committee** after conducting a formal inquiry. The grounds for removal are: (i) the architect is **found guilty of "infamous conduct in any professional respect"** (the statutory expression for serious professional misconduct), or (ii) the architect is **convicted of a criminal offence involving moral turpitude**. The Act mandates a specific inquiry process with opportunity to be heard before removal; the CoA acts on the Disciplinary Committee's recommendation following this due process.

Step 2 — Why other options are wrong:

- **(B)** The State Government has no power under the Architects Act to order removal from the Register; removal can only follow the CoA's own disciplinary process under Sections 30–31.
- **(C)** There is no age-based automatic retirement or deregistration provision in the Architects Act 1972; registration continues as long as the architect remains fit and in good standing.
- **(D)** Non-payment of renewal fees may lead to administrative action (suspension of certificate) under the Act's provisions, but *removal* from the Register requires a disciplinary inquiry for professional misconduct, not a purely administrative fee-related process.

Final Answer: $\boxed{A}$

Answer: (A) Go Back to Q7

Q8.

Solution

Concept: The Earth Air Tunnel (EAT) or earth pipe cooling system is a well-established passive thermal conditioning strategy used extensively in hot-dry and composite climates in India (e.g., CEPT University, Ahmedabad; TERI RETREAT, Delhi). It exploits a fundamental property of soil temperature at depth.

Step 1 — Physical principle of earth air tunnels: Below a depth of approximately **3–5 m**, soil temperature remains nearly constant throughout the year and is approximately equal to the **mean annual surface air temperature** of the location. In summer, when the outdoor air temperature may be 38–42°C, the sub-surface soil temperature at 3–5 m depth typically remains at 22–26°C (depending on location). Hot outdoor air drawn through a pipe buried at this depth is **pre-cooled** by losing heat to the cooler surrounding soil, and the pre-cooled air is then supplied to the building, reducing the load on mechanical HVAC. In winter, the same system **pre-heats** cold outdoor air because the sub-surface soil is warmer than the ambient air.

Step 2 — Why other options are wrong:

- **(A)** Wind-induced negative pressure over a roof drives stack-assisted ventilation, not earth pipe cooling; the EAT principle is independent of wind.
- **(B)** Restricting the function to "radiant heat exchange in winter only" mischaracterises the EAT: it operates in both summer (cooling) and winter (heating), and the dominant heat transfer mechanism in the buried pipe

is forced convection between the moving air and the pipe wall, which then conducts to the surrounding soil.

- **(D)** A Trombe wall stores solar energy in a masonry mass and releases it into the interior; it has no functional connection to underground pipes or earth pipe cooling.

Final Answer: $\boxed{C}$

Answer: (C) Go Back to Q8

Q9.

Solution

Concept: The Energy Conservation Building Code 2017 (ECBC 2017), notified by the Ministry of Power and administered by the Bureau of Energy Efficiency (BEE), establishes energy performance standards for commercial buildings in India. BEE has defined a tiered label framework to incentivise buildings that go beyond the base ECBC compliance level.

Step 1 — ECBC 2017 tiered performance labels: BEE's tiered label framework for commercial buildings under ECBC 2017 defines three levels of performance:

- **ECBC Compliant:** meets the minimum prescribed energy performance norms of ECBC 2017.
- **ECBC+:** exceeds ECBC 2017 norms by about 25% or more (Energy Performance Index approximately 25% below the ECBC baseline).
- **Super ECBC:** exceeds ECBC 2017 norms by **50% or more** (EPI approximately 50% below the ECBC baseline), representing a very high level of energy efficiency. This tier is often informally called the "5-Star ECBC label."

A building consuming at most 50% of the energy permitted under the ECBC 2017 baseline thus qualifies for the **Super ECBC** designation.

Step 2 — Why other options are wrong:

- **(B)** The "ECBC Compliant" label applies only to buildings that meet (but do not significantly exceed) the ECBC 2017 baseline; buildings exceeding the norm by 50% receive the higher "Super ECBC" designation, not the basic compliance label.
- **(C)** GRIHA (Green Rating for Integrated Habitat Assessment) is a voluntary green building rating system developed and administered by TERI; it operates on entirely different criteria from ECBC energy performance tiers and has no 50%-over-ECBC threshold.

- **(D)** LEED Platinum is awarded by IGBC (Indian Green Building Council) using a point-based system covering multiple sustainability categories; it is separate from and does not correspond to any ECBC energy performance tier.

Final Answer: A

Answer: (A) Go Back to Q9

Q10.

Solution

Concept: The UNESCO World Heritage Convention (1972) requires State Parties (member nations) to submit formal nomination dossiers to the UNESCO World Heritage Centre in Paris. In India, the Government designates a specific nodal agency to manage this process, coordinate with UNESCO, and maintain the Tentative List of potential Indian World Heritage Sites.

Step 1 — India's nodal agency for UNESCO World Heritage nominations: The **Archaeological Survey of India (ASI)**, under the Ministry of Culture, Government of India, is the official nodal agency responsible for preparing and submitting nomination dossiers for Indian properties to UNESCO. ASI manages the Tentative List, co-ordinates with property managers and State governments, prepares the nomination dossiers in the UNESCO-prescribed format, and represents India in negotiations with the World Heritage Committee. Examples include ASI's management of nominations such as the Hill Forts of Rajasthan, Rani-ki-Vav, and the Victorian Gothic and Art Deco Ensembles of Mumbai.

Step 2 — Why other options are wrong:

- **(A)** INTACH is a non-governmental heritage conservation organisation; it does not have the authority to submit official State Party nominations to UNESCO on India's behalf.
- **(B)** The National Monuments Authority (NMA) is responsible for regulating development around centrally protected monuments under the Ancient Monuments Preservation Act 1958; it is not the nodal agency for UNESCO nominations.
- **(C)** State Governments and State Archaeology Departments play a supporting role in documentation and management of properties within their territory, but formal nomination dossiers are submitted by the Government of India through ASI, not by individual State Governments directly.

Final Answer: D

Answer: (D) Go Back to Q10

ANSWER KEY

Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans
1	A	2	D	3	B	4	C	5	B
6	D	7	A	8	C	9	A	10	D

All questions are original and based on RERA 2016, NBC 2016, UDCPR 2020, MRTP Act 1966, Architects Act 1972, Smart Cities Mission, and ECBC/Green Building standards as prescribed for Section V of the MAH M Arch CET.