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Sample Mock Test: answer key and explanations

General Studies and Mental Ability · 50 questions · one mark each, one-third negative marking

This is a sample. After every test on the portal you get a key like this for your own answers.

SCORE OF THE SAMPLE STUDENT

32.33 / 50

Correct 36 · Wrong 11 · Not attempted 3

CHAPTER	QUESTIONS	CORRECT	WRONG	MARKS
Current events	5	4	1	3.67
General Science and Technology	7	6	1	5.67
History of India	5	3	1	2.67
Geography of India	5	4	1	3.67
Indian polity and Governance	7	5	2	4.33
Indian Economy and planning	5	3	1	2.67
Sustainable Development and Environment	5	4	1	3.67
Disaster management	3	2	1	1.67
Logical reasoning	5	3	1	2.67
Data Analysis	3	2	1	1.67
Total	50	36	11	32.33

How to read this key

- The correct answer of every question is shown in green.
- Where the sample student chose a wrong answer, that option is shown in red.
- The explanation under each question says why the answer is right.

QUESTION 1 · CURRENT EVENTS

Correct +1

What is the budgeted capital expenditure (public capex) of the Union Government for 2026-27, as announced in the Union Budget on 1 February 2026?

(1) Rs 10.2 lakh crore

(2) Rs 12.2 lakh crore

✓ Correct answer

(3) Rs 11.2 lakh crore

(4) Rs 13.5 lakh crore

EXPLANATION

The Budget raised public capital expenditure from Rs 11.2 lakh crore to Rs 12.2 lakh crore (Rs 12,21,821 crore), about 11.5 per cent above the revised estimates of 2025-26. Rs 11.2 lakh crore was the figure for 2025-26. Related fact: Rs 1.85 lakh crore has been earmarked as special capex loans to States.

QUESTION 2 · CURRENT EVENTS

Correct +1

The Sabka Bima Sabki Raksha (Amendment of Insurance Laws) Act, 2025, passed by Parliament in December 2025, raised the foreign direct investment limit in insurance companies from 74 per cent to

(1) 80 per cent

(2) 90 per cent

(3) 100 per cent

✓ Correct answer

(4) 49 per cent

EXPLANATION

Parliament passed the Sabka Bima Sabki Raksha Bill on 17 December 2025; it received assent on 20 December 2025 and was gazetted on 21 December 2025. It allows up to 100 per cent FDI in insurance companies, up from 74 per cent. It also raised the limit for seeking prior regulatory approval for share transfers from 1 per cent to 5 per cent. The limit was 49 per cent before the 2021 increase to 74 per cent.

QUESTION 3 · CURRENT EVENTS

Correct +1

Which of the following countries was NOT a co-host of the FIFA World Cup 2026?

(1) Canada

(2) Brazil

✓ Correct answer

(3) Mexico

(4) United States

EXPLANATION

The 2026 World Cup was co-hosted by the United States, Canada and Mexico, the first edition shared by three countries; the 104 matches were played in 16 stadiums. Brazil hosted in 2014 and Qatar in 2022. The next men's World Cup (2030) will be hosted across Spain, Portugal and Morocco, with centenary matches in South America.

QUESTION 4 · CURRENT EVENTS

Wrong -0.33

Match the groupings (List I) with their chairs/hosts in 2026 (List II):

List I: A. ASEAN; B. BRICS; C. G20; D. APEC

List II: 1. China; 2. India; 3. United States; 4. The Philippines

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

✓ Correct answer

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

✗ Sample student's answer

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

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

EXPLANATION

In 2026 the Philippines chairs ASEAN, India chairs BRICS (summit 12-13 September 2026), the United States holds the G20 presidency (from 1 December 2025) and China hosts APEC. The correct match is A-4, B-2, C-3, D-1. Related fact: China's turn at BRICS is 2027.

QUESTION 5 · CURRENT EVENTS

Correct +1

Which Women's Cricket World Cup 2025-winning player from Kadapa district was announced a Rs 2.5 crore cash award, a house site and a Group-I job by the Andhra Pradesh government in November 2025?

(1) Sravanthi Naidu

(2) Gongadi Trisha

(3) Shree Charani

✓ Correct answer

(4) Arundhati Reddy

EXPLANATION

Left-arm spinner N. Shree Charani (born in Kamalapuram, Kadapa district) took 14 wickets in India's title-winning campaign; India beat South Africa by 52 runs in the final at Navi Mumbai on 2 November 2025. Chief Minister Naidu announced the reward on 7 November 2025. Gongadi Trisha is from Telangana, and Sravanthi Naidu and Arundhati Reddy are other South Indian women cricketers.

General Science and Technology

Questions 6–12

QUESTION 6 · GENERAL SCIENCE AND TECHNOLOGY

Correct +1

What is the approximate number of molecules in 36 g of water? (Atomic masses: H = 1, O = 16; Avogadro's number = 6.022×10^{23})

(1) 6.022×10^{23} (2) 3.011×10^{23} (3) 1.204×10^{24}

✓ Correct answer

(4) 2.408×10^{24} **EXPLANATION**

The molar mass of water is 18 g/mol, so 36 g is $36/18 = 2$ moles. One mole of any substance contains 6.022×10^{23} particles, so 2 moles contain $2 \times 6.022 \times 10^{23} = 1.204 \times 10^{24}$ molecules. The value 6.022×10^{23} would correspond to 18 g (one mole) of water. Avogadro's number is defined as the number of atoms in exactly 12 g of carbon-12.

In human beings, the sex of a baby is determined by

- (1) the type of ovum, carrying X or Y
- (2) the number of autosomes in the zygote
- (3) the temperature during development of the embryo
- (4) the type of sperm, carrying X or Y, that fertilises the ovum

✓ Correct answer

EXPLANATION

Females are homogametic (XX) and produce only X-bearing ova, whereas males are heterogametic (XY) and produce equal numbers of X-bearing and Y-bearing sperms. An X-bearing sperm gives a girl (XX) and a Y-bearing sperm a boy (XY), so the father determines the sex. The SRY gene on the Y chromosome starts male development. In some reptiles, such as turtles and crocodiles, incubation temperature decides the sex.

Which protocol automatically assigns an IP address, subnet mask and default gateway to a device when it joins a network?

- (1) Domain Name System (DNS)
- (2) Dynamic Host Configuration Protocol (DHCP)
- (3) File Transfer Protocol (FTP)
- (4) Simple Mail Transfer Protocol (SMTP)

✓ Correct answer

EXPLANATION

DHCP lets a server (often the home router) lease IP configuration to hosts dynamically, saving administrators from manual assignment. DNS translates domain names into IP addresses, FTP transfers files and SMTP sends email. DHCP uses UDP ports 67 (server) and 68 (client).

QUESTION 9 · GENERAL SCIENCE AND TECHNOLOGY

Wrong -0.33

Consider the following statements:

1. Pinaka rockets have a calibre of 214 mm.
2. ATAGS is a 105 mm light field gun.
3. The Pinaka rocket system was used in the Kargil conflict of 1999.

Which of the statements given above are correct?

(1) 1 and 2 only

(2) 1 and 3 only

✓ Correct answer

(3) 2 and 3 only

✗ Sample student's answer

(4) 1, 2 and 3

EXPLANATION

Pinaka fires 214 mm rockets and was used in Kargil in 1999, so statements 1 and 3 are correct. ATAGS is a 155 mm / 52-calibre howitzer, not a 105 mm light field gun, so statement 2 is wrong. The 105 mm Indian Field Gun and Light Field Gun are older Army guns. The 155 mm Dhanush (OFB) and K9 Vajra (L&T) are other guns inducted into the Army.

QUESTION 10 · GENERAL SCIENCE AND TECHNOLOGY

Correct +1

If 1 milligram of matter is completely converted into energy, the energy released (taking $c = 3 \times 10^8$ m/s) is

(1) 9×10^7 J

(2) 9×10^{10} J

✓ Correct answer

(3) 9×10^{13} J

(4) 9×10^{16} J

EXPLANATION

By Einstein's relation $E = mc^2$, with $m = 1$ mg = 10^{-6} kg; $E = 10^{-6} \times (3 \times 10^8)^2 = 9 \times 10^{10}$ J. In nuclear fission and fusion only a tiny fraction of the mass is converted (the mass defect), and the energy is calculated from 1 atomic mass unit = 931.5 MeV. This is the reason nuclear fuel has an energy density millions of times that of chemical fuel.

Consider the following statements:

1. An aqueous solution of washing soda turns red litmus blue.
2. Baking soda is sodium carbonate.
3. Baking soda releases carbon dioxide on heating.

Which of the statements given above is/are correct?

(1) 1 and 3 only

✓ Correct answer

(2) 1 only

(3) 2 and 3 only

(4) 1 and 2 only

EXPLANATION

Washing soda ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) is a salt of a strong base and a weak acid, so its solution is basic. Baking soda is sodium hydrogencarbonate (NaHCO_3), not sodium carbonate, so statement 2 is wrong. On heating, 2NaHCO_3 gives $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$, so statement 3 is correct, and this is why baking soda makes dough rise.

Two resistors of 6 ohm and 3 ohm are connected in parallel across a 12 V battery. The total current drawn from the battery is:

(1) 18 A

(2) 3 A

(3) 1.33 A

(4) 6 A

✓ Correct answer

EXPLANATION

In parallel, $1/\text{Req} = 1/6 + 1/3 = 1/2$, so $\text{Req} = 2$ ohm. By Ohm's law, $I = V/\text{Req} = 12/2 = 6$ A (4 A flows through the 3 ohm and 2 A through the 6 ohm resistor). The value 1.33 A would result if the resistors were wrongly taken in series ($12/9$). The smaller resistor carries the larger current in a parallel combination.

QUESTION 13 · HISTORY OF INDIA

Wrong -0.33

Match List-I (Work) with List-II (Author):

List-I: A. Riyaz-ul-Insha B. Dasarathi Satakam C. Kitab-i-Nauras D. Kulliyat (Urdu Diwan)

List-II: 1. Ibrahim Adil Shah II 2. Mahmud Gawan 3. Muhammad Quli Qutb Shah 4. Bhakta Ramadasu

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

✓ Correct answer

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

✗ Sample student's answer

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

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

EXPLANATION

Riyaz-ul-Insha is a collection of letters by Mahmud Gawan. The Dasarathi Satakam is a devotional Telugu work of Bhakta Ramadasu (Kancherla Gopanna). Kitab-i-Nauras, in Dakhni, was composed by Ibrahim Adil Shah II, and Muhammad Quli Qutb Shah is regarded as the first Urdu poet to have a complete Diwan (Kulliyat). The correct code is A-2, B-4, C-1, D-3.

QUESTION 14 · HISTORY OF INDIA

Correct +1

After her defeat at the hands of Altunia and Bahram Shah, Sultan Razia met her death in 1240 near which place?

(1) Kaithal

✓ Correct answer

(2) Panipat

(3) Tarain

(4) Lahore

EXPLANATION

Razia was defeated and then killed in October 1240 near Kaithal (in present-day Haryana) while retreating with Altunia, with whom she had married to regain her throne. Bahram Shah, her half-brother, was already placed on the throne by the Turkish nobles. Minhaj-us-Siraj's Tabaqat-i-Nasiri is the main source for her reign.

Which of the following states was NOT annexed by Lord Dalhousie under the Doctrine of Lapse?

(1) Satara

(2) Jhansi

(3) Nagpur

(4) Awadh

✓ Correct answer

EXPLANATION

Awadh was annexed in 1856 on the ground of misgovernment, after Wajid Ali Shah refused to sign a new treaty, not by the Doctrine of Lapse. Satara (1848), Jhansi (1853) and Nagpur (1854) all lapsed for want of a natural heir. The annexation of Awadh created unrest among sepoys of the Bengal Army, many of whom were recruited from Awadh, and contributed to the Revolt of 1857.

The English weekly 'The Crescent' (1844), which voiced Indian opinion at Madras, was founded by

(1) Kandukuri Veeresalingam

(2) Raghupathi Venkataratnam Naidu

(3) Gurajada Apparao

(4) Gazula Lakshminarasu Chetty

✓ Correct answer

EXPLANATION

Gazula Lakshminarasu Chetty (1806-1868), a Telugu merchant of Madras, started the English newspaper 'The Crescent' in 1844 to express Indian opinion and grievances. He also founded the Madras Native Association in 1852. He is regarded as a pioneer of public life and the press in the Madras Presidency. Veeresalingam, Naidu and Gurajada belong to the later generation of reformers and writers.

Kancherla Gopanna, popularly known as Bhakta Ramadasu, is remembered for building the temple of Sri Rama at

(1) Bhadrachalam

✓ Correct answer

(2) Ontimitta

(3) Simhachalam

(4) Srikalahasti

EXPLANATION

Gopanna was a tahsildar of Palvancho under the Qutb Shahi ruler Abul Hasan (Tana Shah) of Golconda; he spent state revenue on the Bhadrachalam temple on the Godavari and was imprisoned in Golconda fort for about twelve years. He composed the Dasarathi Satakam and the Ramadasu keertanalu. Ontimitta (Kadapa) also has a Rama temple but is not linked to him.

Geography of India

Questions 18–22

Which one of the following is NOT a type of grassland?

(1) Veld

(2) Taiga

✓ Correct answer

(3) Pampas

(4) Prairies

EXPLANATION

Taiga is the northern coniferous forest (boreal forest) belt of Russia, Canada and Scandinavia. The Pampas (South America), Veld (South Africa) and Prairies (North America) are temperate grasslands. Other temperate grasslands are the Steppes of Eurasia and the Downs of Australia.

Which igneous rock is extremely light, full of gas cavities, and capable of floating on water?

(1) Granite

(2) Pumice

✓ Correct answer

(3) Gabbro

(4) Dolerite

EXPLANATION

Pumice is a frothy volcanic (extrusive) glass formed when gas-rich lava cools rapidly and the escaping gas leaves countless bubbles, so its density is low enough to float on water. It is used as an abrasive and in lightweight concrete. Granite and gabbro are dense, coarse-grained intrusive rocks and dolerite is a medium-grained dyke rock.

Which one of the following is the correct sequence of these features as one moves outward from the Sun?

1. Kuiper belt
2. Asteroid belt
3. Oort cloud
4. Orbit of Jupiter

(1) 4-2-1-3

(2) 2-4-1-3

✓ Correct answer

(3) 2-4-3-1

✗ Sample student's answer

(4) 4-2-3-1

EXPLANATION

The main asteroid belt (about 2.2-3.2 AU) lies between Mars and Jupiter; Jupiter orbits at 5.2 AU; the Kuiper belt lies beyond Neptune from about 30 to 50 AU; and the hypothetical Oort cloud extends to thousands of AU. The order is therefore asteroid belt, Jupiter's orbit, Kuiper belt, Oort cloud. Voyager 1, launched in 1977, is now the most distant human-made object.

QUESTION 21 · GEOGRAPHY OF INDIA

Correct +1

The headquarters of the International Solar Alliance, launched at the Paris COP21 in 2015 by India and France, is at

(1) New Delhi

(2) Paris

(3) Gurugram

✓ Correct answer

(4) Jaipur

EXPLANATION

ISA's secretariat is at the National Institute of Solar Energy campus in Gurugram, Haryana. It is a treaty-based organisation of countries lying between the Tropics of Cancer and Capricorn that was initiated by PM Narendra Modi. The Jawaharlal Nehru National Solar Mission (2010) is the domestic programme.

QUESTION 22 · GEOGRAPHY OF INDIA

Correct +1

The concept of sea-floor spreading was proposed in the early 1960s by:

(1) Alfred Wegener

(2) Arthur Holmes

(3) Frederick Vine

(4) Harry Hess

✓ Correct answer

EXPLANATION

The American geologist Harry Hess (Princeton) proposed sea-floor spreading around 1960-62, suggesting that new oceanic crust forms at mid-oceanic ridges by upwelling magma and then moves laterally, finally being consumed at trenches. Vine and Matthews (1963) provided supporting evidence from magnetic stripes on the ocean floor.

QUESTION 23 · INDIAN POLITY AND GOVERNANCE

Correct +1

Which one of the following is NOT a hydroelectric project in Bhutan built with Indian assistance?

(1) Chukha

(2) Mangdechhu

(3) Arun-III

✓ Correct answer

(4) Tala

EXPLANATION

Arun-III (900 MW, developed by India's SJVN) is on the Arun river in Nepal, not Bhutan. Chukha (336 MW), Tala (1,020 MW) and Mangdechhu (720 MW) are Bhutanese projects built with Indian funding (grants and loans); Kurichhu (60 MW) and Punatsangchhu-I and II are others. Nepal's other Indo-assisted projects include Upper Karnali and the Pancheshwar plan on the Mahakali.

QUESTION 24 · INDIAN POLITY AND GOVERNANCE

Wrong -0.33

Match the Andhra Pradesh scheme in List-I with its launch year in List-II.

List-I: A. YSR Vahana Mitra B. Anna Canteens (first launch) C. Deepam-2 D. Stree Shakti

List-II: 1. 2024 2. 2018 3. 2025 4. 2019

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

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

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

✓ Correct answer

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

× Sample student's answer

EXPLANATION

YSR Vahana Mitra was launched in October 2019; Anna Canteens first opened in 2018 under the earlier Naidu government (relaunched August 2024); Deepam-2 was launched on 1 November 2024; and Stree Shakti on 15 August 2025. Hence A-4, B-2, C-1, D-3.

Which one of the following committee–chairman pairs is NOT correctly matched?

(1) States Committee – Jawaharlal Nehru

(2) Fundamental Rights Sub-Committee – B.R. Ambedkar

✓ Correct answer

(3) Order of Business Committee – K.M. Munshi

(4) Credentials Committee – Alladi Krishnaswami Ayyar

EXPLANATION

The Fundamental Rights Sub-Committee of the Advisory Committee was chaired by J.B. Kripalani, not by Ambedkar, who chaired the Drafting Committee. The States Committee (Negotiating Committee for the states) under Nehru, the Order of Business Committee under K.M. Munshi and the Credentials Committee under Alladi Krishnaswami Ayyar are correctly matched. Sardar Patel chaired the parent Advisory Committee.

The Forward Markets Commission, regulator of commodity futures trading, was merged with the Securities and Exchange Board of India in the year

(1) 2017

(2) 2013

(3) 2012

(4) 2015

✓ Correct answer

EXPLANATION

The Forward Markets Commission, set up under the Forward Contracts (Regulation) Act, 1952, was merged with SEBI in September 2015 following the repeal of that Act through the Finance Act, 2015. SEBI thus became the regulator of both securities and commodity derivatives markets. SEBI itself was established in 1988 as a non-statutory body and received statutory powers via the SEBI Act, 1992.

The National Human Rights Commission of India was constituted under the Protection of Human Rights Act, 1993 on

(1) 10 December 1993

(2) 8 January 1994

(3) 12 October 1993

✓ Correct answer

(4) 26 January 1994

EXPLANATION

The NHRC was constituted on 12 October 1993 under the Protection of Human Rights Ordinance and the Protection of Human Rights Act, 1993 (which received assent in January 1994), and its foundation day is celebrated on 12 October. Its headquarters is in New Delhi. The first Chairperson was Justice Ranganath Misra, a former Chief Justice of India. The Act was amended in 2006 and again in 2019.

Which one of the following is NOT a protocol or amendment adopted under the Convention on Biological Diversity?

(1) Nagoya Protocol

(2) Kigali Amendment

✓ Correct answer

(3) Cartagena Protocol

(4) Nagoya-Kuala Lumpur Supplementary Protocol

EXPLANATION

The Kigali Amendment (2016) belongs to the Montreal Protocol on ozone-depleting substances, not the CBD. The CBD's instruments are the Cartagena Protocol on Biosafety (2000), the Nagoya Protocol on Access and Benefit-Sharing (2010) and the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress (2010). The Kunming-Montreal Global Biodiversity Framework (2022) is a COP decision rather than a protocol.

Match the UNFCCC conference in List-I with its host city in List-II.

List-I: A. COP26 B. COP27 C. COP28 D. COP29

List-II: 1. Dubai 2. Baku 3. Glasgow 4. Sharm el-Sheikh

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

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

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

✓ Correct answer

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

✗ Sample student's answer

EXPLANATION

COP26 (2021) was held at Glasgow, COP27 (2022) at Sharm el-Sheikh (Egypt), COP28 (2023) at Dubai (UAE) and COP29 (2024) at Baku (Azerbaijan). Hence A-3, B-4, C-1, D-2. COP27 agreed to set up a loss and damage fund, and COP29 set the New Collective Quantified Goal of at least USD 300 billion per year by 2035. COP30 was hosted at Belem, Brazil, in 2025.

Indian Economy and planning

Questions 30–34

Identify the agreement: signed on 10 March 2024, in force from 1 October 2025, it commits four European countries to a US\$ 100 billion investment target in India over 15 years and the creation of one million jobs.

(1) India-UK Comprehensive Economic and Trade Agreement

(2) India-Australia Economic Cooperation and Trade Agreement

(3) India-EFTA Trade and Economic Partnership Agreement

✓ Correct answer

(4) India-EU Free Trade Agreement

EXPLANATION

The India-EFTA TEPA, with Iceland, Liechtenstein, Norway and Switzerland, was signed in New Delhi on 10 March 2024 and entered into force on 1 October 2025. It contains investment commitments of US\$ 100 billion over 15 years and aims at one million direct jobs, a first for an Indian trade agreement. The UK CETA was signed in July 2025 and the EU talks concluded in January 2026.

Singareni Collieries Company Limited (SCCL), a coal mining company headquartered in Telangana, is jointly owned by the Government of Telangana and the Government of India in the ratio of

(1) 49 : 51

(2) 51 : 49

✓ Correct answer

(3) 74 : 26

(4) 100 : 0 (wholly State owned)

EXPLANATION

SCCL is a Government company with the Government of Telangana holding 51 per cent and the Government of India 49 per cent of the equity. It operates in the Godavari valley coalfields, the only major coal mining area in South India, and is not a subsidiary of Coal India Limited. Coal India Limited (formed 1975) is a separate company with seven coal-producing subsidiaries.

The Ease of Living Index 2018, a Government of India initiative, assessed how many cities?

(1) 100

(2) 98

(3) 150

(4) 111

✓ Correct answer

EXPLANATION

The first Ease of Living Index was launched by the Ministry of Housing and Urban Affairs in 2018 and covered 111 cities, including million-plus cities, smart cities and state capitals. It had three pillars: quality of life, economic ability and sustainability. Pune ranked first. The Ministry also brought out the Municipal Performance Index to assess the performance of urban local bodies.

Match the railway zones (List-I) with their headquarters (List-II):

List-I: A. South Central Railway B. East Coast Railway C. Southern Railway D. South Coast Railway

List-II: 1. Chennai 2. Visakhapatnam 3. Secunderabad 4. Bhubaneswar

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

✓ Correct answer

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

× Sample student's answer

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

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

EXPLANATION

South Central Railway is at Secunderabad (formed in 1966), East Coast Railway at Bhubaneswar (2003), Southern Railway at Chennai and South Coast Railway at Visakhapatnam (functioning from 1 June 2026). Earlier, the state's network was split among the South Central, East Coast, Southern and South Western zones. SCoR was announced in 2019 as the 18th zone.

The Rashtriya Ispat Nigam Limited revival package of ₹11,440 crore (January 2025) includes fresh equity infusion of ₹10,300 crore. The remaining amount, which is the conversion of working capital loans into preference share capital, is

(1) ₹1,040 crore

(2) ₹1,240 crore

(3) ₹2,140 crore

(4) ₹1,140 crore

✓ Correct answer

EXPLANATION

Subtracting ₹10,300 crore from ₹11,440 crore gives ₹1,140 crore, which represents the conversion of working capital loans into preference share capital. The package is intended to restart blast furnaces, secure raw materials and modernise the plant. The other figures given do not add up to the total.

QUESTION 35 · SUSTAINABLE DEVELOPMENT AND ENVIRONMENT

Correct +1

In the process of nitrification, the oxidation of nitrite (NO_2^-) into nitrate (NO_3^-) in the soil is carried out by

(1) Nitrosomonas

(2) Pseudomonas

(3) Nitrobacter

✓ Correct answer

(4) Azospirillum

EXPLANATION

Nitrification occurs in two steps: Nitrosomonas (and Nitrosococcus) oxidise ammonia/ammonium to nitrite, and Nitrobacter (or Nitrococcus) then oxidise nitrite to nitrate. Both groups are chemoautotrophic, using the energy released for synthesising organic compounds. Nitrate is the main form of nitrogen absorbed by plants. Pseudomonas is a denitrifier and Azospirillum is an associative nitrogen fixer.

QUESTION 36 · SUSTAINABLE DEVELOPMENT AND ENVIRONMENT

Correct +1

A house has a roof catchment of 100 square metres. If the annual rainfall is 800 mm and the runoff coefficient of the roof is 0.8, the volume of rainwater that can be harvested in a year is approximately:

(1) 80,000 litres

(2) 8,000 litres

(3) 64,000 litres

✓ Correct answer

(4) 6,400 litres

EXPLANATION

Harvestable volume = roof area $\times$ rainfall $\times$ runoff coefficient = $100 \text{ m}^2 \times 0.8 \text{ m} \times 0.8 = 64$ cubic metres = 64,000 litres. Rainfall of 800 mm is 0.8 m. The runoff coefficient accounts for evaporation, first-flush and spillage losses. A first-flush diverter is used to discard the dirty first rain. The stored water can recharge wells or be used for non-potable purposes.

QUESTION 37 · SUSTAINABLE DEVELOPMENT AND ENVIRONMENT

Correct +1

India's updated NDC (2022) aims to reduce the emissions intensity of its GDP by 45 per cent by 2030 compared with 2005. If emissions intensity in 2005 was 100 units per unit of GDP, what is the target intensity in 2030?

(1) 45 units

(2) 65 units

(3) 55 units

✓ Correct answer

(4) 145 units

EXPLANATION

A 45 per cent reduction of 100 units leaves $100 \times (1 - 0.45) = 55$ units per unit of GDP. Note that emissions intensity is emissions per unit of GDP, not absolute emissions, so total emissions can still rise if GDP grows faster. Along with the intensity target, India aims for 50 per cent of cumulative electric power installed capacity from non-fossil sources by 2030 and net-zero by 2070.

QUESTION 38 · SUSTAINABLE DEVELOPMENT AND ENVIRONMENT

Wrong -0.33

Consider the following statements about international observances:

1. World Soil Day is observed on 5 December.
2. World Rhino Day is observed on 22 September.
3. World Elephant Day is observed on 12 July.

Which of the statements given above is/are correct?

(1) 2 only

(2) 1 and 3 only

(3) 1 and 2 only

✓ Correct answer

(4) 1, 2 and 3

× Sample student's answer

EXPLANATION

Statements 1 and 2 are correct. World Soil Day (5 December) is a UN observance led by FAO, and World Rhino Day (22 September) was started by WWF-South Africa in 2010. World Elephant Day is observed on 12 August, so statement 3 is wrong. India's rhinos, such as the greater one-horned rhino in Kaziranga, are listed in Schedule I of the Wildlife (Protection) Act.

An electric car has a 30 kWh usable battery and consumes 150 Wh of energy per kilometre. Its approximate range on a full charge is

(1) 20 km

(2) 45 km

(3) 200 km

✓ Correct answer

(4) 450 km

EXPLANATION

Range = battery energy / consumption per km = 30,000 Wh / 150 Wh per km = 200 km. In practice, range varies with speed, load, temperature and use of air conditioning. Regenerative braking recovers part of the kinetic energy in city traffic.

Disaster management

Questions 40–42

Match List-I (Satellite) with List-II (Launch vehicle):

List-I: A. INSAT-3D B. INSAT-3DR C. SCATSAT-1 D. EOS-04

List-II: 1. GSLV-F05 2. Ariane-5 3. PSLV-C52 4. PSLV-C35

Choose the correct answer:

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

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

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

✓ Correct answer

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

× Sample student's answer

EXPLANATION

INSAT-3D was launched by Europe's Ariane-5 (2013), INSAT-3DR by GSLV-F05 (2016), SCATSAT-1 by PSLV-C35 (2016) and EOS-04 by PSLV-C52 (2022). INSAT-3DS (2024) was launched by GSLV-F14. Remember that INSAT-3DR was the first operational GSLV flight with the indigenous cryogenic stage, and that INSAT-3D and INSAT-3DR both carry imager and sounder payloads.

QUESTION 41 · DISASTER MANAGEMENT**Correct +1**

The cloudburst of 6 August 2010 that caused devastating flash floods in Choglamsar and other areas occurred in

(1) Kedarnath (Uttarakhand)

(2) Kullu (Himachal Pradesh)

(3) Tawang (Arunachal Pradesh)

(4) Leh (Ladakh)

✓ Correct answer

EXPLANATION

Late on 5-6 August 2010 a cloudburst over the cold desert of Leh in Ladakh triggered flash floods and mudflows that caused heavy loss of life and damage, including at Choglamsar. Cloudbursts in such rain-shadow regions are rare but destructive because slopes are bare and loose. The Amarnath cave cloudburst of July 2022 and the Kedarnath event of 2013 are other well-known events.

QUESTION 42 · DISASTER MANAGEMENT**Correct +1**

India hosted the 14th Conference of the Parties (COP14) of the UN Convention to Combat Desertification in September 2019 at

(1) Hyderabad (Telangana)

(2) Bhubaneswar (Odisha)

(3) Chennai (Tamil Nadu)

(4) Greater Noida (Uttar Pradesh)

✓ Correct answer

EXPLANATION

COP14 of the UNCCD was held in Greater Noida in September 2019 and ended with the 'New Delhi Declaration'. At the event India announced it would raise its land restoration target to 26 million hectares of degraded land by 2030. Hyderabad hosted COP11 of the Convention on Biological Diversity in 2012, which is why it is a tempting distractor. The UNCCD itself was adopted in 1994 and entered into force in 1996.

QUESTION 43 · LOGICAL REASONING

Correct +1

Statement: A notice for candidates: "Carry a valid photo ID card when you appear for the screening test."

Assumptions:

I. A photo ID helps the authorities verify the identity of the candidate.

II. Candidates have access to a valid photo ID card.

(1) Only assumption I is implicit

(2) Only assumption II is implicit

(3) Both I and II are implicit ✓ Correct answer

(4) Neither I nor II is implicit

EXPLANATION

The ID is demanded to verify identity (I) and the instruction expects that candidates possess such a document (II). Both are implicit.

QUESTION 44 · LOGICAL REASONING

Wrong -0.33

The hands of a clock are at right angles at exactly 3:00. After 3:00, at what time will they next be at right angles?

(1) 3:32 8/11 ✓ Correct answer

(2) 3:30 × Sample student's answer

(3) 3:16 4/11

(4) 3:32 9/11

EXPLANATION

Minute hand must be 90° ahead of the hour hand: $5.5m - 90 = 90$, $m = 180/5.5 = 360/11 = 32 \frac{8}{11}$. Time = 3:32 $\frac{8}{11}$.

QUESTION 45 · LOGICAL REASONING

Correct +1

At sunset Ravi's shadow falls exactly behind him. Which direction is he facing?

(1) East

(2) West ✓ Correct answer

(3) North

(4) South

EXPLANATION

At sunset the sun is in the West, so the shadow falls towards the East. If the shadow is behind him, he faces the opposite direction: West.

Find the odd word: Mercury, Venus, Mars, Moon.

(1) Mercury

(2) Venus

(3) Mars

(4) Moon

✓ Correct answer

EXPLANATION

Mercury, Venus and Mars are planets of the solar system. The Moon is a natural satellite of the Earth.

In a class of 60 students, 30 like tea and 35 like coffee. What is the minimum possible number of students who like both?

(1) 0

(2) 5

✓ Correct answer

(3) 25

(4) 30

EXPLANATION

Minimum overlap = $30 + 35 - 60 = 5$, because tea and coffee together would otherwise need 65 distinct students but only 60 exist.

QUESTION 48 · DATA ANALYSIS

Wrong -0.33

Consider the statements:

- I. Primary data are usually more reliable for the specific purpose of an enquiry.
- II. Secondary data usually save time and cost.
- III. Secondary data are always more accurate than primary data.

Which of the statements are correct?

(1) I and III only

(2) I, II and III

(3) I and II only

✓ Correct answer

(4) II and III only

✗ Sample student's answer

EXPLANATION

Primary data fit the purpose and are collected under the investigator's control; secondary data are cheaper and faster. Secondary data need not be more accurate, so III is wrong.

QUESTION 49 · DATA ANALYSIS

Correct +1

Rainfall (cm) at Station A over five years: 2019: 30, 2020: 42, 2021: 36, 2022: 48, 2023: 54.

Rainfall (cm) at Station B: 2019: 24, 2020: 30, 2021: 33, 2022: 36, 2023: 42. By how much does the five-year average of A exceed that of B?

(1) 8 cm

(2) 45 cm

(3) 9 cm

✓ Correct answer

(4) 12 cm

EXPLANATION

Average of A = $(30+42+36+48+54)/5 = 210/5 = 42$. Average of B = $(24+30+33+36+42)/5 = 165/5 = 33$. Difference = 9 cm. (45 is the difference of the totals.)

The average age of 25 men in a village near Anantapur is 36 years and that of 15 women is 28 years. The average age of all 40 persons is

(1) 33 years

✓ Correct answer

(2) 32 years

(3) 34 years

(4) 31 years

EXPLANATION

Total age = $25 \times 36 + 15 \times 28 = 900 + 420 = 1320$. Average = $1320/40 = 33$ years. The simple mean of 36 and 28 is 32, which ignores the group sizes.