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TNPSC
GROUP - I A
ASSISTANT CONSERVATOR OF FORESTS
(PRELIMINARY EXAM)

GENERAL STUDIES
APTITUDE AND MENTAL ABILITY

V.V.K. Subburaj

ASSISTANT CONSERVATOR OF FORESTS
2023
2017
SOLVED ORIGINAL QUESTION PAPERS WITH ANSWERS

SURA COLLEGE OF COMPETITION
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TNPSC

COMBINED CIVIL SERVICES EXAMINATION-I

SCHEME OF EXAMINATION

ASSISTANT CONSERVATOR OF FORESTS

PRELIMINARY EXAMINATION (OBJECTIVE TYPE) (DEGREE STANDARD)

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for All Communities
PRELIMINARY EXAMINATION (OBJECTIVE TYPE) **GENERAL STUDIES** (Degree Standard) (175 Questions)	3 hours	300	90
APTITUDE AND MENTAL ABILITY TEST (S.S.L.C. Standard) (25 Questions)			
Total - 200 Questions			

MAIN WRITTEN EXAMINATION AND ORAL TEST (DESCRIPTIVE TYPE)

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for Selection	
			SCs, SC(A)s, STs, MBCs / DCs, BC(OBCM)s and BCMs	Others
Paper-I **Tamil Eligibility Test** **(SSLC Standard)** **(Descriptive Type)**	3 Hours	100	40	40
General Studies **(Degree Standard)** **(Descriptive type)**				
Paper-II	3 Hours	250		
Paper-III	3 Hours	250	255	340
Paper-IV	3 Hours	250		
Interview & Records		100		
	Total	**850**		

COMBINED CIVIL SERVICES EXAMINATION - GROUP I A

ASSISTANT CONSERVATOR OF FORESTS (ACF)

Marks : 300
Duration : 3 hours

Solved Original Question Paper-2023

Held on : 03.05.2023

1. The six one pillars of scientific temper is .....
A) Scientific Research
B) Scientific Action
C) Scientific Movement
D) Scientific Attitude
Ans : (D)

2. Which of the following petroleum product act as rust inhibitor additives?
A) Alkyl nitrates
B) Amino alkyl phosphates
C) Zinc dithio phosphates
D) Ethylene glycol
Ans : (B & C)

3. Which of the following act as amphiprotic ions?
A) H_2CO_3 **B)** S^{2-}
C) PO_4^{3-} **D)** HS^- **Ans : (D)**

4. Which of the following are correct?
The condition at which the amplifier behaves as an oscillator is
i) Amplifier should have a positive feedback
ii) $A\beta = 1$
iii) $A\beta = 0$
iv) Amplifier should have a negative feedback
A) (i) and (ii) are correct
B) (i) and (iii) are correct
C) (ii) and (iv) are correct
D) (iii) and (iv) are correct
Ans : (A)

5. The colours exhibited in soap bubbles due to the ..... of light.
A) Reflection **B)** Refraction
C) Interference **D)** Diffraction **Ans : (C)**

6. Which among the following is known as "Terror of Bengal"?
A) Algal Bloom **B)** Eichhornia Plant
C) Increased BOD **D)** Eutrophication
Ans : (B)

7. ..... is the dynamic process by which an organism maintains and controls its internal environment despite disturbances from external forces.
A) Hemostasis **B)** Peristasis
C) Homeostasis **D)** Peristalsis **Ans : (C)**

8. The excess quantities of ..... leads to cause of Breast Cancer in our body.
A) Melatonin **B)** Diapause
C) Serotonin **D)** Adrenin
Ans : (A, B, C & D)

9. Which of the following statement is/are incorrect?
i) Pyramids of energy shape is always upright.
ii) Nilgiris biosphere covering Tamil Nadu, Kerala and Karnataka States.
iii) Namdapha bioreserve is located in Andhra Pradesh.
iv) Nandadevi bioreserve is located in Uttar Pradesh.
A) (i) and (ii) only **B)** (iii) only
C) (iv) only **D)** (ii) and (iii) only
Ans : (B)

10. 'Thinking out of box' is related to
i) Logical Thinking **ii)** Creative Thinking
iii) Critical Thinking **iv)** Analyzing Ability
Select the correct answer:
A) (i) and (iii) only **B)** (ii) only
C) (iv) only **D)** (i), (ii) and (iii) only
Ans : (B)

11. Ammonia is prepared by
A) Solvay's process **B)** Haber's process
C) Deacon process **D)** Mulliken process
Ans : (B)

12. India's first fertilizer plant was setup at
A) Ballarpur **B)** Sindri
C) Belagola **D)** Rajahmundry
Ans : (B)

13. Kepler's second law of planetary motion is also known as
A) law of unequal velocity
B) law of equal momentum
C) law of equal area
D) law of inertia
Ans : (C)

14. Assertion (A) : Light incident on a surface at a polarising angle 40° will have the same angle of incidence 40°.
Reason (R) : Polarising angle is the angle of incidence for which the reflected light is completely plane polarised.
Select the correct answer:
A) (A) is true but (R) is false
B) (A) is False; (R) is True
C) Both (A) and (R) are true; and (R) is the correct explanation of (A)
D) Both (A) and (R) are False **Ans : (C)**

15. The binary number 110000111101 corresponds to a hexadecimal number
A) CFD_{16} **B)** $D3C_{16}$
C) DBF_{16} **D)** $C3D_{16}$ **Ans : (D)**

16. The first Old Stone Age tool was discovered at Pallavaram in Tamil Nadu by
A) Robert Bruce Foote **B)** Alexander Flemming
C) Joseph Prestwich **D)** Henry Geoghegan
Ans : (A)

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17. Where a large number of polished stone cults are found in Tamil Nadu?
A) Paiyampalli **B)** Pudukkottai
C) Tirunelveli **D)** Tiruvannamalai
Ans : (A)

18. ..... travelled to Soviet Union and was admired by its speedy progress through five year plans and through the application of modern science and technologies.
A) Singaravelu **B)** Jeevanandan
C) Pandit Jawaharlal Nehru
D) E.V. Ramaswamy **Ans : (D)**

19. Find the compound interest on ₹ 3,200 at 2.5% p.a. for 2 years, compounded annually
A) ₹ 148 **B)** ₹ 162
C) ₹ 157 **D)** ₹ 165
Explanation: **Ans : (B)**
P = ₹ 3,200
r = 2.5%
n = 2
When the interest is compounded annually,

$$A = P\left[1+\frac{r}{100}\right]^n$$

$$= 3200\left[1+\frac{2.5}{100}\right]^2$$

$$= 3200\left[1+\frac{1}{140}\right]^2$$

$$\Rightarrow 3200\times\frac{41}{40}\times\frac{41}{40} = ₹\ 3362$$

Compound Interest = 3362 – 3200 = ₹ 162

20. What number will represent A in the following pattern?
2, 5, 11, 23, A
A) 43 **B)** 45
C) 47 **D)** 49
Explanation: **Ans : (C)**
2, 5, 11, 23, A
The pattern is
2 × 2 + 1 = 5
5 × 2 + 1 = 11
11 × 2 + 1 = 23
23 × 2 + 1 = 47

21. The Editor of Desabhaktan was
A) V.O. Chidambaram **B)** S. Satyaniurthi
C) Thiru Vi. Ka **D)** Bharathiyar
Ans : (C)

22. Dr. Muthulakshmi was the first woman legislator in India because of
A) Minto Morley Reforms
B) Montague Chelmsford Reforms
C) Resolution of 1921
D) Government of India Act of 1935 **Ans : (C)**

23. ..... was a doctor who organised the underground activities and even operated a wireless station during Quit India Movement.
A) Ammu Swaminathan
B) Krishna Bai Nimbkar
C) Devaki Ammal
D) Manjubashini Subramaniam **Ans : (B)**

24. Vira Pandiya Kattabomman was the one who fought against the British, hanged to death at
A) Kayattaru **B)** Nagalapuram
C) Pudukottai **D)** Panchalankurchi
Ans : (A)

25. Match the following and choose the correct answer from the codes given below:

a) Neelakanda Brammachari	**1.** Ananda Vikadan
b) G.A. Natesan	**2.** Suryodhyam
c) R. Krishnamoorthy	**3.** Thinamani
d) T.S. Chokalingam	**4.** Indian Review

Codes:

	a)	b)	c)	d)
A)	1	2	3	4
B)	2	4	1	3
C)	2	1	4	3
D)	2	4	3	1

Ans : (B)

26. "Even weak ones mightily prevail, ..., ... offence"
What is the advice of Thiruvalluvar even a weak king to conquer his enemies?
A) To a mass gold and money
B) To find appropriate place and protect
C) To charity, meditate/penance
D) To remove weakness to be an ambassador
Ans : (B)

27. Serathu iyalvathu naadu ..
What are the 3 evils that pester the people who live according to the Kural that ends like this :
A) Poverty, Illiteracy, Unemployment
B) Hunger, Starvation, Famine
C) Hunger, Disease, Enmity
D) Rain, Sun, Frost **Ans : (C)**

28. Thiruvalluvar says one should never do the deed that sages condemn in any circumstance.
What is the circumstance referred to here?
A) When suffering under diseases
B) When not able to study
C) When not able to earn money
D) When your mother is starving **Ans : (D)**

29. According to Thiruvalluvar which one of the following saves us from all disasters?
A) Education **B)** Knowledge
C) Gold **D)** Wealth **Ans : (B)**

30. What is the meaning of 'Aaru' in Aatruppadai literature?
A) One who guides others
B) River
C) Gift
D) Patron **Ans : (A)**

31. "**Peyakandu Nanjundu amaivar nayathakka Nagarigam Vendubavar**"

These lines occur in

A) Nattrinai **B)** Akananuru
C) Kurunthogai **D)** Purananuru **Ans : (*)**

These lines occurred in Thirukkural (580)

32. **What does "Oppuravu" (Duty to society) in Thirukkural mean?**

A) Cleanliness (Thooyimai)
B) Comparatives (Uvamai)
C) Integrity (Vaaimai)
D) Aide (Udhavi) **Ans : (D)**

33. **Falsehood may take the place of truthful word,**

As per the above Thirukkural when can falsehood be considered to take the place of truthful word.

A) when falsehood can produce blameless good
B) when it does nothing good
C) when it does evil
D) when falsehood is uttered in anger

Ans : (A)

34. **'Nanba Unakku Oru Venba" - what is the meaning of this line by Vairamuthu?**

A) AIDS Awareness
B) Significance of love
C) Social upliftment
D) Significance of friendship **Ans : (A)**

35. **Who is the author of the play "Baliyaadugal"?**

A) Pralayan **B)** Mangai
C) Veli. Rengarajan **D)** K.A. Gunasekaran

Ans : (D)

36. **Choose the correctly matched pairs :**

1) Bharathidasan - Kuyil Pattu
2) Thiru Vi. Kalyana Sundaram - The Navasakthi
3) Subramaniya Siva - Editor of Swedeshamitran
4) Jeevanandam - Mookkandi

A) (1) and (2) are correct
B) (1) and (4) are correct
C) (2) and (3) are correct
D) (2) and (4) are correct **Ans : (D)**

37. **Choose the right pairs :**

1) Colonel Maxwell - Maruthu Brothers
2) Collector W.C. Jackson - Kattabomman
3) Colonel Agnew - Gopal Nayak
4) Colonel Innes - Velu Nachiyar

A) (1) and (2) are correct
B) (3) and (4) are correct
C) (2) and (3) are correct
D) (1) and (4) are correct **Ans : (A)**

38. **Which are the correct statements about Jeevanandam?**

i) Jeevanandam founded an ashram Unmai Vilakka Nilayam.
ii) He did not participated in the temple entry struggle at Susindram
iii) Jeevanandam did not establish Gandhi ashram in Siruvayal
iv) He was involved in Vaikkom Struggle

A) (i) and (ii) only **B)** (iii) and (iv) only
C) (ii) and (iii) only **D)** (i) and (iv) only

Ans : (D)

39. **Match the following with regard to Self Respect Movement :**

a) Gudiyatham Self Respect Meeting	**1.** R. Chinnain
b) 2nd Self Respect Conference	**2.** Altonshalash
c) Christian Conference	**3.** Abdul Khareem Shahib
d) Satyagraha Committee	**4.** MR. J ayakar

Codes:

	a)	b)	c)	d)
A)	3	4	2	1
B)	1	3	4	2
C)	3	2	1	4
D)	1	4	2	3

Ans : (A)

40. **In 1925, E.V. Ramaswamy started the self respect movement.**

i) The aim of the movement was the promotion of rational thinking, self-respect and self-confidence in the people.
ii) It enable them to enjoy the benefits of political and social freedom.

Which statement is correct?

A) (i) **B)** (ii)
C) (i) and (ii) **D)** None of the above

Ans : (C)

41. **Name the person who established on Ashram in Nandhi Hills after his political participation.**

A) Sir Sankaran **B)** Nilakanda Brahmachari
C) S.S. Chidambaram **D)** Sathiya Moorthi

Ans : (B)

42. **Which one of the following is not a part of Thirukkural?**

A) Not to drink liquor **B)** Sin
C) Poverty **D)** The word 'Tamil'

Ans : (D)

43. **Name the person who presided over the nineth conference of the Madras constituency of the All India Women's Conference of the year 1934.**

A) Dr. Muthulakshmi Reddy
B) Mrs. Margaret Cousins
C) Begum Shareegah Hamid Ali
D) Mrs. Annie Besant **Ans : (A)**

44. **Find out the False Statement regarding Gupta Art.**

1. Gupta Artists were normal and natural
2. There was a keen sense of aesthetic culture
3. Nudity is entirely eliminated
4. Not based on religious and spiritual ideals

A) (1), (2) and (3) are True, (4) is False
B) (2) is True, (1), (3) and (4) are False
C) (3) is True, (1) (2) and (4) are False
D) (4) is True, (i), (2) and (3) are False

Ans : (A)

45. What is the First Explanatory writer among the four for the book Thirukkural?
A) Dharmar **B)** Parimelazhakar
C) Mu.Va. **D)** Manakkudavar
Ans : (D)

46. A tender flower (Anitcha) withers when one breaths even Identify the meaning for the term "Anitcham" from the following :
A) A Fruit **B)** An unripe fruit
C) A Tender Flower **D)** Flower
Ans : (D)

47. "The term "virtue" has got eight different meanings in Tamil". Find out the author of the statement.
A) Thirukkural Munusami
B) Mu. Varatharajan
C) K.T. Thirunaavukkarasu
D) Kavingnar Vairamuthu **Ans : (C)**

48. What is the Tamil Name for "Haikku" poem?
A) Seyyul **B)** Pudhukkavithai
C) Kurumpaa **D)** Vasanakavithai
Ans : (C)

49. Who is the Author of the Novel "Malarum Sarukum"?
A) Agilan **B)** D. Selvaraj
C) N. Parthasarathy **D)** Jayakanthan
Ans : (B)

50. According to Thirumoolar one should control his five senses like a
A) Lion **B)** Elephant
C) Tortoise **D)** Earthworm
Ans : (C)

51. On what basis did this case arise?
"Yaayaiyum Paadi Kovai Paadu"
(Sing all the songs then sing Kovai)
A) Uyarvana Ilakkiyam (High class literature)
B) Kadavulodu Thodarbupaduthuvathu (Communication with God)
C) Kadina Ilakkiya Vagai (The genre of hard literature)
D) Payirchi Iruthal Veandum (Practice is must)
Ans : (D)

52. Who sang the Holy verse "Paavai Padia Vaayaal Kovai"?
(The singing mouth of woman changes to sing on God)
A) Thirugnana Sambanthar
B) Thirunavukkarasar
C) Sundharar
D) Manickkavasakar **Ans : (D)**

53. Srilankan tamil professor K. Sivathambi says the characteristics of Semmozhi (Classical Tamil Language) are ....., ..., ...
A) Antiquity, Continuity, Richness
B) Antiquity, excellence, individuality
C) Antiquity, naturalness, individuality
D) Antiquity, continuity, excellence **Ans : (A)**

54. "Vaiyagam panippa valanerbu valaiip"
-Which Pathupattu song begins with this line?
(unfailing clouds climbed to the right ...)
A) Nedunalvaadai **B)** Kurunchippattu
C) Mullaippattu **D)** Pattinappalai
Ans : (A)

55. Identify from the following one head ornament of the women wear on the hair during the Sangam Period.
A) Toyyakam **B)** Pullakam
C) Vayantakam **D)** Valampuri
Ans : (A)

56. The type of drought which lead to a famine, widespread disease and death from starvation is
A) Meteorological drought
B) Hydrological drought
C) Agricultural drought
D) Socio economic drought **Ans : (C)**

57. Which Government has established the Tamil Nadu Slum Clearance Board as an autonomous body?
A) DMK **B)** AIADMK
C) Janata Party **D)** Congress
Ans : (A)

58. Match the following :

a)	Women's Liberation Movement	**1.**	Utopian Movement
b)	Indian National Freedom Movement	**2.**	Reform Movement
c)	Anti-Hindi Movement	**3.**	Revolutionary Movement
d)	Hare Krishna Movement	**4.**	Resistance Movements

Codes:

	a)	**b)**	**c)**	**d)**
A)	1	2	3	4
B)	2	3	4	1
C)	4	3	2	1
D)	4	1	3	2

Ans : (B)

59. Match the following Industry Clusters in Tamil Nadu.

a)	Thiruchengode	**1.**	Sago
b)	Salem	**2.**	Coach-Building
c)	Rajapalayam	**3.**	Bore-well drilling
d)	Karur	**4.**	Surgical cotton products

Codes:

	a)	**b)**	**c)**	**d)**
A)	3	1	4	2
B)	3	2	4	1
C)	3	4	1	2
D)	2	1	4	3

Ans : (A)

60. According to NITI Aayog Health Index of 2021 of Tamil Nadu stands ..... among the Indian States.
A) First **B)** Third
C) Second **D)** Eighth
Ans : (C)

HISTORY, CULTURE OF INDIA, AND INDIAN NATIONAL MOVEMENT

- From the Beginnings to Indus Valley Civilisation
- Chalcolithic, Megalithic, Iron Age and Vedic Cultures
- Rise of Territorial Kingdoms and New Religious Sects
- Emergence of State and Empire
- Early Tamil Society and Culture
- Ancient Cities of Tamilagam
- Post-Mauryan India
- The Guptas
- Harsha and the Rise of Regional Kingdoms
- South Indian Kingdoms
- Advent of Arabs & Turks and Kingdoms in North India
- Sources of Medieval India
- Emergence of New Kingdoms in South India : Later Cholas and Pandyas
- Other South Indian Kingdoms
- Bahmani and Vijayanagar Kingdoms
- The Mughal Empire
- The Rise of Marathas
- New Religious Ideas and Movements
- Art and Architecture of Tamil Nadu
- Arrival of Europeans
- Expansion of British Rule
- Early Uprisings against British Rule
- Effects of British Rule
- Socio-Religious Movements
- Indian National Movement
- Role of Tamil Nadu in Freedom Struggle
- Tamil Renaissance
- Development of Education
- Status of Women in India Through the Ages
- Unity and Diversity
- National Symbols

PRACTICE QUESTIONS

FROM THE BEGINNINGS TO INDUS VALLEY CIVILISATION

The transition from the beginnings of human existence to the rise of the Indus Valley Civilization represents one of the most significant phases in the evolution of Indian history. According to historians, early human societies in the Indian subcontinent passed through various stages of cultural and technological development. During the Paleolithic Age, humans survived as nomadic hunter-gatherers and used crude stone tools made of quartzite and flint. Archaeological sites like Bhimbetka, Hunsgi, and Kurnool caves provide evidence of early human habitation and rock art.

The Mesolithic Age witnessed climatic changes after the Ice Age, leading to the use of microlithic tools, semi-settled life, and the beginning of animal domestication. In the Neolithic period, humans gradually shifted towards food production, agriculture, and permanent settlements. Important Neolithic sites such as Mehrgarh, Burzahom, Chirand, and Paiyampalli reveal developments in farming, pottery, weaving, and social life. Historians regard Mehrgarh as one of the earliest agricultural settlements in South Asia, showing continuity towards urban civilization.

The Chalcolithic phase marked the use of copper along with stone tools and saw the emergence of village cultures, trade networks, craft specialization, and social differentiation. These gradual economic and technological advancements laid the foundation for urbanization. Around 2600 BCE, the Indus Valley Civilization, also called the Harappan Civilization, emerged as the first urban civilization of the Indian subcontinent. Spread across present-day India and Pakistan, it covered major sites such as Harappa, Mohenjo-daro, Dholavira, Lothal, Kalibangan, and Rakhigarhi.

The civilization is noted for its remarkable urban planning, grid-pattern streets, sophisticated drainage system, standardized weights and measures, granaries, dockyards, and extensive trade relations with Mesopotamia and the Persian Gulf. Scholars like Mortimer Wheeler and Stuart Piggott emphasized its urban character, while recent archaeological studies highlight regional diversity within Harappan culture. Although the script remains undeciphered, seals, terracotta figurines, beads, and pottery reflect a highly organized socio-economic and cultural life. Thus, the journey from prehistoric societies to the Indus Valley Civilization demonstrates the gradual transformation of human communities from primitive survival to complex urban civilization in ancient India.

The sources for the history of this are archaeological sites, geological sediments, animal bones and fossils, stone tools, bone tools, rock paintings and artefacts. There is no written evidence for this period. Although the Harappans used a script, it is yet to be deciphered.

The pre-historic period witnessed no development of scripts. It is referred to as Stone Age.

It is believed that human ancestors might have first evolved in Africa and later migrated to different parts of the world. The migrants were known as 'Homo erectus'.

Recent researches have revealed that humans lived in India between 2 million and 1 million years ago.

The period before invention of script is divided into Stone Age, Bronze Age and Iron Age. The names have been assigned depending upon the metals they used.

The earliest age in history is called old Stone Age or Paleolithic. This period is divided into (1) Lower Paleolithic Culture (2) Middle Paleolithic Culture and (3) Upper Paleolithic Culture.

Some of the famous sites of Old Stone Age in India are:

- The Soan valley and Potwar Plateau on the northwest India.
- The Siwalik hills on the north India.
- Bhimpetka in Madhya Pradesh.
- Adamgarh hill in Narmada valley.
- Kurnool in Andhra Pradesh and
- Attirampakkam near Chennai.

The period after Stone Age is Mesolithic Age next is Neolithic Age. In the Neolithic Age only, animal and plant domestication developed leading to food production.

During the Lower Paleolithic Period, human ancestor species of Homo erectus is believed to have lived in India.

The first Paleolithic tools were identified at the site of Pallavaram near Chennai by Robert Bruce Foote in 1863.

Pre-historic study mainly depends on tools they used. They used the tools mainly for hunting, butchering and skinning the animals.

The industries of Paleolithic cultures are divided into the Early, Middle and Late Acheulian Industries. The early Acheulian tools include polyhedrons, spheroids, hand axes, cleavers and flake tools.

The Acheulian tradition is absent in the Western Ghats, coastal areas and north-eastern India. Heavy rainfall is attributed to its absence.

Lower paleolithic tools are found in Athirampakkam, Pallavaram and Gudiyam near Chennai, Hunsgi valley and Isampur in Karnataka, and Bhimbetka in Madhya Pradesh are some important Paleolithic sites where the Acheulian tools are found.

Researchers have concluded that Paleolithic age was around two million years ago. This culture continued upto 60,000 years ago.

Evidence of hominin (immediate ancestors of Homo Sapiens) fossil is rare in India. The only rare hominin fossil was found in Hoshangabad in M.P. A fossil was discovered in Athirampakkam. But now not available.

A hominid Skull cap was found in a basal conglomerate deposit in 1982. It is considered to represent the Archaic Homo Sapiens.

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In Narmada Valley, animal fossils of pre-historic elephant skull was discovered. Skulls of wild cattle and of great horse-like animal were also found. The teeth of horses or asses and of water buffalo were found. 17 animal hoof prints have been uncovered at Athirampakkam.

The people of Lower Paleolithic age lived in caves near river valleys as seen from evidence in Bhimbetka (M.P).

They belonged to the species of 'homo erectus' who had no complex languages. They expressed a few sounds and signs. They were intelligent enough to use stone tools.

About 4,00,000 years from now, changes took place in lithic technology and the species of human ancestors diverged. Anatomically, modern humans are said to have emerged around 3,00,000 years ago. The middle Paleolithic period of Athirampakkam is dated to be around 3.85 to 1.72 lakh years from now.

The tool types of the Middle Paleolithic period are hand axes, cleavers, choppers, chopping tools, scrapers, borers and points, projectile points or shouldered points and knives on flakes. Flake industry was predominant in the Middle Paleolithic period and tools such as scrapers, points and borers were made. Scrapers were used for wood and skin working.

The middle Paleolithic culture in India is dated between 3,85,000 and 40,000 BCE.

The Middle Paleolithic sites are found in Narmada, Godavari, Krishna, Yamuna and other river valleys.

The main features of the Indian Middle Palaeolithic period include the following :

1. The tools became smaller.
2. The decrease in the use of hand axes in relation to other tools.
3. Use of core preparation techniques in stone tool production.
4. Use of chert, jasper, chalcedony and quartz as raw materials.

The period of upper Paleolithic culture is marked by innovation in tool technology and increased cognitive capability of humans.

The modern humans evolved first in Sub-Saharan area about 3,00,000 years ago. They migrated and occupied various areas of Asia around 60,000 years ago.

Their tool technology improved to blades and bone tools. Many tools made of Silica - rich raw materials were used.

Bone tools and faunal remains are found in Kurnool caves of Andhra Pradesh.

The upper Paleolithic culture is represented in India between 40,000 and 10,000 years from now.

The people of this period used caves as well as the open air space for living. Meralbhavi in Karnataka, Kurnool caves and Godavarikhani in Telangana, Baghor I and Baghor III of Son Valley in Madhya Pradesh and Patne in Maharashtra are some of the Upper Palaeolithic sites of India.

Sri Lanka has evidence of microliths and hominin fossils. Incised ostrich eggshell, and shell and stone beads have been found at Jwalapuram in Andhra Pradesh, Patne in Maharashtra and Batadomba-Lena and Fa Hien Cave in Sri Lanka.

Evidences of art in the forms of paintings, beads and ornaments of this period have been found.

Some of the green colour paintings of Bhimbetka belong to this period according to archaeological evidence.

Mesolithic Culture

Mesolithic culture can be found along the length and breadth of India. In the following places, the Mesolithic sites have been discovered.

Mesolithic remains are found in Langhanj in Gujarat, Adamgarh in Madhya Pradesh and also in some places of Rajasthan, Uttar Pradesh.

Mesolithic sites in India are found in Paisra (Bihar), Baghor II, Chopani Mando, Sarai Nahar Rai, Mahadaha and Damdama (all in Uttar Pradesh), Sankanakallu and Kibbanahalli (Karnataka). Rock shelter sites are found in Lekhakia, Baghai Khor, Adamgarh and Bhimbetka.

Coastal sites are seen at Mumbai, teri sites of Thoothukudy in Tamil Nadu and Vishakapatnam, which have microlithic evidence.

The change of climate triggered migration of people to various eco-zones. Monsoon pattern had also developed.

Even in today's deserts of Rajasthan also, there were fresh water lakes between 10,000 and 3500 B.P.

The date of Mesolithic culture differs from place to place.

In eastern Mediterranean (Levant) it dated between 20,000 and 9500 BCE, In Tamil Nadu and Kerala, it continued upto 1000 BCE. In Srilanka, microlithics appeared about 28,500 years BP.

Economy

- Hunting was the main Occupation, Agriculture was not practised. Domestication of animals paved the way for neo-lithic age. The rock paintings of central India depict hunting, trapping, fishing etc.
- The faunal evidence from this period shows that people belonging to this period hunted cattle, gaur, buffalo, barasingha, porcupines, sambar, chital, gazelle, hog deer, nilgai, jackal, turtle, fish, wild hare, lizard, fox and monitor lizard. Bones of rhinoceros and elephant have also been found. They used spears, bow and arrow and traps. The paintings of Bhimbetka show that various animals were hunted and for this men and women went together.
- The people used fire and perhaps roasted food. Domestic animal bones of cattle, sheep, goats, pig and dog have been found at Kanewal, Loteshwar and Ratanpur, and from Adamgarh and Bhimbetka in Madhya Pradesh sites. Camel bones have been found from Kanewal.
- The Mesolithic people were highly mobile. They made temporary hunts with perishable materials. They moved mainly in search of food.

GEOGRAPHY OF INDIA

- INDIA - GEOGRAPHICAL LOCATION, PHYSICAL UNITS
- RIVER SYSTEM
- CLIMATE
- SOIL AND AGRICULTURE
- NATURAL VEGETATION
- MINERALS
- INDUSTRIES
- TRANSPORT
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- ECOSYSTEM
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- SUSTAINABLE DEVELOPMENT GOALS
- CLIMATE CHANGE
- DISASTER MANAGEMENT
- POPULATION DENSITY AND DISTRIBUTION
- CULTURAL GEOGRAPHY
- GEOGRAPHICAL LANDMARKS

PRACTICE QUESTIONS

INDIA - GEOGRAPHICAL LOCATION, PHYSICAL UNITS

India is the seventh largest country in the world and second largest country in Asia. It forms a part of south Asia and is separated by the Himalayas from the rest of the continent. India accounts for about 2.4 % of the total area of the world with an area of 32,87,263 sq.km. Many of the Indian states are larger in size than several countries of the world.

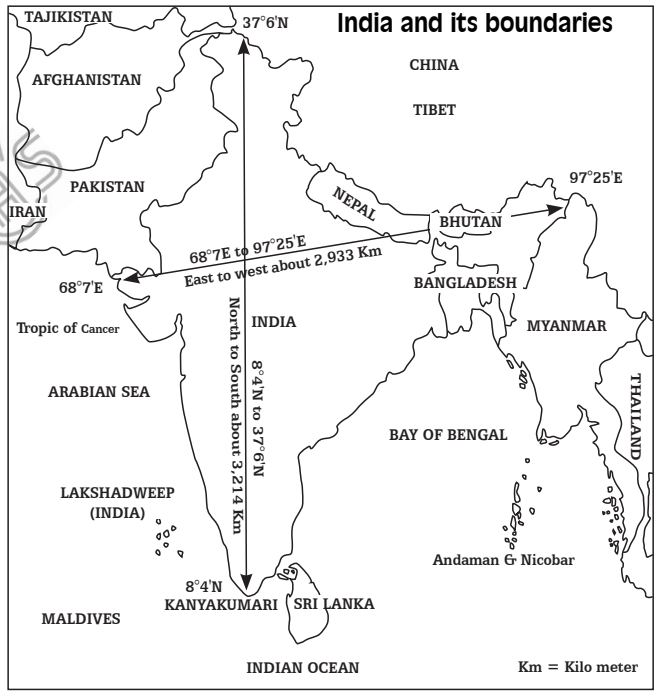
India's Land and Water Frontiers

- India shares its 15,200 km long land frontier with Pakistan in the west, Afghanistan in the north-west, China, Nepal and Bhutan in the north and Bangladesh and Myanmar in the east. India shares longest border with Bangladesh (4156 km) as Bangladesh is totally encircled by Indian states, while the shortest border with Afghanistan (106 km). About 6,100 km long coastline of India is washed on three sides of the country by the Indian Ocean and its two arms namely the Arabian sea in the west and the Bay of Bengal in the east. The total length of the coast line of India including the islands is 7,516.6 km. India and Sri Lanka are separated by a narrow stretch of water called Palk Strait.
- India is located between the East and West Asia. India along with the countries of Myanmar, Bangladesh, Pakistan, Nepal, Bhutan and Sri Lanka is called a subcontinent. This region is separated from the rest of Asia by a chain of mountains in the northwest, north and northeast and by seas in the south. This region also possesses a distinct continental characteristics in physiography, climate, natural vegetation, minerals, human resources etc. Hence India is known as **'subcontinent'**. As India is surrounded on three sides by sea, it is called as 'Peninsula' also.

Location and Extent

- India extends from **8°4 'N** to **37°6 'N** latitudes and **68°7 'E** to **97°25 'E** longitudes. Hence India is located in the north Eastern hemisphere. India lies totally to the north of Equator.
- The southernmost point of the country is Pygmalion Point or Indira Point (6°45'N latitude) located in the Andaman and Nicobar Islands. The southernmost point of main land of India is **Cape Comorin** (Kanyakumari). The north-south extent of India is **3214 km** and it extends from **Indira Col** in Jammu and Kashmir in the north to Kanyakumari in the south. The east-west extension is **2933** km and it stretches from Rann of Kutch (Gujarat) in the west to Arunachal Pradesh in the east. The Tropic of Cancer (23°30' N) passes through the middle of the country dividing it into two halves as northern temperate and southern tropical lands. India has been politically divided into 28 states and 8 union territories for administrative convenience.

Indian Standard Time (IST)



- The longitudinal difference between Gujarat in the west and Arunachal Pradesh in the east is about 30°. The Earth rotates through its axis around 360° in 24 hours. Thus, a difference of 1° longitude will make a difference of 4 minutes in time. The difference in longitude between Gujarat (68°7 'E) and Arunachal Pradesh (97°25 'E) is 29°18'. Hence the difference in local time between these two places is 29°18' × 4' (minutes) = 1 hour 57 minutes 12 seconds (approximately 2 hours). Hence Arunachal Pradesh will have sunrise about two hours earlier than the Gujarat which is in the west.
- To offset these differences, India has set a standard time. The local time of the central meridian of India is the standard time of India. **India's central meridian is 82°30' E longitude.** It passes through Mirzapur and roughly bisects the country in terms of longitude. The IST is 5.30 hrs ahead of Greenwich Mean Time (GMT).

Major Physiographic Divisions of India

As India possesses varied landmass, it is conveniently divided into six physiographic divisions.

- The Himalayan Mountains
- The Great Northern Plains
- The Peninsular Plateau
- The Indian Desert
- The Coastal Plains
- The Islands

SURA'S

Himalayan Mountains

- They are young folded mountains formed few million years ago by tectonic activity. It stretches for a distance of 2500 kms from east to west. It serves as the strong northern boundary of India. The width varies between 500 kms in Kashmir and 200 kms in Arunachal Pradesh. 'The Pamirs' or the 'Pamir Knot' popularly known as the 'Roof of the world' is the link between the Himalayas and high ranges of central Asia.
- The term "Himalaya" is derived from Sanskrit. It means **"The Abode of Snow".** The Himalayan Mountains that function as a great wall is grouped into three divisions. **1) The Trans-Himalayas, 2) Himalayas, 3) Eastern or Purvanchal hills.**

Aravalli range is the oldest fold mountain range in India.

The Trans Himalayas

- Trans Himalayan range which lies in the west (it is also known as western himalayas) and it is north to the Great Himalayan range that lies in Jammu & Kashmir and Tiban Plateau. This part is known as Tibetan Himalayas, as more extent of this lies in Tibet. The Trans-Himalayan range has 40 km width in its eastern and western extremities and about 225 km width in its central part. They contain **Tethys** sediments.
- The rocks of this region contain fossils bearing marine sediments which are underlain by 'Tertiary granite'. It has partly metamorphosed sediments and constitutes the core of the Himalayan axis. The prominent ranges of Trans Himalayas are Zaskar, Ladakh, Kailash, and Karakoram.

The Himalayas

It forms the core of the Himalayan range. It was formed by the movement of Angara land mass in the north and Gondwana land mass in the south. The Tethys sea found between these two land masses was uplifted by the compression and the resultant landform was the Himalayas. It consists of many ranges. The main divisions of the Himalayas are the **(A) Greater Himalayas, (B) the Lesser Himalayas and (C) the Siwaliks**

Important Peaks in the Himalayas

Peak	Country	Height in metres
Mt. Everest	Nepal	8848
Mt.K2 or Godwin Austen	India	8611
Kanchenjunga	India	8598
Makalu	Nepal	8481
Dhaulagiri	Nepal	8172
Nanga Parbat	India	8126
Annapurna	Nepal	8078
Nanda Devi	India	7817
Kamet	India	7756
Namcha Barwa	India	7756
Gurla Mandhata	Nepal	7728

A. The Greater Himalayas or the Himadri

They are 25 km wide and has average height of 6000 mts. The greater Himalayas receive lesser rainfall than lesser Himalayas and the Siwaliks. Physical weathering is less effective over the greater Himalayas. Most of the lofty peaks lie in this range. The notable ones are Mt. Everest (8,848 m) and Kanchenjunga (8,586 m). Mt. Everest is located in Nepal and Kanchenjunga is located between Nepal and Sikkim. This range is the most continuous of all ranges. It is the region of permanent snow cover. So, it has many glaciers. **Gangothri, Yamunothri and Siachen** are some of them.

Himalaya is the home to several high peaks. It holds the record of having the maximum number of highest peaks among any mountain range in the world. Out of 14 high peaks in the world, Himalayas holds 9.

B. The Lesser Himalayas or The Himachal

It is the middle range. The height varies between 3700 and 4500 mts and width upto 80 kms.

The major passes in the Himalayas are Karakoram pass (Jammu and Kashmir), Zojila pass, Shipkila pass (Himachal Pradesh), Bomdila pass (Arunachal Pradesh), Nathala pass (Sikkim) and Jhelepla pass (Sikkim). The Khyber pass which connects Pakistan and Afghanistan, and Bolan pass in Pakistan are important passes of the Indian subcontinent.

C. The Siwaliks or Outer Himalayas

- This range is formed partly by debris brought by the Himalayan rivers. The width of Siwaliks varies between 10 km and 50 km and height varies between 900-1100 mts. The elevation is 1300 mtr. This range is disconnected and a number of longitudinal valleys are found.
- The longitudinal valleys found between the siwaliks and the lesser himalayas are called Duns in the west and Duars in the east. These are considered as ideal sites for settlement.

Purvanchal Hills

- The eastern offshoot of Himalayas are Purvanchal Hills.
- Most of these hills are located along the border of India and Myanmar while others are inside India. Dafla Hills, Abor Hills, Mishmi Hills, Patkai Bum Hills, Naga Hills, Manipur Hills, Mizo Hills, Tripura Hills, Mikir Hills, Garo Hills, Khasi Hills and Jaintia Hills are the hills which are collectively known as **Purvanchal Hills**.

INDIAN POLITY

- Constitution of India
- Preamble
- Salient Features of Indian Constitution
- Union and its Territories
- Citizenship
- Fundamental Rights
- Directive Principles of State Policy
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PRACTICE QUESTIONS

CONSTITUTION OF INDIA

CONSTITUTIONAL DEVELOPMENT IN INDIA

- The constitution consists of a set of fundamental principles based on which the state organisation is governed. It is the supreme law of the land.
- The need for the constitution came along with the dawn of independence. For this purpose the Constituent Assembly was formed in 1946 and on January 26,1950 the Constitution came into force.
- The idea of Constituent Assembly for India was put forward for the first time by M.N. Roy in 1934. M.N. Roy was a pioneer of Communist movement in India.

Prem Behari Narain Raizada was the calligrapher of the Indian Constitution. The original constitution was handwritten by him in a flowing italic style.

BACKGROUND:

The company rule (1773-1857)

There are certain Acts that had been formulated by the British Government to regulate and control the affairs of East India Company in British India. They formed the basis for our constitution.

Regulating Act of 1773

- It designated the Governor of Bengal as the Governor General of Bengal. The first Governor-General was Lord Warren Hastings.
- It established a Supreme Court in Calcutta (1774) which comprised a Chief Justice and three other judges.
- It laid the foundation for Central administration in India.

Amending act of 1781 : (Act of settlement)

- To rectify the defects of the Regulating Act of 1773, the British Parliament passed the Amending Act of 1781. It is also known as Act of Settlement.

Pitt's India Act of 1784

- It established a system of dual government.
- It established a new body called 'Board of control' to manage the political affairs of the company and the existing court of directors to manage the commercial affairs.

Charter Act of 1813

- The Company's entire commercial trade monopoly ended, except the tea trade and the trade with China.
- Alloted ₹ 1 lakh to promote education in India.

Charter Act of 1833

- The Charter Act of 1833 attempted to introduce a system of open competition for selection of civil servants, and stated that the Indians should not be debarred from holding any place, office and employment under the Company. However, this provision was negated after opposition from the Court of Directors.
- This act was final step towards centralisation.
- It made Governor-General of Bengal as the Governor General of India and vested in him all civil and military powers.
- Lord William Bentick was the first Governor-General of India.
- It ended the activities of East India company as a commercial body and changed it into a purely administrative body.
- A Law commission under Lord Macaulay was formed to codify the laws.

Charter Act of 1853

- It established a separate Governor-General's Legislative Council which came to be known as Indian Legislative Council.
- It introduced the local representation in the Indian Legislative Council.
- It introduced an open competition system of selection and recruitment of civil servants. The covenanted civil service was thus thrown open to the Indians also. Accordingly, the Macaulay Committee (the Committee on the Indian Civil Service) was appointed in 1854.

The Crown Rule (1858-1947)

The Revolt of 1857 brought about important changes in the British administration in India. The rule of the East India Company came to an end. The administration of India came under the direct control of the British Crown. These changes were announced in the Government of India Act of 1858. The 'Proclamation of Queen Victoria' assured the Indians a benevolent administration. Thereafter, important developments had taken place in constitutional history of India as a result of the Indian National Movement.

Government of India Act of 1858

The Government of India Act of 1858 was passed by the Parliament of England and received royal assent on 2nd August 1858. Following are the main provisions of the Act :

- East India Company's rule came to an end and the Indian administration came under the direct control of the Crown.
- In England, the Court of Directors and Board of Control were abolished. In their place the Secretary of State for India and India Council were established. The Secretary of State would be a member of the British cabinet. Sir Charles Wood was made the first Secretary of State for India. The Council consisting of 15 members would assist him.
- The Governor General of India was also made the Viceroy of India. The first Viceroy of India was Lord Canning.
- All the previous treaties were accepted and honoured by the Act.

Queen Victoria's Proclamation

On 1 November 1858 the Proclamation of Queen Victoria was unveiled by Lord Canning at Allahabad. This royal Proclamation was translated into Indian languages and publicly read in many important places. It announced the end of Company's rule in India and the Queen's assumption of the Government of India. It endorsed the treaty made by the Company with Indian princes and promised to respect their rights, dignity and honour. It assured the Indian people equal and impartial protection of law and freedom of religion and social practices. The Proclamation of Queen Victoria gave a practical shape to the Act of 1858.

Indian Councils Act of 1861

- The Indian Councils Act of 1861 increased the number of members in the Governor-General's executive Council from 4 to 5. Further the Governor-General's Executive Council was enlarged into a Central Legislative Council. Six to twelve "additional members" were to be nominated by the Governor-General. Not less than half of these members were to be non-officials. Thus a provision was made for the inclusion of Indians in the Legislative Council. The functions of these members were strictly limited to making legislation and they were forbidden from interfering in the matters of the Executive Council. They did not possess powers of administration and finance.
- Legislative Councils were also established in the provinces. The number of additional members in the provinces was fixed between four and eight. So, this Act was an important constitutional development and the people of India came to be involved in the law making process. The mechanism of Indian legislation developed slowly and was reinforced further by the Acts of 1892 and 1909.

Indian Councils Act of 1892

The Indian Councils Act of 1892 was the first achievement of the Indian National Congress. It had increased the number of "additional members" in the Central Legislative Council. They were to be not less than 10 and not more than 16. It had also increased the proportion of non-officials – 6 officials and 10 non-officials. The members were allowed to discuss the budget and criticize the financial policy of the government. In the provinces the number of additional members also was increased with additional powers.

Indian Councils Act of 1909

This Act is also known as Morley-Minto Reforms (Lord Morley was the then Secretary of State for India and Lord Minto was the then Viceroy of India).

The features of this Act were as follows:

- It considerably increased the size of the legislative councils, both Central and provincial. The number of members in the Central legislative council was raised from 16 to 60. The number of members in the provincial legislative councils was not uniform.
- It retained official majority in the Central legislative council, but allowed the provincial legislative councils to have nonofficial majority.
- It enlarged the deliberative functions of the legislative councils at both the levels. For example, members were allowed to ask supplementary questions, move resolutions on the budget and so on.
- It provided (for the first time) for the association of Indians with the executive councils of the Viceroy and Governors. Satyendra Prasad Sinha became the first Indian to join the Viceroy's executive council. He was appointed as the Law Member.
- It introduced a system of communal representation for Muslims by accepting the concept of 'separate electorate'. Under this, the Muslim members were to be elected only by Muslim voters. Thus, the Act 'legalised communalism' and Lord Minto came to be known as the Father of Communal Electorate.
- It also provided for the separate representation of presidency corporations, chambers of commerce, universities and zamindars.

Government of India Act of 1919

On August 20, 1917, the British Government declared, for the first time, that its objective was the gradual introduction of responsible Government in India.

The Government of India Act of 1919 was thus enacted, which came into force in 1921. This Act is also known as Montagu-Chelmsford Reforms (Montagu was the Secretary of State for India and Lord Chelmsford was the Viceroy of India).

The features of this Act were as follows:

- It relaxed the central control over the provinces by demarcating and separating the central and provincial subjects. The central and provincial legislatures were authorised to make laws on their respective list of subjects. However, the structure of government continued to be centralised and unitary.
- It further divided the provincial subjects into two parts–transferred and reserved. The transferred subjects were to be administered by the Governor with the aid of Ministers responsible to the legislative council. The reserved subjects, on the other hand, were to be administered by the Governor and his executive council without being responsible to the legislative council. This dual scheme of governance was known as 'dyarchy'–a term derived from the Greek word diarche which means double rule. However, this experiment was largely unsuccessful.
- It introduced, for the first time, bicameralism and direct elections in the country. Thus, the Indian legislative council was replaced by a bicameral legislature consisting of an Upper House (Council of State) and a Lower House (Legislative Assembly). The majority of members of both the Houses were chosen by direct election.
- It required that the three of the six members of the Viceroy's executive Council (other than the Commander-in-Chief) were to be Indian.

INDIAN ECONOMY AND DEVELOPMENT ADMINISTRATION IN TAMIL NADU

- Nature of Indian Economy
- Five-Year Plan Models - An Assessment
- Planning Commission and Niti Aayog
- Fiscal Policy
- Banking
- Monetary Economics
- Finance Commission
- Land Reforms and Agriculture
- Application of Science and Technology in Agriculture
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- E-Governance in Tamil Nadu
- Some Important Policies and Programmes of Tamil Nadu
- Some Important State Government Schemes

PRACTICE QUESTIONS

NATURE OF INDIAN ECONOMY

Nature of Indian Economy

Indian economy is the fourth largest economy in the world (nominal GDP). Being one of the top listed countries, in terms of industrialization and economic growth, India's national GDP has witnessed a growth rate of 7.6% in the 2025–2026 financial year. Nominal GDP is estimated to grow at 8.0% in FY 2025-26. Even though the rate of growth has been sustainable and comparatively stable, there are still signs of backwardness.

Features of a Developed Economy :

1. High National Income, 2. High Per Capita Income, 3. High Standard of Living, 4. Full Employment of Resources, 5. Dominance of Industrial Sector, 6. High Level of Technology, 7. High Industrialization, 8. High Consumption Level, 9. High Level of Urbanisation, 10. Smooth Economic Growth, 11. Social Equity, Gender Equality and Low Levels of Poverty, 12. Political Stability and Good Governance

Features of Indian Economy

India has a mixed economy	Indian economy is a typical example of mixed economy. This means both private and public sectors co-exist and function smoothly. On one side, some of the fundamental and heavy industrial units are being operated under the public sector, while, due to the liberalization of the economy, the private sector has gained importance. This makes it a perfect model for public – private partnership.
An emerging market	India has emerged as vibrant economy sustaining stable GDP growth rate even in the midst of global downtrend. This has attracted significant foreign capital through FDI and FII. India has a high potential for prospective growth. This also makes it an emerging market for the world.
Agriculture plays the key role	Agriculture being the maximum pursued occupation in India, it plays an important role in economy as well. Around 50% of the people in India depend upon agriculture for their livelihood. In fact, approx. 18% of our GDP today is contributed by the agricultural sector. Green revolution, ever green revolution and inventions in bio-technology have made India as a self sufficient and also surplus production country. The export of agricultural products such as fruits, vegetables, spices, vegetable oils, tobacco, animal skin, etc. also added to forex earning through international trading.
Emerging Economy	Emerging as a top economic giant among the world economy, India bags the **fifth** position in terms of nominal Gross Domestic Product (GDP) and third in terms of Purchasing Power Parity (PPP). As a result of rapid economic growth Indian economy has a place among the G20 countries.
Fast Growing Economy	India, the world's fourth-largest economy, has emerged as the fastest-growing major economy and is on track to become the world's third-largest economy with a projected GDP of $7.3 trillion by 2030. India is projected to be world's fastest growing major economy (6.3% to 6.8% in 2025-26).
Fast growing Service Sector	The service sector, contributes a lion's share to the GDP of India. There has been a high rise growth in the technical sectors like Information Technology, BPO etc. These sectors have contributed immensely to the growth of the economy. These emerging service sectors have helped the country go global and helped in spreading its branches around the world.
Large Domestic Consumption	With the faster growth rate in the economy the standard of living has improved a lot. This in turn has resulted in rapid increase in domestic consumption in the country. The standard of living has considerably improved and life style has changed.
Rapid growth of Urban areas	Urbanization is a key ingredient of the growth of any economy. There has been a rapid growth of urban areas in India after independence. Improved connectivity in transport and communication, education and health have speeded up the pace of urbanization.
Stable macro economy	The Indian economy has been projected and considered as one of the most stable economies of the world. The 2014-15 Economic survey represents the Indian economy to be a "heaven of macroeconomic stability, resilience and optimism.
Demographic dividend	The human capital of India is young. This means that India is a pride owner of the maximum percentage of youth. The young population is not only motivated but skilled and trained enough to maximize the growth. Thus human capital plays a key role in maximizing the growth prospects in the country. Also, this has invited foreign investments to the country and outsourcing opportunities too.

Weakness of Indian Economy

Large Population	India stands second in terms of size of population next to China and our country is likely to overtake china in near future. Population growth rate of India is very high and this is always a hurdle to sustainable growth rate. The population growth rate in India is as high as 1.7 per thousand.
Inequality and poverty	There exists a huge economic disparity in the Indian economy. The proportion of income and assets owned by top 10% of Indians goes on increasing. This has led to an increase in the poverty level in the society and still a higher percentage of individuals are living Below Poverty Line (BPL). As a result of unequal distribution of income, the rich becomes richer and poor becomes poorer.
Increasing Prices of Essential Goods	Even though there has been a constant growth in the GDP and growth opportunities in the Indian economy, there have been steady increase in the price of essential goods. The continuous rise in prices erodes the purchasing power and adversely affects the poor people, whose income is not protected.
Weak Infrastructure	Even though there has been a gradual improvement in the infrastructural development in the past few decades, there is still a scarcity of the basic infrastructure like power, transport, storage etc.
Inadequate Employment generation	With growing youth population, there is a huge need of the employment opportunities. The growth in production is not accompanied by creation of job. Sometimes, the Indian economy is characterized by 'jobless growth'.
Outdated technology	The level of technology in agriculture and small scale industries is still outdated and obsolete.

Demographic trends in India

Scientific study of the characteristics of population is known as Demography. The various aspects **of demographic trends in India are :**

1. Size of population
2. Rate of growth
3. Birth and death rates
4. Density of population
5. Sex-ratio
6. Life-expectancy at birth
7. Literacy ratio

a. Size of Population

Census Year	Population (in crores)	Average annual growth rate
1901	23.84	–
1911	25.21	0.56
1921	25.13	– 0.03
1931	27.90	1.04
1941	31.87	1.33
1951	36.11	1.25
1961	43.92	1.96
1971	54.81	2.20
1981	68.33	2.22
1991	84.33	2.16
2001	102.70	1.97
2011	121.02	1.66

- As per the United Nation database, India's current 1.41 billion population surpassed China in 2023. It is also expected to hit 1.5 billion by 2030 and 1.78 billion by 2050.
- India has only about 2.4% of the world's geographical area and contributes less than 1.2% of the world's income, but accommodates about 17.5% of the world's population. In other words, every 6th person in the world is an Indian. Infact, the combined population of just two states namely, Uttarpradesh and Maharashtra is more than the population of United States of America, the third most populous country of the world. Some of the states in India have larger population than many countries in the world.
- The negative growth during 1911-21 was due to rapid and frequent occurrence of epidemics like cholera, plague and influenza and also famines. The year 1921 is known as the **'Year of Great Divide'** for India's population as population starts increasing.

SURA'S

GENERAL SCIENCE

Scientific Knowledge and Scientific Temper

Power of Reasoning

Rote Learning vs Conceptual Learning

Science as a Tool to Understand the Past, Present, and Future

PHYSICS

- Nature of Universe
- Measurement of Physical Quantities
- General Scientific Laws
- Everyday Application of the Science
- Nuclear Physics in our Daily Life

CHEMISTRY

- Elements and Compounds
- Acids, Bases and Salts
- Periodic Classification of Elements
- Carbon and its Compounds
- Chemistry in Everyday Life
- Food Adulteration
- Metallurgy

BIOLOGY

- Main Concepts of Life Science
- Classification of Living Organisms
- Evolution
- Genetics and Heredity
- Physiology
- Nutrition, Health and Human Diseases
- Environmental Science

PRACTICE QUESTIONS

Scientific Knowledge and Scientific Temper

Introduction

- **Scientific Knowledge:** Refers to the systematic understanding of the natural and social world through observation, experimentation, and logical reasoning. It is based on empirical evidence and is constantly evolving.
- **Scientific Temper:** A mindset or attitude that emphasizes rationality, logic, and evidence-based thinking. It involves questioning, critical thinking, and a willingness to change beliefs based on new evidence.

Scientific Knowledge

- **Definition:** The body of knowledge obtained through scientific methods, which includes facts, theories, laws, and principles.
- **Characteristics:**
  - **Empirical:** Based on observable and measurable evidence.
  - **Systematic:** Follows a structured and methodical approach.
  - **Objective:** Aims to be free from personal biases.
  - **Cumulative:** Builds upon previous knowledge.
  - **Falsifiable:** Can be tested and potentially disproven.
- **Components:**
  - **Facts:** Observable phenomena.
  - **Hypotheses:** Proposed explanations for phenomena.
  - **Theories:** Well-substantiated explanations of aspects of the natural world.
  - **Laws:** Statements that describe consistent patterns in nature.

The Scientific Method

Scientific knowledge is obtained through a structured approach known as the scientific method, which consists of:

1. Observation – Identifying a phenomenon or problem.
2. Formulating a Question – Asking "why" or "how" the phenomenon occurs.
3. Developing a Hypothesis – Making an educated guess based on existing knowledge.
4. Conducting Experiments – Testing the hypothesis through controlled experiments.
5. Analyzing Data – Interpreting experimental results.
6. Drawing Conclusions – Confirming or rejecting the hypothesis.
7. Formulating Theories or Laws – Establishing principles that explain the phenomenon.

Examples of Scientific Knowledge

- The Law of Gravitation by Newton explains how objects attract each other.
- The Germ Theory of Disease by Pasteur and Koch describes how microorganisms cause diseases.
- The Theory of Evolution by Darwin explains the process of natural selection.
- The Periodic Table classifies chemical elements based on properties.

Importance of Scientific Knowledge

Scientific knowledge has transformed society in multiple ways:

- **Technological Advancement** – Innovations like electricity, the internet, and artificial intelligence.
- **Medical Breakthroughs** – Vaccines, antibiotics, and surgical techniques save lives.
- **Environmental Conservation** – Understanding climate change, renewable energy, and biodiversity.
- **Space Exploration** – Discoveries about planets, black holes, and space travel.
- **Economic Growth** – Science-based industries such as pharmaceuticals, IT, and agriculture boost economies.

Scientific Temper

Definition

Scientific temper refers to a rational mindset that promotes questioning, reasoning, and evidence-based decision-making. It discourages superstition, blind faith, and irrational beliefs.

The term Scientific Temper was first introduced by Jawaharlal Nehru in his book "The Discovery of India", where he emphasized the role of science in shaping modern India.

Characteristics of Scientific Temper

- Rational Thinking – Accepting ideas based on logic, not myths.
- Curiosity – A continuous desire to learn and explore.
- Skepticism – Not believing in claims without sufficient evidence.
- Open-Mindedness – Willingness to accept new facts and ideas.
- Questioning Attitude – Challenging traditional beliefs that lack scientific proof.
- Ethical and Objective Approach – Making decisions based on facts rather than emotions.

Role of Scientific Temper in Society

- Eliminates Superstitions – Encourages people to question myths and blind faith.
- Encourages Logical Thinking – Helps in making informed decisions in daily life.
- Promotes Social Reform – Challenges social evils like caste discrimination and gender bias.
- Strengthens Democracy – Helps citizens make rational choices in elections and governance.
- Aids in Economic and Technological Development – Leads to innovation and progress.

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Examples of Scientific Temper in Daily Life

- Choosing modern medicine over faith healing or black magic.
- Using fact-checking to verify information before sharing it on social media.
- Relying on scientific farming methods rather than astrological predictions for agriculture.
- Understanding that eclipses are celestial events and not bad omens.

Constitutional and Legal Provisions for Scientific Temper in India

1. Article 51A(h) of the Indian Constitution – It is a Fundamental Duty of every citizen to develop scientific temper, humanism, and the spirit of inquiry.
2. Right to Education (Article 21A) – Provides access to scientific education for all children.
3. Drugs and Magic Remedies Act (1954) – Bans misleading advertisements promoting magical cures.
4. Consumer Protection Act (2019) – Protects consumers from fraudulent claims in medicine and technology.
5. National Science and Technology Policy – Encourages research and technological innovation in India.

Relationship Between Scientific Knowledge and Scientific Temper

- **Interdependence:** Scientific temper is essential for the development of scientific knowledge, and scientific knowledge reinforces scientific temper.
- **Mutual Reinforcement:** Scientific temper drives the pursuit of scientific knowledge, and the acquisition of scientific knowledge enhances scientific temper.
- **Role in Society:** Together, they contribute to the progress of society by promoting rational thinking, technological advancement, and evidence-based policies.

Challenges to Scientific Temper in India

Despite constitutional provisions, scientific temper faces several challenges:

1. Superstitions and Blind Beliefs – Practices like astrology, black magic, and miracle cures persist.
2. Misinformation and Fake News – Social media spreads unverified and false information.
3. Lack of Awareness and Education – Many people do not receive proper science education.
4. Reluctance to Change – Traditional beliefs and customs prevent the acceptance of scientific ideas.
5. Political and Religious Influence – Some groups promote anti-scientific narratives for personal gain.

Ways to Promote Scientific Temper

- Strengthening Science Education – Making science education more practical and interactive in schools.
- Encouraging Critical Thinking – Teaching students how to analyze and question information.
- Media Awareness – Promoting responsible journalism that highlights scientific facts.
- Government Initiatives – Organizing science fairs, research programs, and public awareness campaigns.
- Involvement of Scientists – Encouraging scientists to engage with the public and explain complex concepts.

Scientific knowledge and scientific temper are the backbones of a progressive, rational, and developed society. While scientific knowledge provides facts and innovations, scientific temper ensures that these advancements are applied logically and ethically.

Encouraging scientific temper will help India eliminate superstitions, adopt modern technologies, and ensure sustainable development. Thus, developing a scientifically aware and rational society is essential for India's future.

Power of Reasoning

Introduction

The Power of Reasoning refers to the ability to think logically, analyze situations, and draw conclusions based on facts and evidence rather than emotions or blind faith. It is an essential cognitive skill that helps individuals make rational decisions, solve problems, and understand complex concepts.

Reasoning plays a crucial role in science, philosophy, law, and daily life by enabling people to distinguish between truth and falsehood, detect fallacies, and develop critical thinking.

Meaning and Definition of Reasoning

- Reasoning is the mental process of drawing conclusions from premises or facts using logic.
- It involves evaluating evidence, identifying patterns, and applying logical principles.
- Example: If all humans are mortal and Socrates is a human, then Socrates is mortal (a logical deduction).

Definitions by Scholars

- Aristotle – "Reasoning is an instrument of knowledge that helps in discovering truth."
- John Dewey – "Reasoning is the process of thinking in which thought proceeds in a linear, logical manner."

Types of Reasoning

1. Deductive Reasoning

- Involves drawing specific conclusions from general principles.
- Example:
  - Premise 1: All mammals have lungs.
  - Premise 2: A whale is a mammal.
  - Conclusion: A whale has lungs.

Characteristics:

- Moves from general to specific.
- If the premises are true, the conclusion must be true.

2. Inductive Reasoning

- Involves drawing general conclusions from specific observations.
- Example:
  - Observation: The sun has risen in the east every day.
  - Conclusion: The sun always rises in the east.

Characteristics:

- Moves from specific to general.
- The conclusion is probable but not always certain.

3. Abductive Reasoning

- Involves making the best possible explanation based on incomplete evidence.
- Example: If a person is sneezing, coughing, and has a fever, we may infer they have the flu.

Characteristics:

- Commonly used in detective work and medical diagnosis.
- Based on inference and probability.

4. Analogical Reasoning

- Comparing two different things based on similarities.
- Example: The structure of an atom is like a solar system (electrons revolve around the nucleus like planets orbit the sun).

Characteristics:

- Helps in understanding complex ideas.
- Used in legal arguments and scientific models.

5. Logical Reasoning

- The process of using formal rules of logic to reach conclusions.
- Example:
  - Statement: If it rains, the ground will be wet.
  - Observation: It rained.
  - Conclusion: The ground is wet.

Components of Reasoning

- **Logic:** The framework for constructing valid arguments.
  - **Propositional Logic:** Deals with simple declarative propositions.
  - **Predicate Logic:** Involves predicates and quantifiers.
- **Critical Thinking:** The objective analysis and evaluation of facts to form a judgment.
  - **Skills:** Analysis, interpretation, inference, explanation, evaluation.
- **Problem-Solving:** The process of finding solutions to difficult or complex issues.
  - **Steps:** Identify the problem, generate possible solutions, evaluate and select the best solution, implement and assess the solution.

Cognitive Processes Involved in Reasoning

- **Perception:** The process of recognizing and interpreting sensory information.
- **Memory:** The retention and recall of information.
- **Attention:** The focus of cognitive resources on specific stimuli.
- Language: The use of symbols and rules to communicate and reason.

Factors Affecting Reasoning

- **Cognitive Biases:** Systematic patterns of deviation from norm or rationality in judgment.
  - **Examples:** Confirmation bias, availability heuristic, anchoring bias.
- **Emotions:** Can both positively and negatively influence reasoning.
- **Knowledge and Experience:** Greater knowledge and experience can enhance reasoning abilities.
- **Cultural Influences:** Cultural background can shape reasoning styles and preferences.

Importance of Reasoning

1. Enhances Critical Thinking

- Helps individuals analyze information logically rather than accepting things blindly.
- Encourages questioning and skepticism.

2. Aids in Decision-Making

- Enables people to weigh pros and cons before making choices.
- Used in business, law, politics, and everyday life.

3. Essential for Scientific Discovery

- Scientists use reasoning to form hypotheses, conduct experiments, and validate theories.
- Example: Isaac Newton reasoned that an invisible force (gravity) causes apples to fall.

4. Strengthens Problem-Solving Skills

- Helps in solving puzzles, mathematical problems, and strategic challenges.
- Used in programming, engineering, and artificial intelligence.

5. Helps in Legal and Ethical Judgments

- Courts use logical reasoning to interpret laws and deliver justice.
- Ethical reasoning helps in moral decision-making.

Applications of Reasoning in Daily Life

1. Medical Diagnosis – Doctors use reasoning to identify diseases based on symptoms.
2. Crime Investigation – Detectives use logical reasoning to solve cases.
3. Education – Helps students understand subjects like mathematics, science, and philosophy.
4. Politics – Used to form policies and arguments in debates.
5. Technology Development – Engineers use reasoning to innovate new technologies.