SOLVED PAPER · ANSWER KEY WITH EXPLANATIONS

UPSC Combined Geo-Scientist (Prelims) 2020

Paper I: General Studies · 120 questions · 100 marks · 2 hours

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How to use this sheet. Attempt the paper first (it is free to read and download on vkcscience.com). Then check your answers with the key below and read the explanation of every question you got wrong or guessed. Key words are in **blue**. Numericals show formula, substitution and result.

Answer key

1 **b**	2 **a**	3 **d**	4 **a**	5 **c**	6 **d**	7 **b**	8 **c**	9 **b**	10 **a**	11 **d**	12 **a**
13 **b**	14 **c**	15 **d**	16 **b**	17 **c**	18 **c**	19 **a**	20 **a**	21 **b**	22 **c**	23 **b**	24 **c**
25 **c**	26 **a**	27 **d**	28 **c**	29 **d**	30 **c**	31 **a**	32 **c**	33 **a**	34 **a**	35 **b**	36 **c**
37 **a**	38 **d**	39 **b**	40 **b**	41 **b**	42 **b**	43 **c**	44 **c**	45 **a**	46 **a**	47 **b**	48 **d**
49 **a**	50 **a**	51 **b**	52 **c**	53 **d**	54 **a**	55 **c**	56 **a**	57 **c**	58 **d**	59 **d**	60 **a**
61 **d**	62 **d**	63 **a**	64 **a**	65 **b**	66 **a**	67 **b**	68 **c**	69 **b**	70 **d**	71 **a**	72 **c**
73 **a**	74 **d**	75 **c**	76 **a**	77 **d**	78 **d**	79 **b**	80 **c**	81 **b**	82 **b**	83 **b**	84 **c**
85 **c**	86 **c**	87 **c**	88 **d**	89 **b**	90 **a**	91 **b**	92 **a**	93 **d**	94 **d**	95 **a**	96 **d**
97 **c**	98 **a**	99 **a**	100 **b**	101 **c**	102 **d**	103 **b**	104 **b**	105 **a**	106 **a**	107 **d**	108 **c**
109 **b**	110 **d**	111 **a**	112 **b**	113 **c**	114 **a**	115 **c**	116 **b**	117 **c**	118 **d**	119 **c**	120 **c**

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Every question of this paper as text, with its answer, is also on vkcscience.com (Geo-Scientist, Prelims, General Studies, 2020).

Q1 Ecology / competition

Gause's competitive exclusion principle states that two species:

(a) can coexist if they occupy the same niche.
(b) cannot coexist if they occupy the same niche.
(c) cannot coexist if they occupy the adjacent niches.
(d) can coexist if they occupy similar niches.

Answer: (b) cannot coexist if they occupy the same niche.

Gause's principle (competitive exclusion): two species competing for the **same limiting resources** (same niche) **cannot coexist** indefinitely; one excludes the other. Coexistence needs **niche differentiation** (resource partitioning). Gause showed it with Paramecium aurelia and P. caudatum in culture.

Q2 Ecology / chemosynthesis

Chemosynthetic bacteria found near sub-marine volcanic vents feed on:

(a) Hydrogen sulphide (H_2S).
(b) Organic matter.
(c) Deep sea tube worms.
(d) Inorganic carbon.

Answer: (a) Hydrogen sulphide (H_2S).

Vent bacteria are **chemosynthetic**: they oxidise **H_2S** to get energy and use it to fix CO_2. H_2S is the energy source they 'feed' on. Tube worms (Riftia) host these bacteria; they are not their food. Remember: chemosynthesis = energy from **inorganic oxidation**, not light.

Q3 Ecology / nutrition types

Chemoautotrophs are those organisms which obtain energy:

(a) from the oxidation of organic electron donors in the presence of light.
(b) solely from the oxidation of inorganic electron donors in the presence of light.
(c) from the oxidation of organic electron donors in the absence of light.
(d) solely from the oxidation of inorganic electron donors in the absence of light.

Answer: (d) solely from the oxidation of inorganic electron donors in the absence of light.

Chemo = energy from chemical oxidation, not light. **Auto** = carbon from CO_2, so the electron donors are **inorganic** (H_2S, NH_3, Fe^{2+}, H_2). They work in the **absence of light**. Options with 'light' are photo-trophs; 'organic donors' are chemo-organotrophs.

Q4 Ecology / energy flow

The amount of sun energy trapped by plants is:

(a) 1 % - 3 %
(b) 12 % - 15 %
(c) 17 % - 20 %
(d) 23 % - 26 %

Answer: (a) 1 % - 3 %

Plants fix only about **1–3%** of incident sunlight (often quoted as ~1–2% of PAR) as gross primary production. The rest is reflected, transmitted or lost as heat and in transpiration. Remember: **10% law** applies to transfer between trophic levels, not to light capture.

Q5 Ecology / wetlands

The term wetland implies:

(a) land covered by rain water only.
(b) slow moving water covered wet ground.
(c) water logged wet ground.
(d) fast moving water covered wet ground.

Answer: (c) water logged wet ground.

A wetland is land that is **waterlogged** or shallow-flooded long enough for **hydric soils** and water-tolerant plants (marshes, swamps, bogs, mangroves). The defining feature is saturation of the ground, not the source or speed of the water.

Q6 Geomorphology / estuaries

The edge effect at the contact of continental fresh water and sea water results in:

(a) non-deposition of sediments due to turbulence.
(b) deposition of sand due to fall in system energy.
(c) deposition of organic matter due to density difference.
(d) flocculation of clays resulting in formation of mud deposits.

Answer: (d) flocculation of clays resulting in formation of mud deposits.

At the river-sea contact (estuary), dissolved **salts neutralise the charge** on suspended clay particles. The clays **flocculate**, settle and build **mud flats**. Remember: salinity, not just loss of velocity, drives estuarine mud deposition.

Q7 Ecology / light and plants

Heliophile plants require mean maximum illumination of:

(a) 30,000 lux.
(b) 20,000 lux.
(c) 10,000 lux.
(d) 40,000 lux.

Answer: (b) 20,000 lux.

Heliophytes (sun-loving plants) need high light; the mean maximum illumination quoted for them in ecology texts is about **20,000 lux**, while sciophytes (shade plants) need far less. Answer as per the official key.

Q8 Ecology / pollination

Which one of the following about anemophilous plants is correct?

(a) Bright coloured flowers
(b) Sweet smelling flowers
(c) No nectar
(d) Dwarf stigmata

Answer: (c) No nectar

Anemophily = wind pollination. Flowers are small, dull, **no nectar**, no scent; pollen is light and abundant; stigmas are **large and feathery** to catch pollen. So bright colour, scent and dwarf stigma are features of insect flowers or wrong.

Q9 Oceanography / salinity

The salt in sea water comes from:

(a) rain.
(b) chemical exchange between sea water and its substratum as well as hydrothermal emissions.
(c) evaporation of water and concentration of dissolved salts.
(d) mixing of different density waters during natural warm and cold current movements.

Answer: (b) chemical exchange between sea water and its substratum as well as hydrothermal emissions.

Sea salt comes from **rock weathering** brought by rivers, **exchange with the sea floor** and **hydrothermal emissions** (Cl^- and other volatiles from vents and volcanoes). Evaporation only **concentrates** salt; it does not supply it. Rain is nearly salt-free.

Q10 Ecology / biodiversity

Biodiversity in terms of species richness is maximum in:

(a) natural grasslands.
(b) semi-natural grasslands.
(c) artificial grasslands.
(d) well maintained and watered grasslands.

Answer: (a) natural grasslands.

Natural grasslands carry the highest **species richness** because they are old, undisturbed and have many niches. Semi-natural, artificial and managed (watered, fertilised) grasslands are dominated by a few species. Remember: management for yield **lowers** richness.

Q11 Environment / climate change

Which one of the following greenhouse gases is the largest single contributor to anthropogenic radiative forcing?

(a) Methane
(b) Ozone
(c) Nitrous oxide
(d) Carbon dioxide

Answer: (d) Carbon dioxide

CO_2 gives the largest share of **anthropogenic radiative forcing** (about two-thirds of the forcing from long-lived greenhouse gases), from fossil fuel burning and land-use change. CH_4 is stronger per molecule but far less abundant.

Q12 Environment / methane

Which one of the following is the main natural source of Methane?

(a) Wetlands
(b) Belching by cattle
(c) Leakage from pipelines
(d) Burning of wood

Answer: (a) Wetlands

Wetlands are the largest **natural** source of methane (anaerobic decay by methanogens). Cattle belching and pipeline leaks are **anthropogenic** sources; burning wood mainly gives CO_2.

Q13 Environment / ozone

Ozone layer depletion is concentrated in:

(a) mid-latitude regions.
(b) high latitude regions.
(c) equatorial regions.
(d) tropical regions.

Answer: (b) high latitude regions.

Ozone depletion is greatest at **high latitudes**, especially the **Antarctic ozone hole** in spring. Polar stratospheric clouds form in the cold polar vortex and convert stable chlorine into active Cl that destroys O_3 when sunlight returns.

Q14 Environment / air quality

Which of the following particulate matters (size based) are notified pollutants in National Ambient Air Quality Standards (NAAQS)?

(a) PM 10 and PM 3.5
(b) PM 9 and PM 2.5
(c) PM 10 and PM 2.5
(d) PM 5 and PM 3.5

Answer: (c) PM 10 and PM 2.5

NAAQS (2009) notify **PM_{10}** (particles ≤ 10 µm) and **$PM_{2.5}$** (≤ 2.5 µm) along with SO_2, NO_2, O_3, CO, NH_3, Pb, benzene, benzo(a)pyrene, As and Ni — 12 pollutants in all.

Q15 Environment / sea level rise

The broad estimates of sea level rise due to global warming by 2100 is approximately:

(a) 10 cm
(b) 20 cm
(c) 30 cm
(d) 40 cm

Answer: (d) 40 cm

IPCC projections put global mean sea level rise by **2100** at roughly **0.3–1 m** depending on emissions; the broad mid estimate used in texts of that time is about **40 cm** (IPCC AR5: 26–82 cm). Main causes: **thermal expansion** and melting ice.

Q16 Environment / thermal pollution

Thermal pollution which involves release of excessive amounts of heated water in aquatic systems is harmful. It is because hot water:

(a) kills aquatic plants.
(b) causes oxygen starvation.
(c) kills aquatic microbes.
(d) causes CO_2 depletion.

Answer: (b) causes oxygen starvation.

Solubility of O_2 falls as water temperature rises, while metabolic rate of aquatic animals **rises**. Result: **oxygen starvation** (low DO), fish kills. Heat may harm plants and microbes too, but the basic harm is loss of dissolved oxygen.

Q17 Environment / water quality

The biological oxygen demand (BOD) of unpolluted river water is:

(a) 10 - 20 mg $O_2/dm^3/5$ day.
(b) 5-10 mg $O_2/dm^3/5$ day.
(c) less than 5 mg $O_2/dm^3/5$ day.
(d) more than 20 mg $O_2/dm^3/5$ day.

Answer: (c) less than 5 mg $O_2/dm^3/5$ day.

BOD = O_2 used by microbes to oxidise organic matter in 5 days at 20 °C. Clean, unpolluted river water has **BOD < 5 mg/L** (often 1–2). Untreated sewage: 100–400 mg/L. Remember: **higher BOD = more pollution**.

Q18 Botany / adaptations

Pneumatophores are specialized structures for:

(a) maintaining turgor pressure in cells.
(b) providing physical support to plants in marshy lands.
(c) oxygen inhalation by plants.
(d) carbon dioxide release during photosynthesis.

Answer: (c) oxygen inhalation by plants.

Pneumatophores are negatively geotropic **breathing roots** of mangroves (Avicennia, Rhizophora). Waterlogged mud lacks oxygen, so these roots rise above the surface and take in air through **lenticels**. Prop/stilt roots give support, not pneumatophores.

Q19 Ecology / wetlands

Bog ecosystem wetland receives water only from:

(a) Rain
(b) Streams
(c) Rivers
(d) Groundwater

Answer: (a) Rain

A **bog** is **ombrotrophic**: it gets water **only from precipitation** (rain, snow). So it is acidic, nutrient-poor and dominated by **Sphagnum** moss and peat. A **fen** gets ground or surface water and is less acidic.

Q20 Agriculture / hedgerows

Farmers surround the fields with hedgerows during high insolation period to:

(a) prevent the reduction in photosynthetic activity.
(b) reduce evapotranspiration.
(c) create conditions for plants to close their stomata.
(d) prevent wilting of plants.

Answer: (a) prevent the reduction in photosynthetic activity.

Hedgerows act as **windbreaks** and give partial shade. In high insolation, excess light and heat cause stomatal closure and photo-inhibition; hedgerows **prevent the fall in photosynthetic activity** and also cut moisture loss. Key holds (a).

Q21 Environment / greenhouse effect

Greenhouse gases are known so as:

(a) they trap heat in the high altitudes.
(b) they act like a greenhouse on the surface of the planet.
(c) the colour of some of the gases emanating from industrial plants are green.
(d) these gases are produced by agricultural crops.

Answer: (b) they act like a greenhouse on the surface of the planet.

The name comes from the **greenhouse analogy**: like glass, these gases let short-wave sunlight in but **trap outgoing long-wave (infrared) radiation**, warming the **surface** and lower atmosphere. Colour has nothing to do with it.

Q22 Environment / biodiversity law

Pursuant to the ratification of Convention on Biological Diversity, India legislated Biodiversity Act in the year:

(a) 1992 (b) 1994
(c) 2002 (d) 2014

Answer: (c) 2002

India signed the **CBD** in 1992 (ratified 1994) and enacted the **Biological Diversity Act in 2002**; Biological Diversity Rules 2004. It set up the **National Biodiversity Authority** (Chennai), State Biodiversity Boards and BMCs.

Q23 Environment / climate commitments

India has committed to reduce emission intensity of its GDP from 2005 levels by 33-35 per cent by the year:

(a) 2022 (b) 2030
(c) 2032 (d) 2035

Answer: (b) 2030

India's **INDC/NDC** under the Paris Agreement (2015): cut **emission intensity of GDP by 33–35%** below **2005** levels **by 2030**, 40% non-fossil power capacity and a 2.5–3 billion t CO_2 carbon sink. (2022 update raised it to 45%.)

Q24 Polity / Article 297

Which one of the following is NOT vested in the Union by the Constitution (Fortieth Amendment) Act?

(a) All mines and minerals lying in the ocean within its territorial waters
(b) All resources of the exclusive economic zone
(c) Fisheries
(d) All things of value in the ocean within its continental shelf

Answer: (c) Fisheries

The 40th Amendment (1976) rewrote **Article 297**: vests in the Union all **lands, minerals and things of value** under the ocean within territorial waters and continental shelf, and **all other resources of the EEZ**. 'Fisheries' as such is not named.

Q25 Environment / energy

Which one of the following is NOT a renewable source of energy?

(a) Wind (b) Sunlight
(c) Nuclear minerals (d) Biofuels

Answer: (c) Nuclear minerals

Nuclear minerals (uranium, thorium) are **finite**, mined resources → **non-renewable**. Wind, sunlight and biofuels are replenished naturally. Remember: nuclear power is low-carbon but not renewable.

Q26 Geography / monsoon

India's climate is most affected by which of the following two winds?

(a) North-East monsoon and South-West monsoon
(b) North-West monsoon and South-East monsoon
(c) North-East monsoon and South-East monsoon
(d) North-West monsoon and South-West monsoon

Answer: (a) North-East monsoon and South-West monsoon

India's climate is controlled by the **South-West monsoon** (June–Sept, ~75% of rain) and the **North-East monsoon** (re-treating/winter, rain on Tamil Nadu coast). This seasonal reversal of winds defines the 'monsoon type' climate.

Q27 Schemes / health

Centrally sponsored scheme Ayushman Bharat is a national health insurance system for:

(a) women.
(b) every citizen.
(c) old age people.
(d) poor and vulnerable.

Answer: (d) poor and vulnerable.

Ayushman Bharat–PMJAY (2018) gives ₹5 lakh per family per year cover for secondary and tertiary care to **poor and vulnerable** families identified by **SECC 2011** (about 10.74 crore families then). It is not universal.

Q28 Schemes / rural livelihoods

Which one of the following statements about Deendayal Antyodaya Yojana is NOT correct?

(a) It is a livelihood mission aiming at alleviation of rural poverty
(b) It seeks to mobilize about 9 crore households into community institutions like self-help groups
(c) It is wage employment scheme for the landless agricultural labour
(d) It proposes to build skills of the poor and to enable them to access formal sources of finance

Answer: (c) It is wage employment scheme for the landless agricultural labour

DAY–NRLM is a **self-employment and livelihood** mission: mobilise poor households into **SHGs**, give skills and access to credit. It is **not a wage employment** scheme; wage employment for unskilled labour is **MGNREGA**.

Q29 History / colonial trade

East India Company, to begin with, exported Indian goods to Western countries. Which one of the following is NOT one of the goods in the trade?

(a) Muslin
(b) Calico
(c) Silk
(d) Wool

Answer: (d) Wool

The Company exported Indian **cotton textiles** (**muslin**, **calico**), **silk**, indigo, saltpetre, spices. **Wool** was not an Indian export to Europe; Britain itself was a wool producer.

Q30 Geography / water

Which one of the following is the common term to describe the main source of water for human withdrawals?

(a) Green water
(b) Hard water
(c) Blue water
(d) Storm water

Answer: (c) Blue water

Blue water = fresh surface and groundwater (rivers, lakes, aquifers) — the source of human **withdrawals** for irrigation, industry and homes. **Green water** = soil moisture used by plants; **grey water** = used/polluted water.

Q31 Polity / law officers

Which one of the following statements regarding the Solicitor General of India is NOT correct?

(a) It is a constitutional position under Article 76 of the Constitution of India
(b) He is appointed by the Appointments Committee of the Cabinet
(c) He assists the Attorney General of India
(d) It is a statutory position

Answer: (a) It is a constitutional position under Article 76 of the Constitution of India

The **Attorney General** is constitutional (**Art. 76**). The **Solicitor General** is a **statutory** post (Law Officers (Conditions of Service) Rules, 1987), appointed by the **ACC**, and assists the AG. So statement (a) is wrong.

Q32 Polity / parliamentary committees

Which one of the following is NOT a parliamentary standing committee on financial matters?

(a) Estimates committee
(b) Public Accounts committee
(c) Committee on Members of Parliament Local Area Development Schemes
(d) Committee on Public Undertakings

Answer: (c) Committee on Members of Parliament Local Area Development Schemes

The three **financial committees** are **Estimates**, **Public Accounts** and **Public Undertakings**. The **MPLADS Committee** (Lok Sabha) is not one of them.

Q33 Polity / civil services

Who among the following is the ex-officio Chairman of the Civil Services Board?

(a) Cabinet Secretary
(b) Chairman, UPSC
(c) Secretary, Department of Personnel and Training
(d) Prime Minister of India

Answer: (a) Cabinet Secretary

The **Civil Services Board** (for transfers and postings of senior officers) at the Centre is headed by the **Cabinet Secretary**; in states, the Chief Secretary heads the state CSB (as directed in **T.S.R. Subramanian v. UoI**, 2013).

Q34 Economy / statistics

The National Statistical Commission was established on the basis of the recommendations of which one of the following commissions/committees?

(a) Rangarajan Commission
(b) Lodha Commission
(c) Santhanam Committee
(d) M.G.K. Menon Committee

Answer: (a) Rangarajan Commission

The **NSC** (2006) was set up on the recommendation of the **Rangarajan Commission** (National Statistical Commission report, 2001) to reform official statistics. First chairman: Suresh Tendulkar.

Q35 Economy / trade zones

Which one of the following countries in Asia established the first Export Processing Zone (EPZ) in 1965?

(a) China
(b) India
(c) South Korea
(d) Japan

Answer: (b) India

India set up Asia's **first EPZ at Kandla** (Gujarat) in **1965**. EPZs were later converted into **SEZs** (SEZ Act, 2005). China's SEZs came only in 1980.

Q36 Environment / climate risk

According to the Global Climate Risk Index 2020, published by environmental think tank Germanwatch, in the year 2018 India's rank in the list of top most climate affected nations is:

(a) 1st
(b) 3rd
(c) 5th
(d) 7th

Answer: (c) 5th

Germanwatch's **Global Climate Risk Index 2020** (data for 2018) ranked **India 5th** most affected, after Japan, Philippines, Germany and Madagascar — due to the Kerala floods and cyclones Titli and Gaja.

Q37 Schemes / health

Mission Indradhanush is a scheme pertaining to:

(a) immunization of children.
(b) traditional healing system.
(c) conservation and protection of environment.
(d) welfare of urban street vendors.

Answer: (a) immunization of children.

Mission Indradhanush (2014) aims at **full immunisation** of children (< 2 years) and pregnant women against vaccine-preventable diseases. **Intensified Mission Indradhanush** followed later.

Q38 Polity / Finance Commission

Which one of the following statements about the Finance Commissions, periodically established by the Government of India, is NOT true?

(a) It recommends distribution of taxes between the Union and the states
(b) It recommends the principles governing the grants-in-aid of revenues of states
(c) It recommends measures to augment the consolidated fund of a state
(d) It recommends measures regarding the salary of government employees

Answer: (d) It recommends measures regarding the salary of government employees

Under **Art. 280**, the FC recommends sharing of taxes (vertical and horizontal), principles of **grants-in-aid** (Art. 275), and measures to **augment state consolidated funds** for local bodies. **Salaries** of government employees are fixed by **Pay Commissions**, not the FC.

Q39 Polity / schedules

The Seventh Schedule of the Constitution of India deals with:

(a) languages.
(b) Union, State and Concurrent Lists.
(c) land reforms.
(d) anti-defection.

Answer: (b) Union, State and Concurrent Lists.

Seventh Schedule (Art. 246) has the **Union List, State List and Concurrent List**. Languages = 8th Schedule; land reforms = 9th; anti-defection = 10th.

Q40 Schemes / pensions

The Swavalamban Scheme of the Government of India is directed to provide a social safety net to:

(a) senior citizens.
(b) unorganized workers.
(c) women.
(d) new born girl child.

Answer: (b) unorganized workers.

Swavalamban (2010) gave a co-contribution of ₹1,000 a year to **unorganised sector workers** joining the NPS-Lite pension. It was later replaced by **Atal Pension Yojana** (2015).

Q41 Security / forces

Which one of the following is the oldest Para Military Force in India?

(a) Central Reserve Police Force
(b) Assam Rifles
(c) Indo Tibetan Border Police
(d) Border Security Force

Answer: (b) Assam Rifles

Assam Rifles, raised in **1835** as the Cachar Levy, is the **oldest** paramilitary force in India. CRPF dates from 1939, BSF 1965, ITBP 1962.

Q42 Polity / law reform

The Justice J S Verma Committee was constituted in 2012 to propose legal reforms regarding the safety of which of the following sections of Indian society?

(a) Dalits and Backward castes
(b) Women
(c) Religious minorities
(d) Children

Answer: (b) Women

After the Delhi gang rape (Dec 2012), the **Justice J.S. Verma Committee** proposed reforms of criminal law on **crimes against women**. It led to the **Criminal Law (Amendment) Act, 2013**.

Q43 Polity / residuary powers

Who among the following determines as to whether a particular matter (not enumerated in any of the 3 lists) falls under the residuary power of the Parliament?

(a) Lok Sabha
(b) Rajya Sabha
(c) Supreme Court
(d) President of India

Answer: (c) Supreme Court

Residuary powers lie with **Parliament** (**Art. 248**, entry 97 of the Union List). Whether a matter falls under it is a question of **interpretation of the Constitution**, decided finally by the courts, i.e. the **Supreme Court**.

Q44 Current affairs 2019

Why was sub-lieutenant Shivangi in news recently?

(a) First woman officer to receive Sena Medal
(b) First woman officer to be deployed at Nathu La Pass as Signals in-charge
(c) First woman pilot of Indian Navy
(d) First woman officer from the Indian Air Force to summit the Mount Everest

Answer: (c) First woman pilot of Indian Navy

Sub-Lt Shivangi (Dec 2019) became the **first woman pilot of the Indian Navy**, flying the **Dornier** aircraft at Kochi.

Q45 Economy / planning

Which of the following Five Year Plans emphasized the need for establishing a "Socialist Pattern of Society" in India?

(a) 2nd Five Year Plan
(b) 3rd Five Year Plan
(c) 4th Five Year Plan
(d) 5th Five Year Plan

Answer: (a) 2nd Five Year Plan

The **2nd Five Year Plan** (1956–61, **Mahalanobis** model) stressed **heavy industry** and adopted the goal of a **'socialistic pattern of society'** set by the Avadi session of Congress (1955) and Parliament (1954).

Q46 Polity / DPSP

Which one of the following Articles of the Constitution of India deals with Uniform Civil Code?

(a) Article 44
(b) Article 40
(c) Article 39A
(d) Article 41

Answer: (a) Article 44

Article 44 (DPSP): the State shall endeavour to secure a **Uniform Civil Code** for citizens throughout India. Art. 40 = village panchayats; 39A = free legal aid; 41 = right to work, education, public assistance.

Q47 Development / PURA

Who among the following envisioned the framework of sustainable development called PURA (Providing Urban Amenities to Rural Areas)?

(a) Jawaharlal Nehru
(b) A.P.J. Abdul Kalam
(c) Atal Bihari Vajpayee
(d) K.R. Narayanan

Answer: (b) A.P.J. Abdul Kalam

PURA (Providing Urban Amenities in Rural Areas) was proposed by **Dr. A.P.J. Abdul Kalam**: physical, electronic and knowledge connectivity to make villages economically viable.

Q48 Development / Gandhian model

Which one of the following about the Gandhian approach to development is NOT true?

(a) Voluntary limitation of wants
(b) Development of self-sufficient village community
(c) Achieve balance between man and nature
(d) Industrialization and participation of private players

Answer: (d) Industrialization and participation of private players

Gandhian development: **limited wants**, **self-sufficient villages**, cottage industries, decentralisation, harmony with nature. Gandhi opposed **large-scale industrialisation** and profit-driven private capital. So (d) is not Gandhian.

Q49 Economy / poverty

The 'head count ratio' relates to which one of the following?

(a) The poverty line
(b) Millennium development goals
(c) Food insecurity
(d) Population growth

Answer: (a) The poverty line

Head count ratio = share of population **below the poverty line**. It counts how many are poor, but not how poor (poverty gap index does that).

Q50 Polity / ministries

The ministry of Rural Development consists of which of the following departments?

(a) Department of Rural Development and Department of Land Resources
(b) Department of Community Development, Department of Drinking Water and Sanitation and Department of Social Assistance
(c) Department of Rural Development, Department of Community Resources and Department of Drinking Water and Sanitation
(d) Department of Land Resources, Department of Drinking Water and Sanitation and Department of Social Assistance

Answer: (a) Department of Rural Development and Department of Land Resources

The Ministry of Rural Development has **two departments**: **Department of Rural Development** and **Department of Land Resources**. Drinking Water and Sanitation became a separate ministry (2011; now Jal Shakti).

Q51 Geography / horticulture

Which among the following states in India is known as 'Fruit Bowl' of the country?

(a) Kerala
(b) Himachal Pradesh
(c) Maharashtra
(d) Karnataka

Answer: (b) Himachal Pradesh

Himachal Pradesh is called the **'Fruit Bowl of India'** for apples, plums, peaches, apricots and other temperate fruits grown in its hill districts.

Q52 Geography / rivers

The state of Telangana is drained by two major rivers. What are they?

(a) Mahanadi and Godavari
(b) Mahanadi and Krishna
(c) Godavari and Krishna
(d) Krishna and Kaveri

Answer: (c) Godavari and Krishna

Telangana is drained mainly by the **Godavari** (north) and the **Krishna** (south), with tributaries such as Manjira, Pranhita and Musi.

Q53 Agriculture / wheat

Which one of the following states in India produces largest marketable surplus of wheat?

(a) Maharashtra
(b) Haryana
(c) Uttar Pradesh
(d) Punjab

Answer: (d) Punjab

Punjab produces far more wheat than it consumes, so it gives the **largest marketable surplus** and the largest share of central pool procurement. UP produces the most wheat but consumes much of it.

Q54 Geography / states

Which one among the following states does NOT share boundary with Chhattisgarh?

(a) Bihar
(b) Telangana
(c) Andhra Pradesh
(d) Uttar Pradesh

Answer: (a) Bihar

Chhattisgarh borders **UP, Jharkhand, Odisha, Andhra Pradesh, Telangana, Maharashtra and Madhya Pradesh** (7 states). It does **not touch Bihar**; Jharkhand lies between them.

Q55 Economy / state income

Which of the following two states have the highest per capita income in India?

(a) Punjab and Kerala
(b) Kerala and Goa
(c) Goa and Haryana
(d) Haryana and Punjab

Answer: (c) Goa and Haryana

Among the options, **Goa** has the highest per capita NSDP, and **Haryana** is among the top major states (ahead of Kerala and Punjab in that period). Sikkim and Delhi are also high but are not offered.

Q56 Climatology / insolation

Insolation percentage received on Pole as compared to Equator is approximately:

(a) 42 percent.
(b) 68 percent.
(c) 33 percent.
(d) 47 percent.

Answer: (a) 42 percent.

Insolation falls with latitude because the sun's rays are more oblique and pass through more air. Annual insolation at the **poles** is roughly **40% of the equator's** (texts quote ~42%). Remember: equator gets the maximum annual total.

Q57 Census / workers

According to Census of India, 'Main Worker' is a person who works for at least:

(a) 100 days in a year.
(b) 153 days in a year.
(c) 183 days in a year.
(d) 200 days in a year.

Answer: (c) 183 days in a year.

Census of India: **Main worker** = worked for **6 months or more (≥ 183 days)** in the reference year. **Marginal worker** = worked for less than 183 days.

Q58 Population / migration

Which one of the following states has a different female marriage migration practice in India?

(a) West Bengal
(b) Nagaland
(c) Goa
(d) Meghalaya

Answer: (d) Meghalaya

In most of India, women migrate on marriage to the husband's home (**patrilocal**). In **Meghalaya** (Khasi and Garo, **matrilineal**), the husband often moves to the wife's home, so female marriage migration is different.

Q59 Agriculture / world

Which one of the following countries is the top producer of cereals in the world?

(a) USA
(b) Russia
(c) India
(d) China

Answer: (d) China

China is the world's **largest producer of cereals** (rice, wheat, maize together), followed by the USA and India.

Q60 Forestry / social forestry

The National Commission on Agriculture (1976) has classified social forestry into how many categories?

(a) Three
(b) Four
(c) Five
(d) Six

Answer: (a) Three

The **National Commission on Agriculture (1976)** classified social forestry into **three** categories: **urban forestry**, **rural forestry** and **farm forestry**.

Q61 Geography / UTs

Which one among the following Union Territories is largest in terms of area?

(a) Chandigarh
(b) Lakshadweep
(c) Daman and Diu
(d) Puducherry

Answer: (d) Puducherry

Areas (2019, before J&K reorganisation): **Puducherry ~490 km²**, Chandigarh ~114 km², Daman and Diu ~112 km², Lakshadweep ~32 km². So Puducherry is largest among the options.

Q62 Climatology / classification

Global climates are classified on the basis of:

(a) annual averages in temperature and precipitation only.
(b) annual averages in temperature only.
(c) seasonal variations in temperature and precipitation only.
(d) annual averages and seasonal variations in temperature and precipitation.

Answer: (d) annual averages and seasonal variations in temperature and precipitation.

Climate classifications (e.g. **Köppen**) use **annual averages and seasonal patterns** of both **temperature and precipitation**, linked to vegetation. Neither alone is enough.

Q63 Food / consumption

Which one among the following countries has the highest consumption of food in terms of kcal per day per person?

(a) USA
(b) Australia
(c) Netherland
(d) Saudi Arabia

Answer: (a) USA

FAO data show the **USA** among the highest per capita food supply, about **3,600–3,700 kcal per person per day**, above Australia, the Netherlands and Saudi Arabia.

Q64 Ecology / productivity

Which one of the following ecosystems has the highest net primary productivity?

(a) Rainforest
(b) Extreme desert
(c) Lakes and streams
(d) Mid-latitude grassland

Answer: (a) Rainforest

Tropical rainforests have the highest NPP per unit area among the options (~2,000 g/m²/yr). Extreme deserts are lowest. (Swamps, estuaries and reefs also rank high, but are not offered.)

Q65 Environment / mangroves

Which one of the following Indian states does NOT have mangrove forest?

(a) Odisha
(b) Telangana
(c) Andhra Pradesh
(d) West Bengal

Answer: (b) Telangana

Telangana is **landlocked**, so it has **no mangroves**. Odisha (Bhitarkanika), AP (Godavari-Krishna delta) and West Bengal (Sundarbans) all have mangrove forests.

Q66 History / press

Which one of the following pairs of founder and newspaper is NOT correctly matched?

(a) Bande Mataram – Bankim Chandra
(b) Kesari – Bal Gangadhar Tilak
(c) Bombay Samachar – Fardonjee Marzban
(d) Al Hilal – Abul Kalam Azad

Answer: (a) Bande Mataram – Bankim Chandra

Bankim Chandra wrote the **song** 'Bande Mataram' (Anandamath), but the **newspaper Bande Mataram** (1905) was started by **Bipin Chandra Pal** and edited by **Aurobindo Ghosh**. Others are correct: Kesari–Tilak, Bombay Samachar–Fardunjee Marzban, Al-Hilal–Azad.

Q67 History / colonial law

Which one of the following was NOT a feature of Criminal Tribes Act, 1871?

(a) Communities of craftsmen, traders and pastoralists were classified as criminal tribes
(b) The tribes were declared criminal on the basis of their profession
(c) The notified criminal tribes were expected to live only in the notified village settlements
(d) The criminal tribes were not allowed to move out without a permit

Answer: (b) The tribes were declared criminal on the basis of their profession

The **Criminal Tribes Act, 1871** labelled whole communities as **'criminal by birth'** (hereditary criminality), not by profession. Notified groups had to live in notified settlements and needed a **pass** to move. So (b) is not a feature.

Q68 History / land revenue

In 1797, under a clause of which one of the following settlements, Raja of Burdwan's estate was auctioned when he failed to pay the revenue to the East India Company?

(a) Taluqdari
(b) Ryotwari
(c) Permanent
(d) Mahalwari

Answer: (c) Permanent

Under the **Permanent Settlement** (1793, Bengal), the **sunset law** let the Company **auction** estates of zamindars who failed to pay revenue on time. The **Raja of Burdwan's** lands were auctioned in **1797**.

Q69 History / chronology

Which one of the following groups of movements/revolts/rebellions/riots is in chronological order (starting from the earliest)?

(a) Santhal uprising, Tebhaga movement, Deccan riots
(b) Kol rebellion, Santhal uprising, Deccan riots
(c) Santhal uprising, Tebhaga movement, Kol rebellion
(d) Kuka revolt, Deccan riots, Santhal uprising

Answer: (b) Kol rebellion, Santhal uprising, Deccan riots

Kol rebellion (1831–32) → **Santhal uprising** (1855–56) → **Deccan riots** (1875). Tebhaga is 1946–47, Kuka revolt 1871–72, so other options break the order.

Q70 History / Khilafat

Which one of the following statements is NOT correct about Khilafat movement?

(a) It was led by Muhammad Ali and Shaukat Ali
(b) It demanded that Turkish Sultan must retain control over the Muslim sacred places in the erstwhile Ottoman Empire
(c) Khalifa must be left with sufficient territory to enable him to defend the Islamic faith
(d) The Congress did not support the movement

Answer: (d) The Congress did not support the movement

Khilafat movement (1919–24), led by the **Ali brothers**, demanded the Sultan keep control of holy places and enough territory. **Gandhi and the Congress supported it**, merging it with Non-Cooperation. So (d) is wrong.

Q71 History / Swarajists

Which one among the following groups was known as 'no-changers' opposing Congress Party's entry into Legislative Council following the withdrawal of Non-Cooperation Movement?

(a) Sardar Vallabhbhai Patel, Dr. Rajendra Prasad and Dr. M.A. Ansari
(b) C.R. Das, Motilal Nehru and S.C. Mitra
(c) Anil Baran Roy, Subhash Bose and S. Satyamurti
(d) Srinivas Iyengar and B.S. Munje

Answer: (a) Sardar Vallabhbhai Patel, Dr. Rajendra Prasad and Dr. M.A. Ansari

After Non-Cooperation ended (1922), **no-changers** — **Vallabhbhai Patel, Rajendra Prasad, M.A. Ansari**, C. Rajagopalachari — opposed council entry. **Pro-changers** (C.R. Das, Motilal Nehru) formed the **Swaraj Party**.

Q72 History / princely states

In which one of the following years did Indian National Congress include in its goal the independence of the Princely States?

(a) 1927
(b) 1929
(c) 1938
(d) 1939

Answer: (c) 1938

At the **Haripura session (1938)**, Congress declared that **purna swaraj** included the **princely states**, and backed people's movements there.

Q73 Art and culture / Gupta terracotta

The life-size terracotta images of Ganga and Yamuna dating to the period 300-600 AD have been found at:

(a) Ahichchhatra, Uttar Pradesh
(b) Akhnur, Kashmir
(c) Devnimori, Gujarat
(d) Bhitargaon, Uttar Pradesh

Answer: (a) Ahichchhatra, Uttar Pradesh

Life-size **terracotta Ganga and Yamuna** figures (Gupta period, ~5th century) come from **Ahichchhatra** (Bareilly, UP); now in the National Museum, Delhi.

Q74 History / Muslim organisations

Which one of the following pairs is NOT correctly matched?

(a) Mohammedan Literary Society – Abdul Latif
(b) National Mohammedan Association – Sayyid Ameer Ali
(c) Mohammedan Educational Conference – Sayyid Ahmad Khan
(d) Anglo-Mohammedan Defence Association – Nawab Muhsin-ul-Mulk

Answer: (d) Anglo-Mohammedan Defence Association – Nawab Muhsin-ul-Mulk

Anglo-Muhammadan Defence Association (1893) was founded by **Sayyid Ahmad Khan** with Theodore Beck, not Muhsin-ul-Mulk. Others correct: Mohammedan Literary Society–Abdul Latif (1863), CNMA–Ameer Ali, Educational Conference–Sayyid Ahmad Khan.

Q75 History / Poona Pact

Which one of the following gave reserved seats for the Depressed Classes in the provincial and central legislative councils that were to be voted in by the general electorate?

(a) First round table conference
(b) Second round table conference
(c) Poona pact
(d) Government of India Act, 1935

Answer: (c) Poona pact

The **Poona Pact** (1932) replaced separate electorates (Communal Award) with **reserved seats for Depressed Classes** in a **joint (general) electorate** — 148 seats in provincial legislatures and 18% in the central legislature.

Q76 History / Mughal court

Jahangir got impressed by the Turkish fluency of which one of the following European travellers and made him a Mansabdar of 400 sawar?

(a) William Hawkins
(b) Ralph Fitch
(c) William Finch
(d) Thomas Coryat

Answer: (a) William Hawkins

William Hawkins reached Jahangir's court (1609) for the English Company. Jahangir liked his **Turkish**, made him a **mansabdar of 400** and gave him a wife, but trading rights were not granted.

Q77 History / Mughal economy

Which of the following statements is / are correct?

1. Shantidas was a leading Jain jeweler and banker in Ahmedabad
2. Shajahan granted land to build poshalas to Shantidas
3. In 1656 Murad Bakhsh granted village Palitana to Shantidas for the use of Jain pilgrims. The grant was later confirmed by Aurangzeb in 1660

Select the correct answer using the code given below:

(a) 1 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

Answer: (d) 1, 2 and 3

1 ✔ **Shantidas Jhaveri**, Jain jeweller-banker of Ahmedabad. 2 ✔ **Shah Jahan** granted land for **poshalas** (Jain rest-houses). 3 ✔ **Murad Bakhsh** granted **Palitana** (1656); **Aurangzeb** confirmed it (1660). All correct → (d).

Q78 History / Sufism

Which one of the following Sufi saints of Qadiriyya order was condemned by Aurangzeb for his discussion on Wahdat-al-wujud with his father Shahjahan and elder brother Dara Shikoh?

(a) Shaikh Abdul Qadir
(b) Shaikh Hamid
(c) Miyan Mir
(d) Mulla Shah

Answer: (d) Mulla Shah

Mulla Shah Badakhshi (Qadiri, disciple of Miyan Mir) was the **teacher of Dara Shikoh**; his talk on **wahdat-al-wujud** with Shah Jahan and Dara led **Aurangzeb** to condemn him.

Q79 Art and culture / music

The musical treatise Sangitasiromani was dedicated to which one of the following rulers?

(a) Sultan Sikandar Lodi
(b) Ibrahim Shah Sharqi of Jaunpur
(c) Bahadur Shah of Gujarat
(d) Raja Man Singh Tomar of Gwalior

Answer: (b) Ibrahim Shah Sharqi of Jaunpur

Sangita Shiromani (1428), a Sanskrit music compendium, was compiled under **Sultan Ibrahim Shah Sharqi** of **Jaunpur**. (Man Singh Tomar is linked to Mankutuhal.)

Q80 History / Sanskrit texts

Chronologically arrange the following Sanskrit texts (starting from the earliest):

1. Brihat Samhita of Varahmihir
2. Sushrut Samhita
3. Ashtadhyayi of Panini
4. Natyashastra of Bharat

Select the correct answer using the code given below:

(a) 1, 4, 2, 3
(b) 4, 3, 1, 2
(c) 3, 2, 4, 1
(d) 2, 3, 1, 4

Answer: (c) 3, 2, 4, 1

Ashtadhyayi (Panini, ~5th–4th c. BCE) → **Sushruta Samhita** (core ~6th c. BCE–early CE) → **Natyashastra** (~200 BCE–200 CE) → **Brihat Samhita** (Varahamihira, 6th c. CE). Order 3, 2, 4, 1 → (c).

Q81 Chemistry / states of matter

At a given temperature and pressure, the force of attraction among the molecules will be highest in case of:

(a) helium
(b) sugar
(c) water
(d) carbon tetrachloride

Answer: (b) sugar

Sugar is a solid; in solids molecules are held by the **strongest intermolecular forces** (here many **H-bonds**). Water is liquid; CCl_4 liquid (weak dispersion); helium gas (weakest). Order: sugar > water > CCl_4 > He.

Q82 Chemistry / halogens

Which one of the following has the similar physical state with water at room temperature?

(a) Iodine
(b) Bromine
(c) Chlorine
(d) Fluorine

Answer: (b) Bromine

At room temperature **bromine is a liquid** (like water). F_2 and Cl_2 are gases; I_2 is a solid. Remember: Br_2 and Hg are the only elements liquid at room temperature.

Q83 Physics / density

Which one of the following is the correct sequence of substances having densities in decreasing order?

(a) Iron, Water, Honey, Air
(b) Iron, Honey, Water, Air
(c) Iron, Honey, Air, Water
(d) Water, Iron, Air, Honey

Answer: (b) Iron, Honey, Water, Air

Densities (g/cm^3): **iron ~7.9** > **honey ~1.4** > **water 1.0** > **air ~0.0012**. So (b).

Q84 Chemistry / sublimation

Which one of the following statements is correct about camphor and ammonium chloride?

(a) Both of them are inorganic compounds
(b) Both of them are organic compounds
(c) Both of them undergo sublimation
(d) Camphor is an element but ammonium chloride is a compound

Answer: (c) Both of them undergo sublimation

Camphor (organic) and **NH_4Cl** (inorganic) both **sublime** on heating — pass from solid to vapour directly. NH_4Cl actually dissociates to NH_3 + HCl and recombines on cooling.

Q85 Chemistry / states of matter

Number of states of matter known so far is:

(a) 3
(b) 4
(c) 5
(d) 6

Answer: (c) 5

NCERT counts **five** states: **solid, liquid, gas, plasma** and **Bose–Einstein condensate**. More exotic states exist, but 5 is the textbook answer.

Q86 Chemistry / colloids

The scattering of a beam of light by colloidal particles is termed as:

(a) Thomson effect
(b) Raman effect
(c) Tyndall effect
(d) Compton effect

Answer: (c) Tyndall effect

Tyndall effect: colloidal particles (1–1000 nm) **scatter light**, making the beam path visible. Raman = inelastic scattering by molecules; Compton = X-ray scattering by electrons; Thomson = thermoelectric effect.

Q87 Chemistry / colloids

Which one of the following is NOT an example of colloids?

(a) Milk
(b) Jelly
(c) Tincture of iodine
(d) Fog

Answer: (c) Tincture of iodine

Tincture of iodine (I_2 in alcohol) is a **true solution**. Milk = emulsion (liquid in liquid), jelly = gel, fog = aerosol (liquid in gas) — all colloids.

Q88 Chemistry / separation

The dye in black ink can be separated by the method of:

(a) evaporation
(b) fractional distillation
(c) dialysis
(d) chromatography

Answer: (d) chromatography

Dyes in ink are separated by **chromatography**: components move at different speeds on paper/column due to different **adsorption and solubility**. Evaporation leaves all dyes together.

Q89 Chemistry / periodic table

Name the scientist who was NOT associated with the work of periodic classification of elements?

(a) Dmitri Mendeleev
(b) Robert Bunsen
(c) Johann Wolfgang Dobereiner
(d) John Newlands

Answer: (b) Robert Bunsen

Periodic classification: **Döbereiner** (triads), **Newlands** (octaves), **Mendeleev** (periodic law), also Lothar Meyer and Moseley. **Bunsen** is known for the burner and spectroscopy (with Kirchhoff), not periodic classification.

Q90 Chemistry / mass conservation

When 10 g of calcium carbonate is decomposed completely, then 5.6 g of calcium oxide is formed along with the generation of carbon dioxide. Mass of the carbon dioxide formed is:

(a) 4.4 g
(b) 5.6 g
(c) 4.6 g
(d) 4.8 g

Answer: (a) 4.4 g

$CaCO_3 \rightarrow CaO + CO_2$. By **conservation of mass**: $CO_2 = 10 - 5.6 =$ **4.4 g** → (a). Check: 100 g $CaCO_3$ gives 56 g CaO + 44 g CO_2.

Q91 Biology / cell

Which one of the following correctly represents RER?

(a) Endoplasmic reticulum having no ribosomes attached to its surface
(b) Endoplasmic reticulum having ribosomes attached to its surface
(c) Endoplasmic reticulum with rounded vesicles
(d) Endoplasmic reticulum with Golgi appears on its surface

Answer: (b) Endoplasmic reticulum having ribosomes attached to its surface

RER = **rough endoplasmic reticulum**: studded with **ribosomes**, makes proteins for secretion and membranes. **SER** has no ribosomes and makes lipids, detoxifies.

Q92 Biology / plastids

Plastids, in which materials such as starch, oils and protein granules are stored, are called:

(a) Leucoplasts
(b) Chromoplasts
(c) Chloroplasts
(d) Chromatophores

Answer: (a) Leucoplasts

Leucoplasts are colourless storage plastids: **amyloplasts** (starch), **elaioplasts** (oils, fats), **aleuroplasts** (proteins). Chromoplasts carry carotenoid pigments; chloroplasts photosynthesise.

Q93 Biology / plant tissues

Which of the following features are found in cells of meristematic tissues in plants?

(a) Cells active with thick cellulose walls
(b) Cells active with little cytoplasm and thin cellulose walls
(c) Cells active with dense cytoplasm, thick cellulose walls, and no nuclei
(d) Cell active with dense cytoplasm, thin cellulose walls and prominent nuclei

Answer: (d) Cell active with dense cytoplasm, thin cellulose walls and prominent nuclei

Meristematic cells: actively dividing, **dense cytoplasm**, **thin cellulose walls**, **prominent nuclei**, no vacuoles (or very small). Thick walls belong to permanent mechanical tissues.

Q94 Biology / animal tissues

Squamous epithelial cells are NOT found in:

(a) lining of the mouth.
(b) oesophagus.
(c) skin.
(d) kidney tubules.

Answer: (d) kidney tubules.

Squamous epithelium (flat cells) lines the **mouth**, **oesophagus**, skin surface (stratified), alveoli and blood vessels. **Kidney tubules** are lined by **cuboidal epithelium**.

Q95 Biology / animal tissues

Cells of which one of the following tissues in animals undergo contraction and relaxation?

(a) Muscular tissue
(b) Connective tissue
(c) Epithelial tissue
(d) Nervous tissue

Answer: (a) Muscular tissue

Muscular tissue has contractile proteins (**actin, myosin**) that **contract and relax**, causing movement. Nervous tissue conducts impulses; connective tissue binds; epithelium covers.

Q96 Biology / classification

Which of the following organisms are included in Kingdom Protista as given by R Whittakar?

(a) Nostoc, mycoplasma and protozoans
(b) Bacteria, amoeba and protozoan
(c) Anabaena, bacteria and paramecium
(d) Unicellular algae, diatoms, slime moulds and protozoans

Answer: (d) Unicellular algae, diatoms, slime moulds and protozoans

Whittaker's **Protista**: unicellular **eukaryotes** — **chrysophytes (diatoms)**, dinoflagellates, euglenoids, **slime moulds** and **protozoans**. Bacteria, Nostoc, Anabaena and mycoplasma are prokaryotes (**Monera**).

Q97 Biology / taxonomy

Which one of the following represents the correct hierarchical sequence of taxonomic categories in ascending order?

(a) Species → Genus → Order → Class → Family
(b) Genus → Species → Order → Family → Class
(c) Species → Genus → Family → Order → Class
(d) Species → Genus → Order → Family → Class

Answer: (c) Species → Genus → Family → Order → Class

Ascending hierarchy: **Species → Genus → Family → Order → Class** → Phylum → Kingdom. Trick: 'Family' must come before 'Order'.

Q98 Biology / digestion

Which one of the following is the correct sequence of parts in human alimentary canal?

(a) Buccal cavity, oesophagus, stomach, small intestine, large intestine and anus
(b) Buccal cavity, oesophagus, stomach, large intestine, small intestine and anus
(c) Buccal cavity, stomach, oesophagus, small intestine, large intestine and anus
(d) Buccal cavity, stomach, oesophagus, large intestine, small intestine and anus

Answer: (a) Buccal cavity, oesophagus, stomach, small intestine, large intestine and anus

Alimentary canal: **mouth (buccal cavity) → oesophagus → stomach → small intestine → large intestine → anus**.

Q99 Botany / plant tissues

Which one of the following provides buoyancy to aquatic plants to help them float?

(a) Aerenchyma
(b) Tracheid
(c) Guard cell
(d) Sclerenchyma

Answer: (a) Aerenchyma

Aerenchyma = parenchyma with large **air spaces**; it gives **buoyancy** and aeration to aquatic plants (Hydrilla, water hyacinth). Tracheids conduct water; sclerenchyma gives strength.

Q100 Zoology / body plan

Which one of the following is correct with regards to animals with bilateral symmetry, triploblastic body and true body cavity?

(a) Roundworm, earthworm and leech
(b) Earthworm, leech and nereis
(c) Ascaris, round worm and earthworm
(d) Earthworm, sea cucumber and sea urchin

Answer: (b) Earthworm, leech and nereis

Bilateral, triploblastic, true coelom = coelomates. **Annelids**: earthworm, leech, **Nereis** → (b). Roundworms/Ascaris are **pseudocoelomates**; sea cucumber and sea urchin are echinoderms with **radial** symmetry in adults.

Q101 Physics / magnetism

Which one of the following is NOT a unit of magnetic field strength?

(a) Tesla
(b) Gauss
(c) Ampere - metre
(d) Ampere/metre

Answer: (c) Ampere - metre

Units of **B**: **tesla** (SI), **gauss** (CGS; 1 T = 10^4 G). **H** (magnetising field) is in **A/m**. **Ampere-metre** (A·m) is the unit of **pole strength**, not field strength.

Q102 Physics / magnetism

A straight conducting wire carries a DC current through it. Which one of the following statements is true regarding the magnetic field around the wire?

(a) The magnetic field does not depend upon the amount of current flowing through the wire
(b) The magnetic field does not depend upon the distance from the wire
(c) The magnetic field depends upon the material of the wire
(d) The magnetic field decreases with an increase from the wire

Answer: (d) The magnetic field decreases with an increase from the wire

Field of a long straight wire: **$B = \mu_0 I/(2\pi r)$**. It depends on current I and distance r, not on the wire material. **$B \propto 1/r$**: it **decreases with distance** from the wire.

Q103 Physics / magnetism

Which one of the following statements is correct regarding the magnetic field inside a current carrying solenoid?

(a) The magnetic field inside the solenoid is zero
(b) The magnetic field inside the solenoid is uniform at all the points
(c) The magnetic field inside the solenoid increases as we move towards the ends
(d) The magnetic field inside the solenoid decreases as we move towards the ends

Answer: (b) The magnetic field inside the solenoid is uniform at all the points

Inside a long solenoid **$B = \mu_0 nI$**, **uniform** at all points (parallel field lines). Near the ends it falls to about half. Textbook answer: uniform → (b).

Q104 Physics / magnetism

A current carrying circular loop having n number of turns per unit length has a current I through it. If the current through it and the number of turns per unit length are doubled, then the magnetic field at the centre of the loop will:

(a) remain same.
(b) increase by four times.
(c) increase by two times.
(d) decrease by two times.

Answer: (b) increase by four times.

B at the centre $\propto$ **n × I**. Doubling both: B′ = (2n)(2I) $\propto$ **4 × B** → **four times**.

Q105 Physics / current electricity

A metallic wire having length l and area of cross-section A has a resistance R. It is now connected in series with a wire of same metal but with length 2l and area of cross-section 2A. The total resistance of the combination will be:

(a) 2R
(b) 4R
(c) R
(d) R/2

Answer: (a) 2R

R = ρl/A. Second wire: ρ(2l)/(2A) = **R**. In series: R + R = **2R** → (a).

Q106 Physics / oscillations

Which one of the following statements is true regarding the time period (T) of oscillation of a simple pendulum?

(a) T increases with increase in length of the pendulum
(b) T depends on the mass of the pendulum bob
(c) T decreases with increase in length of the pendulum
(d) T is independent of the length of the pendulum

Answer: (a) T increases with increase in length of the pendulum

$T = 2\pi\sqrt{(l/g)}$: $T \propto \sqrt{l}$, so T **increases with length**. It is independent of the mass of the bob (and of amplitude, for small swings).

Q107 Physics / waves

Which of the following statements is NOT true regarding the infrared radiation?

(a) It is electromagnetic in nature
(b) Its wavelength is larger than that of the visible light
(c) It can travel through vacuum
(d) It is a longitudinal wave

Answer: (d) It is a longitudinal wave

Infrared is an **electromagnetic** wave: **transverse**, travels through **vacuum**, wavelength **longer than visible** (700 nm – 1 mm). So 'longitudinal' is false.

Q108 Physics / heat

In a thermos flask, the walls are made of shiny glass. Which one of the following heat loss process is minimised by using shiny walls?

(a) Convection
(b) Conduction
(c) Radiation
(d) Both radiation and convection

Answer: (c) Radiation

Shiny (silvered) walls **reflect** infrared, cutting heat loss by **radiation**. The **vacuum** between walls cuts conduction and convection.

Q109 Physics / water

At atmospheric pressure, the density of water is maximum at a temperature of:

(a) 0 °C
(b) 4 °C
(c) –4 °C
(d) 1 °C

Answer: (b) 4 °C

Water has **maximum density at 4 °C** (anomalous expansion). That is why lakes freeze from the top and life survives below.

Q110 Physics / sound

Which one of the following statements is NOT true about the sound waves?

(a) Sound waves are longitudinal in nature
(b) Sound waves can propagate through water
(c) Speed of sound waves in steel is more than its speed in air
(d) Sound waves can propagate through vacuum

Answer: (d) Sound waves can propagate through vacuum

Sound is a **mechanical, longitudinal** wave; it needs a **medium** and **cannot travel through vacuum**. It travels faster in solids (steel ~5,000 m/s) than in air (~343 m/s).

Q111 Current affairs 2019

Which one of the following countries was ranked 1st in the IMD World Competitiveness ranking 2019?

(a) Singapore
(b) USA
(c) India
(d) Switzerland

Answer: (a) Singapore

IMD World Competitiveness Ranking 2019: **Singapore 1st**, Hong Kong 2nd, USA 3rd; India was 43rd.

Q112 Current affairs / languages

According to a UN Report, which one of the following countries has the highest number of living indigenous languages in the world?

(a) India
(b) Papua New Guinea
(c) South Sudan
(d) Fiji

Answer: (b) Papua New Guinea

UN (International Year of Indigenous Languages, 2019): **Papua New Guinea** has the most living languages — **about 840**.

Q113 Awards

Shanti Swarup Bhatnagar Prize is given as recognition of outstanding Indian work in the field of:

(a) Arts and crafts
(b) Journalism
(c) Science and Technology
(d) Medicine

Answer: (c) Science and Technology

Shanti Swarup Bhatnagar Prize (CSIR, from 1958) honours outstanding Indian scientists **under 45** in **science and technology**.

Q114 Current affairs 2019

Who among the following became the first woman officer of the Indian Air Force to be appointed as the Flight Commander of a flying unit?

(a) Shaliza Dhami
(b) Bhawana Kanth
(c) Anuradha Shukla
(d) Nivedita Choudhary

Answer: (a) Shaliza Dhami

Wing Commander Shaliza Dhami became the IAF's **first woman Flight Commander** of a flying unit (Chetak helicopter unit, Hindon, 2019).

Q115 International / groupings

How many member states are there in CARICOM, a grouping of Caribbean nations?

(a) 10
(b) 12
(c) 15
(d) 18

Answer: (c) 15

CARICOM (Caribbean Community, 1973, HQ Georgetown, Guyana) has **15 member states** and 5 associate members.

Q116 Current affairs 2019

The International Astronomical Union has named an asteroid after an Indian singer. Name the singer:

(a) Lata Mangeshkar
(b) Pandit Jasraj
(c) Bhimsen Joshi
(d) Kumar Gandharva

Answer: (b) Pandit Jasraj

The IAU named minor planet **2006 VP32** as **'Panditjasraj'** (2019) — first Indian musician so honoured.

Q117 Awards / literature

Saraswati Samman is instituted by:

(a) Smile foundation.
(b) Gandhi Peace Foundation.
(c) K K Birla Foundation.
(d) Kamal Kumari Foundation.

Answer: (c) K K Birla Foundation.

Saraswati Samman (1991) is given by the **K.K. Birla Foundation** for an outstanding literary work in any Indian language. The foundation also gives the Vyas Samman and Bihari Puraskar.

Q118 Sports 2019

Football team of which one of the following countries was defeated by Indian football team to won the South Asian Football Federation (SAFF) under-18 Football Championships 2019?

(a) Nepal
(b) Pakistan
(c) Sri Lanka
(d) Bangladesh

Answer: (d) Bangladesh

India beat **Bangladesh 2–1** in the final of the **SAFF U-18 Championship 2019** (Kathmandu).

Q119 International days

International Day for Total Elimination of Nuclear Weapons is celebrated on:

(a) July 26
(b) August 26
(c) September 26
(d) October 26

Answer: (c) September 26

International Day for the Total Elimination of Nuclear Weapons: **26 September** (UN, observed since 2014).

Q120 Defence / exercises

'Surya kiran' is a joint military exercise between the militaries of India and:

(a) Bangladesh
(b) Sri Lanka
(c) Nepal
(d) Bhutan

Answer: (c) Nepal

Surya Kiran = India–**Nepal** army exercise. Others: Sampriti (Bangladesh), Mitra Shakti (Sri Lanka), Hand-in-Hand (China), Nomadic Elephant (Mongolia).

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