



# THE TIMES OF INDIA

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TODAY'S  
EDITION

► Learn more about sources of energy  
► Check out maths sample paper set for you by a teacher  
**PAGE 2**



► As India's neighbours (Sri Lanka, Pakistan, Afghanistan) face leadership crisis, students debate whether democracy works all the time  
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► Sri Lanka smash Australia by an innings to draw Test series in Galle  
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STUDENT EDITION

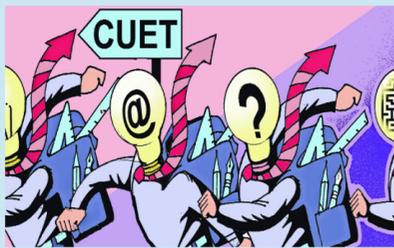
WEDNESDAY, JULY 13, 2022



Webb is named after James E Webb, who ran NASA during the height of the Apollo Moon-exploration programme in the 1960s

CLICK HERE: PAGE 1 AND 2

## CUET schedule out



**A**head of the first date for the Common University Entrance Test for undergraduate courses (CUET-UG), the

National Testing

Agency (NTA) on Monday

released the subject schedule

and the city where the exam

will be held for individual

candidates. The exam is

being conducted in 544

cities in India. However,

while some students could

log in to the website

([cuet.samarth.ac.in](http://cuet.samarth.ac.in)) and get

their exam schedules, many others

reported that they were unable to

access the data ostensibly because the server could

not handle the increased traffic.

CUET is a computer-based exam divided into three

sections – language, the second is domain-specific

subjects, and then the general aptitude test. Each of

the universities, out of the 87 under CUET, has a different

criteria for calculating the score

The NTA, which is conducting the exam that is the sole gateway for undergraduate admissions to all central universities and several state and private varsities, had announced earlier that the tests will be held from July 15 to Aug 10. Around 10 lakh students will be taking the test

## Webb telescope reveals deepest image of early UNIVERSE

**H**umanity's view of the distant cosmos will never be the same. The James Webb Space Telescope, the most powerful to be placed in orbit, has revealed the clearest image to date of the early universe, going back 13 billion years. US space agency NASA said on Monday. The stunning shot, released during a White House briefing by President Joe Biden, is overflowing with thousands of galaxies and features, some of the faintest objects observed, colourised in blue, orange and white tones.



**1** Known as the Webb's First Deep Field, it shows the galaxy cluster, SMACS 0723, which acts as a gravitational lens, bending light from more distant galaxies behind it towards the observatory, in a cosmic magnification effect

**2** Webb's primary imager NIRCam, which operates in the near infrared wavelength spectrum because light from the early universe has been stretched out by the time it reaches us, has brought these faint background galaxies into focus

**3** Webb compiled the composite shot in 12.5 hours, achieving well beyond what its predecessor, the Hubble Space Telescope, could in weeks

### WHY ARE SCIENTIST EXCITED ABOUT IT



The first image, closely guarded before the reveal, showcases the telescope's transformational capabilities. It shows thousands of distant galaxies in the constellation Volans, fainter than any galaxies seen before, in a patch of sky no larger than that covered by a grain of sand held at arm's length



Scientists are now eagerly-awaiting what secrets James Webb might unlock and what this could mean for our understanding of the universe



Described by NASA as the premier space-science observatory of the next decade, Webb will mainly view the cosmos in the infrared spectrum, allowing it to gaze through clouds of gas and dust where stars are being born



In other words, the plan is to use the telescope to peer back so far that scientists will get a glimpse of the early days of the universe about 13.7 billion years ago and zoom in on closer cosmic objects, even our own solar system, with sharper focus



Currently, the earliest cosmological observations date to within 330 million years of the Big Bang, but with Webb's capacities, astronomers believe they will easily break the record

## What is James Webb Space Telescope

■ It is the world's biggest and most powerful orbital space telescope, capable of peering back 100-200 million years after the Big Bang

■ The telescope is being used to study the first galaxies born in the early universe more than 13.5 billion years ago, and observe the sources of stars, exoplanets, and even the moons and planets of our solar system

■ James Webb began development in 1996 and was originally envisaged to launch in 2007, but a major redesign in 2005 put this back and a series of further delays led to it eventually making it to orbit at the end of last year

■ The observatory and most of its instruments have an operating temperature of roughly 40 Kelvin – about minus 387 Fahrenheit (minus 233 degree Celsius)

### WHAT ARE ITS FEATURES

► Launched in December 2021 from French Guiana on an Ariane 5 rocket, Webb is orbiting the sun at a distance of 1.6 million kilometres) from the Earth, in a region of space called the second Lagrange point

► Here, it remains in a fixed position relative to the Earth and sun, with minimal fuel required for course corrections  
► A wonder of engineering, the total project cost is estimated at \$10 billion, making it one of the most expensive scientific platforms ever built, comparable to the Large Hadron Collider at CERN  
► Webb's over 21-foot-wide primary mirror is made up of 18 gold-coated mirror segments. Like a camera held in one's hand, the structure must remain as stable as possible to achieve the best shots

## UN expert speculates if becoming most populous nation strengthens India's claim to UNSC

**A** UN population expert has speculated that India becoming the world's most-populous country could strengthen its claim to a permanent seat at the UN Security Council. The UN population division director, John Wilmoth, said on Monday that India's emergence as the country with the largest population could lead to "certain claims on things."



■ According to the World Population Prospects report, India's population is projected to be 1.429 billion next year when China's would be 1.426 billion  
■ November 15, 2023 will mark a milestone for the global population when the eight billionth baby is projected to be born

**DID YOU KNOW?** Webb has also carried out a spectroscopy – an analysis of light that reveals detailed information – on a gas giant planet called WASP-96 b, which was discovered in 2014. Nearly 1,150 light-years from Earth, WASP-96 b is about half the mass of Jupiter and zips around its star in just 3.4 days

Webb is considered the successor to the highly successful, but aging Hubble Space Telescope. Hubble has stared as far back as 13.4 billion years. It found the light wave signature of an extremely bright galaxy in 2016. Astronomers measure how far back they look in light-years with one light-year being 5.8 trillion miles (9.3 trillion kilometres).



LESSON TIME

## WhatsApp to let you react with more emojis

Meta-owned messaging platform

WhatsApp has announced that it

is rolling out a new feature that

will let users react to messages with

any emoji of their choice. Currently, the platform gives several users

the ability to react with a limited number of just six emojis.

Zuckerberg also mentioned some of the emojis like a robot, french fries, surfing in the sea, etc.



## RBI aiming to de-dollarise global trade and the economy

The RBI is aiming to de-dollarise global trade and the Indian economy, Motilal Oswal Financial Services said in a report. In another move aimed at supporting the currency, the RBI allowed international trade settlement in INR on Monday. Implementation of this process will require extensive deliberations with trading partners. The success of this measure will depend on how many of them are willing to trade in the INR.

## National Emblem: Crown of the new Parliament

**P**riime Minister Narendra Modi on Monday unveiled the national emblem cast on the roof of the new Parliament building. This marks the first major milestone ahead of the new building's opening.

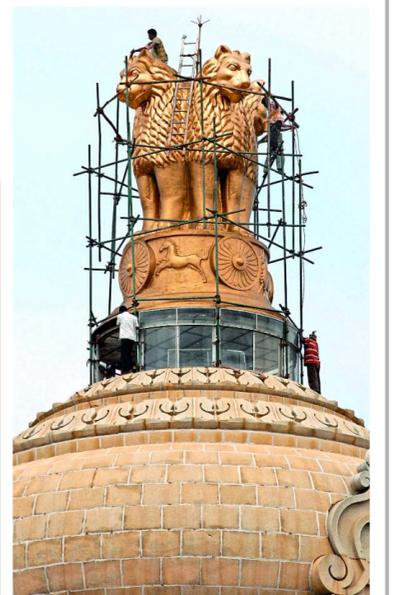
### FEATURES

■ The emblem is made up of bronze. It's 6.5 metre in height, and weighs 9,500 kg. It has been cast at the top of the central foyer of the new parliament building. A supporting structure of steel supports it.

■ Over 100 artisans from various parts of the country tirelessly worked on the design, crafting and casting of the emblem for over six months to bring out the quality that could be seen in the final installation.

► The National Emblem is an adaptation of the Sarnath Lion Capital of Asoka, which is preserved in the Sarnath Museum. The Lion Capital has four lions mounted back-to-back on a circular abacus. The frieze of the abacus is adorned with sculptures in high relief of an elephant, a galloping horse, a bull, and a lion separated by intervening Dharma Chakras

► The profile of the Lion Capital has been adopted as the National Emblem of India. This finds pride of place, and the design is adopted for the Emblem above the parliament building



## TICKER-TAPE

### Sri Lanka's Parliament to elect a new President on July 20

Sri Lanka, which is completely bankrupt and embroiled in a political crisis virtually with no leader, has decided to elect a new President from Parliament on July 20. Speaker Mahinda



Yapa Abeywardena made the announcement after President Gotabaya Rajapaksa informed him officially that he would resign on July 13, as he promised earlier.

# SOURCES OF ENERGY

**E**nergy is a critical factor in our daily lives. The resources from which the required energy is harvested are known as sources of energy. Our success depends on our ability to develop energy sources that are plentiful, renewable, and environmentally sound. A good source of energy is that which is capable of providing sufficient and safe energy at a steady rate over a long period of time.

## CHARACTERISTICS OF A GOOD FUEL

- It should produce a large amount of energy per unit.
- It must be economical and pollution-free.
- It must be able to be produce over a long period of time.
- It must be easy to handle or carry and store.
- It should be of low cost but high calorific value.

Based on the available energy sources, they can be broadly classified into two major categories:

- Renewable sources of energy
- Non-renewable sources of energy



## 1 RENEWABLE SOURCES OF ENERGY

A renewable energy source is any natural resource that can replace itself quickly and dependably. Renewable energy sources are plentiful, sustainable, and kind to the environment. And the great thing is, they'll never run out.

### ADVANTAGES OF RENEWABLE SOURCES OF ENERGY

- A fuel supply that never runs out, i.e., abundantly available in nature.
- Zero carbon emissions
- Renewable resources are not affected by human activities

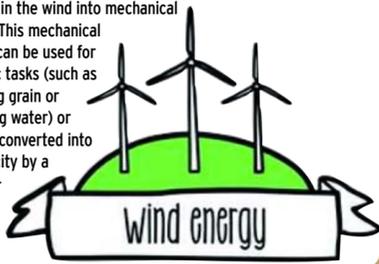
### SOLAR ENERGY

**S**olar energy is energy from the sun that is converted into thermal or electrical energy. Solar energy is the cleanest and most abundant renewable energy source available. Solar technologies can harness this energy for a variety of uses, including generating electricity for providing light and heating water for domestic, commercial, or industrial use. For example, solar cookers trap the heat of the sun to cook food.



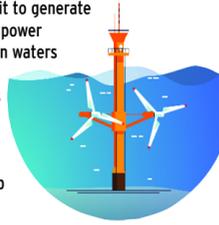
### WIND ENERGY

**W**ind power or wind energy describes the process by which wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or can be converted into electricity by a generator.



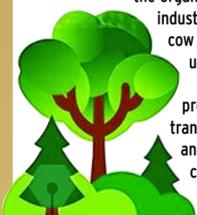
### OCEAN ENERGY

**T**his refers to all forms of renewable energy derived from the ocean. There are three main types of ocean technology: **Wave energy** is harnessed by capturing the energy contained in the waves and using it to generate electricity. **Tidal energy** is the power produced by the surge of ocean waters during the rise and fall of tides. **Ocean thermal energy** is produced by harnessing the temperature differences (thermal gradients) between ocean surface waters and deep ocean waters.



### BIO-MASS

**B**iomass energy or 'bioenergy' is a form of renewable energy that is derived from recently living organic materials known as biomass, which can be used to produce transportation fuels, heat, electricity, and other byproducts. Biomass has been in use since people first began burning wood to cook, and keep warm. Wood is still the largest biomass energy resource today. Other sources include food crops, grassy and woody plants, residues from agriculture or forestry, animal excreta, oil-rich algae, and the organic component of municipal and industrial wastes. **Gobar gas** derived from cow dung (gobar) is a very commonly used biogas in rural India. Biomass is also used to produce biofuels, which are transportation fuels, such as ethanol and biodiesel, created by converting biomass into liquid fuels to meet transportation needs.



### HYDRO ENERGY

**H**ydro power, or hydroelectric power, is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity. For example, in hydel power plants, dams are constructed to collect water flowing in high-altitude rivers. The stored water has a lot of potential energy. When water is allowed to fall from a height with a force, the potential energy in the stored water changes to kinetic energy which rotates the turbines below to produce electricity.



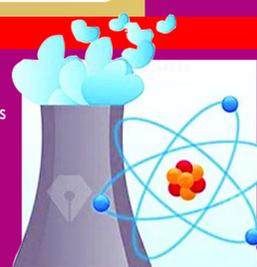
### GEOTHERMAL ENERGY

**I**t is the heat from the earth. The molten rocks from the earth's inside are pushed into certain regions of the earth. Such regions are called the hot spots of the earth. When groundwater comes in contact with such hot spots, a lot of steam is generated. This steam is harnessed to produce energy. The common application of geothermal energy is natural hot springs, electrical power generation using hot water and steam, heating buildings in colder regions, etc.



### NUCLEAR ENERGY

**A** reaction in which the nucleus of an atom undergoes a change to form a new atom by releasing an enormous amount of energy is called nuclear energy. There are two distinct ways of obtaining nuclear energy, (a) Nuclear fission and (b) Nuclear fusion. Hence, the energy released when some changes take place in the nucleus of the atom of a substance is called nuclear energy.

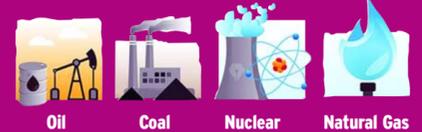


**E**ven though the energy that is produced by nuclear power plants is renewable, but the fuel that is required is not renewable. Nuclear fission requires uranium known as U-235, which is comparatively rare. That is why nuclear energy is considered as a non-renewable source of energy.



N. NAGA JYOTHI, Science HOD, Chitturi High School, Vijayawada

## 2 NON-RENEWABLE SOURCES OF ENERGY



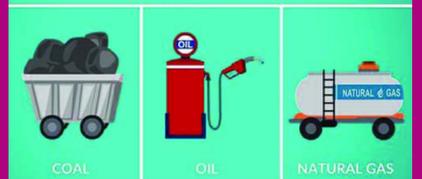
**N**on-renewable sources of energy are those which are exhaustible and cannot be replaced once they have been used. These sources have been accumulated in nature over millions of years. Most non-renewable energy sources are fossil fuels, which are generally bad news for the environment.

EXAMPLES OF NON-RENEWABLE SOURCES OF ENERGY ARE AS FOLLOWS

- Coal ● Oil ● Natural gas ● Nuclear energy

COAL, OIL & NATURAL GAS ARE COLLECTIVELY CALLED FOSSIL FUELS

### FOSSIL FUELS



**F**ossil fuels are formed within the earth from dead plants and animals over millions of years, hence the name "fossil" fuels. They are found in underground layers of rock and sediments. Pressure and heat work together to transform the plant and animal remains into crude oil (also known as petroleum), coal, and natural gas.

### DISADVANTAGE OF FOSSIL FUELS

- It produces greenhouse gases
- Its by-products cause damage to the environment
- Once exhausted they are not easily replenished
- Rising costs
- Its residual products are generally non-biodegradable
- Its products pose a potential threat to human health
- Responsible for acid rain

# PRACTICE MAKES PERFECT IN MATHS



CLASS: X  
SUBJECT:  
MATHEMATICS (CBSE)  
MARKS: 40 TIME: 2 Hrs

### GENERAL INSTRUCTIONS

- 1) The question paper consists of 14 questions divided into 3 sections A, B, C.
- 2) All questions are compulsory.
- 3) Section A comprises 6 questions of 2 marks each. Internal choice has been provided in two questions.
- 4) Section B comprises 4 questions of 3 marks each. Internal choice has been provided in one question.
- 5) Section C comprises of 4 questions of 4 marks each. An internal choice has been provided in one question. It contains two case study-based questions.

### SECTION-A

**Q1:** The sum of the first 'n' terms of an AP is  $2n^2 + 5n$ . Find the AP.

OR

The first and the last terms of an AP are 7 and 49 respectively. If the sum of all its terms is 420, find its common difference [2]

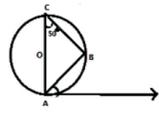
**Q2:** For what value of 'k',  $(4-k)x^2 + (2k+4)x + (8k+1) = 0$ , is a perfect square. [2]

**Q3:** If O is the centre of the circle, AT is tangent and  $\angle ACB = 50^\circ$ , find  $\angle BAT$  [2]

**Q4:** A hemisphere of maximum size is cut out

### PAPER SET BY MATHEMATICS DEPARTMENT, ASSISI VIDYANIKETAN PUBLIC SCHOOL, KAKKANAD, ERNAKULAM

from a cube of edge 14cm. Find the surface area of the remaining solid (p=22/7) [2]



**Q5:** Find the mode of the following data. [2]

Marks	0-20	20-40	40-60	60-80	80-100
No. of Students	15	18	21	29	17

**Q6:** A natural number when increased by 12, equals 160 times its reciprocal. Find the number. [2]

OR

Solve for x:  $a^2x^2 + (a^2 - b^2)x - b^2 = 0, a, b \neq 0$ .

### SECTION-B

**Q7:** Find the median height of 50 students from the following data and interpret the data. [3]

Height (in cm)	120-130	130-140	140-150	150-160	160-170
No. of Students	2	8	12	20	8

**Q8:** Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q. [3]

**Q9:** The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is 18. Find the missing frequency k. [3]

Daily pocket allowance (in -)	11-13	13-15	15-17	17-19	19-21	21-23	23-25
No. of Students	3	6	9	13	k	5	4

**Q10:** From the top of a hill the angles of depression of two consecutive kilometre stones due east are found to be  $30^\circ$  and  $60^\circ$ . Find the height of the hill. [3]

OR

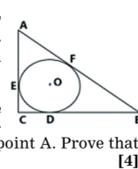
Two pillars of equal heights stand on either side of a roadway which is 120m wide. From a point on the roadway between the pillars, the elevation of the top of the pillars are  $60^\circ$  and  $30^\circ$ . Find the height of the pillars and the position of the point.

### SECTION-C

**Q11:** Water is flowing at the rate of 15 km per

hour through a pipe of diameter 14 cm into a rectangular tank which is 50m long and 44m wide. Find the time in which the level of water in the tank will rise by 21 cm [4]

**Q12:** A circle of radius 'r' is inscribed in a right triangle ABC with AC = 6 cm and BC = 8 cm, find 'r'.



OR  
Tangents AP and AQ are drawn to circle with centre O from an external point A. Prove that  $\angle PAQ = 2\angle OPQ$ . [4]

### CASE STUDY

**Q13:** In athletics and track and field, sprints (or dashes) are races over short distances, typically as a way of quickly reaching a target or goal, or avoiding or catching an opponent. They are among the oldest running competitions, being recorded at the Ancient Olympic Games.

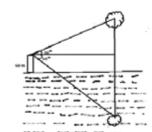
An athlete is practicing for 200 m Sprint event. The athlete can currently run that distance in 45 sec. But wants to do that in under 30 sec. With each day of practice, it takes her

two seconds less. Respond to the above situation by answering the question below.

i) Form an A.P for the above given situation and write the common difference. [4]

ii) What is the minimum number of days she needs to practice till her goal is accomplished

**Q14:** The angle of elevation of a cloud from a point 60 m above a lake is  $30^\circ$  and the angle of depression of the reflection of cloud in the lake is  $60^\circ$ . [4]



i) Find the height of the cloud from the lake. ii) Find the distance of the cloud from the observer.

These questions are meant for practice purpose only. Students are advised to check format, syllabus and marks for Board test papers with their teachers. Questions have been given by teachers and NIE is not responsible for them.