NOTES

AGNIVEER

STUDY MATERIAL

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🎯 AGNIVEER COMPLETE STUDY MATERIAL

Topic-Wise Comprehensive Guide | GovtCareerHub.com

EXAM OVERVIEW

- **Exam Type:** Computer Based Test (CBT)
- **Negative Marking:** -0.5 marks for wrong answers
- **Selection:** Written Test → Physical Test → Medical Test
- **Total Questions:** 50 (varies by trade)
- **Time Duration:** 60 minutes

📊 MATHEMATICS - COMPLETE TOPICS

TOPIC 1: NUMBER SYSTEM

Key Concepts:

- Natural Numbers: 1, 2, 3, 4, 5...
- Whole Numbers: 0, 1, 2, 3, 4...
- Integers: ...-2, -1, 0, 1, 2...
- Prime Numbers: Numbers divisible only by 1 and itself
- Composite Numbers: Numbers having more than 2 factors

Important Formulas:

- Sum of first n natural numbers: $n(n+1)/2$
- Sum of first n odd numbers: n^2
- Sum of first n even numbers: $n(n+1)$

Practice Questions:

1. **Find the sum of first 20 natural numbers.**
2. **How many prime numbers are there between 1 to 50?**

📊 MATHEMATICS - COMPLETE TOPICS

TOPIC 2: HCF & LCM

Key Concepts:

- HCF (Highest Common Factor): Largest number that divides all given numbers
- LCM (Least Common Multiple): Smallest number divisible by all given numbers

Important Formulas:

- For two numbers: HCF × LCM = Product of numbers
- HCF by Division Method: Use Euclidean algorithm
- LCM by Prime Factorization: Take highest powers of all prime factors

Shortcuts:

- HCF of fractions: HCF of numerators / LCM of denominators
- LCM of fractions: LCM of numerators / HCF of denominators

Practice Questions:

- Find HCF and LCM of 12, 18, 24
- Two numbers are in ratio 3:4 and their LCM is 84. Find the numbers.

TOPIC 3: PERCENTAGE

Key Concepts:

- Percentage means "per hundred" (%)
- Converting fraction to percentage: multiply by 100
- Converting percentage to fraction: divide by 100

Important Formulas:

- Percentage Increase: [(New Value - Old Value) / Old Value] × 100
- Percentage Decrease: [(Old Value - New Value) / Old Value] × 100
- Successive Percentage: If two changes of a% and b% occur: Final change = a + b + (ab/100)

Quick Calculations:

- 10% = 1/10, 20% = 1/5, 25% = 1/4
- 33⅓% = 1/3, 50% = 1/2, 66⅔% = 2/3

Practice Questions:

1. If a number is increased by 20% and then decreased by 15%, find the net change.
2. In an election, candidate A got 60% votes and won by 4000 votes. Find total votes.

📊 MATHEMATICS - COMPLETE TOPICS

TOPIC 4: PROFIT & LOSS

Key Concepts:

- Cost Price (CP): Price at which article is bought
- Selling Price (SP): Price at which article is sold
- Profit: SP > CP, Loss: SP < CP

Important Formulas:

- Profit = SP - CP, Loss = CP - SP
- Profit% = (Profit/CP) × 100
- Loss% = (Loss/CP) × 100
- SP = CP + Profit = CP(100 + Profit%)/100
- CP = SP × 100/(100 + Profit%)

Advanced Concepts:

- Marked Price (MP): Listed price before discount
- Discount = MP - SP
- Discount% = (Discount/MP) × 100

Practice Questions:

1. A shopkeeper marks his goods 40% above CP and gives 20% discount. Find his profit%.
2. If SP of 10 articles = CP of 12 articles, find profit%.

TOPIC 5: SIMPLE INTEREST (SI)

Key Concepts:

- Interest calculated only on principal amount
- Remains same for each year

Important Formulas:

- SI = (P × R × T)/100
- Amount = P + SI
- P = Principal, R = Rate%, T = Time in years

Shortcuts:

- If SI for n years = x, then SI for 1 year = x/n
- If rate changes: Calculate SI separately for each period

Practice Questions:

1. Find SI on ₹5000 at 8% per annum for 3 years.
2. At what rate will ₹2000 amount to ₹2400 in 4 years?

TOPIC 6: COMPOUND INTEREST (CI)

Key Concepts:

- Interest calculated on principal + previous interest
- Amount grows exponentially

Important Formulas:

- Amount = $P(1 + R/100)^t$
- CI = Amount - P
- For half-yearly: Rate = R/2, Time = 2T
- For quarterly: Rate = R/4, Time = 4T

Quick Method:

- **1st year CI = SI**
- **Difference between CI and SI for 2 years = $P(R/100)^2$**

Practice Questions:

1. Find CI on ₹10000 at 10% per annum for 2 years.
2. Difference between CI and SI for 2 years is ₹25. If rate is 10%, find principal.

TOPIC 7: RATIO & PROPORTION

Key Concepts:

- Ratio: Comparison of two quantities (a:b)
- Proportion: Equality of two ratios (a:b = c:d)

Important Properties:

- a:b = c:d means ad = bc
- Continued ratio: a:b:c
- Compound ratio: (a:b) × (c:d) = ac:bd
- Inverse ratio: If a:b then inverse is b:a

Types of Proportions:

- Direct Proportion: As one increases, other increases
- Inverse Proportion: As one increases, other decreases

Practice Questions:

1. Divide ₹1200 among A, B, C in ratio 2:3:7
2. If a:b = 2:3 and b:c = 4:5, find a:b:c

TOPIC 8: TIME & WORK

Key Concepts:

- **Work Rate:** Part of work done in unit time
- If A can do work in 'n' days, A's rate = 1/n per day

Important Formulas:

- Combined work rate = Sum of individual rates
- If A can do work in 'a' days, B in 'b' days: Together they finish in: ab/(a+b) days

Pipes & Cisterns:

- Inlet pipe: Fills the tank (positive work)
- Outlet pipe: Empties the tank (negative work)

Practice Questions:

1. A can do work in 15 days, B in 20 days. In how many days can they complete work together?
2. A pipe fills tank in 4 hours, another empties in 6 hours. If both are open, when will tank be full?

TOPIC 9: TIME, SPEED & DISTANCE

Key Concepts:

- **Speed = Distance/Time**
- **Distance = Speed × Time**
- **Time = Distance/Speed**

Unit Conversions:

- **km/hr to m/s:** Multiply by 5/18
- **m/s to km/hr:** Multiply by 18/5

Important Concepts:

- **Average Speed = Total Distance/Total Time**
- **Relative Speed:**
  - Same direction: $|S_1 - S_2|$
  - Opposite direction: $S_1 + S_2$

Train Problems:

- **Time to cross pole = Length of train/Speed of train**
- **Time to cross platform = (Length of train + Length of platform)/Speed**

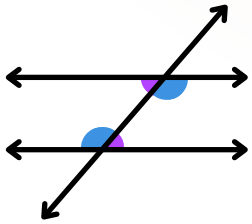
Practice Questions:

1. A train 150m long crosses a pole in 15 seconds. Find its speed.
2. Two trains of lengths 100m and 150m cross each other in 10 seconds when moving in opposite directions at speeds 45 km/hr and 55 km/hr respectively.

TOPIC 10: GEOMETRY

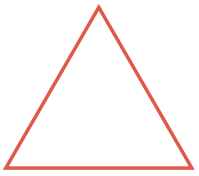
Lines & Angles:

- **Straight angle:** 180°
- **Right angle:** 90°
- **Acute angle:** < 90°
- **Obtuse angle:** > 90° but < 180°
- **Vertically opposite angles are equal**
- **Linear pair angles sum = 180°**



Triangles:

- Types by sides: Equilateral, Isosceles, Scalene
- Types by angles: Acute, Right, Obtuse
- Angle sum property: Sum of angles = 180°
- Pythagorean theorem: $a^2 + b^2 = c^2$ (for right triangle)

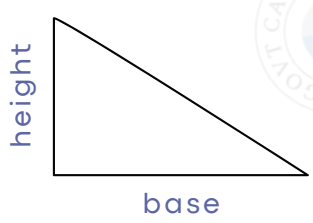


Areas:

- **Triangle:** ½ × base × height
- **Rectangle:** length × breadth
- **Square:** side²
- **Circle:** πr²
- **Parallelogram:** base × height
- **Trapezium:** ½ × (sum of parallel sides) × height

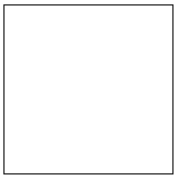
Practice Questions:

1. Find the area of triangle with sides 3, 4, 5.
2. A rectangle has perimeter 24 cm and area 32 sq cm. Find its dimensions.

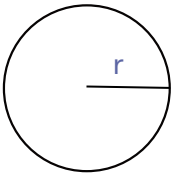


1.Triangle

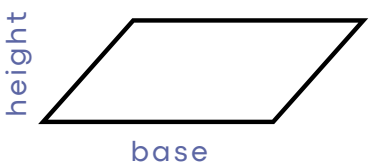
2. Rectangle



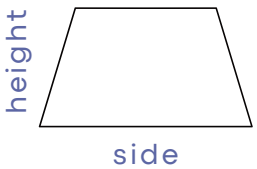
3. Square



4. Circle



5. Parallelogram



6. Trapezium

🧠 REASONING - COMPLETE TOPICS

TOPIC 1: ANALOGIES

Key Concepts:

- Finding relationship between given pair
- Applying same relationship to find missing term
- **Format:** A : B :: C : ?

Types of Relationships:

- **Synonym/Antonym:** Happy : Sad :: Day : Night
- **Part to Whole:** Wheel : Car :: Wing : Bird
- **Cause & Effect:** Fire : Smoke :: Rain : Flood
- **Function:** Pen : Write :: Knife : Cut
- **Degree:** Cool : Cold :: Warm : Hot

Practice Questions:

1. Eye : See :: Ear : ?
2. Cat : Kitten :: Dog : ?

TOPIC 2: SERIES COMPLETION

Key Concepts:

- **Number Series:** Finding pattern in numbers
- **Letter Series:** Finding pattern in alphabets

Common Patterns:

- **Arithmetic Series:** +2, +4, +6, +8...
- **Geometric Series:** ×2, ×3, ×4...
- **Square/Cube Series:** 1^2, 2^2, 3^2...
- **Prime Number Series:** 2, 3, 5, 7, 11...
- **Fibonacci Series:** 1, 1, 2, 3, 5, 8...

Letter Series Patterns:

- **Alphabetical order:** A, C, E, G... (+2 positions)
- **Reverse order:** Z, X, V, T... (-2 positions)

Practice Questions:

1. 2, 6, 12, 20, 30, ?
2. AZ, BY, CX, DW, ?

TOPIC 3: CODING-DECODING

Key Concepts:
- Converting words/numbers into code
- Finding pattern in coding system

Types:
- **Letter Shift:** Each letter shifted by fixed positions
- **Number Coding:** Letters replaced by numbers
- **Conditional Coding:** Different rules for different conditions

Methods:
- **Forward/Backward:** A→B, B→C (forward by 1)
- **Position Value:** A=1, B=2, C=3...
- **Opposite Letters:** A↔Z, B↔Y, C↔X..

Practice Questions:
1. If GOOD is coded as HPPE, how is BEST coded?
2. In a code, 5 × 3 = 16, 7 × 4 = 33, then 9 × 7 = ?

TOPIC 4: BLOOD RELATIONS

Key Concepts:
- Understanding family relationships
- Drawing family tree for complex problems

Basic Relations:
- **Parents:** Father, Mother
- **Children:** Son, Daughter
- **Siblings:** Brother, Sister
- **Grandparents:** Grandfather, Grandmother
- **Uncle/Aunt:** Father's/Mother's brother/sister
- **Cousins:** Uncle's/Aunt's children

Key Points:
- **Paternal:** Father's side
- **Maternal:** Mother's side
- **In-laws:** Spouse's relations
- **Generation gap:** Count levels up/down

Practice Questions:
1. Pointing to a woman, Ram said "She is daughter of my grandfather's only son." How is woman related to Ram?
2. A is B's sister. C is B's mother. D is C's father. E is D's mother. How is A related to D?

TOPIC 5: DIRECTION & DISTANCE

Key Concepts:

- **Cardinal directions:** North, South, East, West
- **Sub-directions:** Northeast, Northwest, Southeast, Southwest
- Finding final position and distance

Movement Rules:

- **Right turn:** Clockwise 90°
- **Left turn:** Anti-clockwise 90°
- **About turn:** 180° turn

Distance Calculation:

- Use Pythagorean theorem for shortest distance
- **Displacement ≠ Total distance traveled**

Practice Questions:

1. A man walks 10m North, then 20m East, then 10m South. Find his displacement from starting point.
2. A faces North, turns right, walks 5km, turns left, walks 3km. In which direction is he from starting point?

TOPIC 6: LOGICAL VENN DIAGRAMS

Key Concepts:

- Representing relationships using overlapping circles
- Understanding logical connections between groups

Types of Relationships:

- **No relation:** Separate circles
- **Partial overlap:** Intersecting circles
- **Subset:** One circle inside another
- **Complete overlap:** Same circle

Practice Questions:

1. Draw Venn diagram for: Books, Novels, Science Books
2. Which diagram represents: Animals, Dogs, Cats?

🧠 REASONING - COMPLETE TOPICS

TOPIC 7: SYLLOGISM

Key Concepts:

- Drawing conclusions from given statements
- Understanding logical validity

Key Rules:

- **All A are B + All B are C = All A are C**
- **Some A are B ≠ Some B are A (but both can be true)**
- **No A are B = No B are A**

Common Mistakes:

- Don't assume beyond given statements
- Negative statements don't give positive conclusions
- "Some" doesn't mean "all"

Practice Questions:

1. All roses are flowers. Some flowers are red. Conclusions?
2. No cats are dogs. All dogs are animals. What can you conclude?

📚 GENERAL KNOWLEDGE - COMPLETE TOPICS

TOPIC 1: INDIAN HISTORY

ANCIENT INDIA

Indus Valley Civilization (2500-1500 BCE)

- Important Sites: Harappa, Mohenjodaro, Dholavira, Kalibangan
- Features: Well-planned cities, drainage system, standardized weights
- Decline: Climate change, Aryan invasion theory

Vedic Period (1500-600 BCE)

- Early Vedic: Rigveda, pastoral life, tribal society
- Later Vedic: Agriculture, varna system, urbanization
- Literature: 4 Vedas, Upanishads, Epics (Ramayana, Mahabharata)

Mauryan Empire (321-185 BCE)

- Founder: Chandragupta Maurya (with Chanakya's help)
- Greatest Ruler: Ashoka (273-232 BCE)
- Ashoka's Dhamma: Non-violence, tolerance, welfare
- Administration: Well-organized bureaucracy, espionage system

Gupta Empire (320-550 CE) - Golden Age

- Rulers: Chandragupta I, Samudragupta, Chandragupta II
- Achievements: Art, literature, science, mathematics
- Scholars: Kalidasa, Aryabhata, Varahamihira
- Inventions: Concept of zero, decimal system

📚 GENERAL KNOWLEDGE - COMPLETE TOPICS

MEDIEVAL INDIA

Delhi Sultanate (1206-1526)

- Dynasties: Slave, Khilji, Tughlaq, Sayyid, Lodi
- Important Rulers:
  - Qutub-ud-din Aibak: First Sultan, built Qutub Minar
  - Alauddin Khilji: Market reforms, Deccan campaigns
  - Muhammad bin Tughlaq: Capital shift, token currency

Mughal Empire (1526-1857)

- Founder: Babur (won First Battle of Panipat, 1526)
- Greatest Ruler: Akbar (1556-1605)
  - Din-i-Ilahi, Mansabdari system, Religious tolerance
- Shah Jahan: Built Taj Mahal, Red Fort
- Aurangzeb: Last great Mughal, orthodox policies
- Decline: After Aurangzeb, weak successors, regional powers

MODERN INDIA

British East India Company

- Battle of Plassey (1757): British defeated Siraj-ud-Daulah
- Battle of Buxar (1764): British got Diwani rights of Bengal
- Regulating Act (1773): Warren Hastings as first Governor-General

British Policies

- Economic: Drain of wealth, de-industrialization
- Social: Sati abolition, Widow remarriage, English education
- Administrative: Civil services, railways, telegraph

Freedom Struggle

- Sepoy Mutiny (1857): First War of Independence
- Formation of INC (1885): A.O. Hume founded
- Partition of Bengal (1905): Divide and rule policy
- Swadeshi Movement: Boycott of British goods

Important Freedom Fighters

- Mahatma Gandhi: Satyagraha, Non-cooperation, Quit India
- Subhas Chandra Bose: INA, "Give me blood, I'll give you freedom"
- Bhagat Singh: Revolutionary, Hindustan Socialist Republican Association
- Chandrashekhar Azad: Kakori conspiracy, never caught alive

TOPIC 2: INDIAN GEOGRAPHY

PHYSICAL FEATURES

Northern Mountains

- Himalayas: Young fold mountains, highest peak Kanchenjunga
- Ranges: Greater Himalayas, Lesser Himalayas, Shivaliks
- Important Passes: Khyber, Bolan, Nathu La, Rohtang

Northern Plains

- Formation: Alluvial deposits by rivers
- Rivers: Ganga, Yamuna, Brahmaputra system
- Most fertile region: High population density

Peninsular Plateau

- Western Ghats: Higher elevation, source of many rivers
- Eastern Ghats: Lower, broken hills
- Deccan Plateau: Triangular, ancient rocks

Coastal Plains

- Western Coast: Narrow, Konkan, Malabar coasts
- Eastern Coast: Wider, Coromandel, Northern Circar

Islands

- Andaman & Nicobar: Bay of Bengal, volcanic origin
- Lakshadweep: Arabian Sea, coral origin

RIVERS

Himalayan Rivers

- Ganga System: Longest river system, highly sacred
  - Tributaries: Yamuna, Gomti, Ghaghara, Gandak, Kosi
- Brahmaputra: Originates in Tibet, flows through Assam
- Indus: Now mostly in Pakistan, Ladakh in India

Peninsular Rivers

- Godavari: Largest peninsular river, "Vriddh Ganga"
- Krishna: Second largest, flows through Karnataka, AP
- Narmada & Tapi: Flow westward, form estuaries

CLIMATE

- Monsoon Type: Seasonal reversal of winds
- Southwest Monsoon: June-September, main rainy season
- Northeast Monsoon: October-December, affects Tamil Nadu
- Seasons: Summer, Monsoon, Post-monsoon, Winter

TOPIC 3: INDIAN POLITY

CONSTITUTIONAL FRAMEWORK

Preamble

- Key Words: Sovereign, Socialist, Secular, Democratic, Republic
- Objectives: Justice, Liberty, Equality, Fraternity
- Adopted: 26th November 1949, Effective: 26th January 1950

📚 GENERAL KNOWLEDGE - COMPLETE TOPICS

Fundamental Rights (Part III)

1. Right to Equality (Articles 14-18)
2. Right to Freedom (Articles 19-22)
3. Right against Exploitation (Articles 23-24)
4. Right to Freedom of Religion (Articles 25-28)
5. Cultural and Educational Rights (Articles 29-30)
6. Right to Constitutional Remedies (Article 32)

Directive Principles (Part IV)

- Not legally enforceable but fundamental in governance
- Examples: Right to work, education, public health
- Gandhi's influence: Village panchayats, prohibition

Fundamental Duties (Part IVA)

- Added by: 42nd Amendment (1976)
- Total: 11 duties (originally 10, 11th added in 2002)
- Examples: Respect Constitution, protect environment

UNION GOVERNMENT

President

- Head of State, Supreme Commander of Armed Forces
- Election: Indirect, by Electoral College
- Term: 5 years, re-election possible
- Powers: Executive, Legislative, Judicial, Emergency

Prime Minister

- Head of Government, Leader of Lok Sabha
- Appointment: By President (leader of majority party)
- Council of Ministers: Collective responsibility

Parliament

- Lok Sabha: Lower house, 545 members, 5-year term
- Rajya Sabha: Upper house, 245 members, 6-year term
- Functions: Lawmaking, Budget approval, Control over executive

STATE GOVERNMENT

- **Governor:** Constitutional head, appointed by President
- **Chief Minister:** Real executive head
- **State Legislature:** Vidhan Sabha (Assembly), Vidhan Parishad (Council)

🔬 GENERAL SCIENCE - COMPLETE TOPICS

TOPIC 1: PHYSICS

🔬 GENERAL SCIENCE - COMPLETE TOPICS

Motion

- **Types:** Uniform, non-uniform, circular, oscillatory
- **Equations of Motion:**
  - $v = u + at$
  - $s = ut + \frac{1}{2}at^2$
  - $v^2 = u^2 + 2as$
- **Important Concepts:**
  - **Velocity:** Rate of change of displacement
  - **Acceleration:** Rate of change of velocity

Force & Newton's Laws

- First Law: Law of Inertia (object at rest stays at rest)
- Second Law: $F = ma$ (Force = mass × acceleration)
- Third Law: Action-Reaction (equal and opposite forces)

Work, Energy & Power

- Work: $W = F \times s \times \cos\theta$
- Kinetic Energy: $KE = \frac{1}{2}mv^2$
- Potential Energy: $PE = mgh$
- Power: P = Work/Time

Gravitation

- Universal Law: $F = Gm_1m_2/r^2$
- Acceleration due to gravity: $g = 9.8\ m/s^2$
- Weight: $W = mg$

HEAT & THERMODYNAMICS

Temperature & Heat

- Temperature Scales:
  - Celsius: Water freezes at 0°, boils at 100°
  - Fahrenheit: Water freezes at 32°, boils at 212°
  - Kelvin: Absolute scale, 0K = -273°C

Heat Transfer

- Conduction: Through direct contact
- Convection: Through fluid movement
- Radiation: Through electromagnetic waves

Laws of Thermodynamics

- First Law: Energy conservation (Heat supplied = Change in internal energy + Work done)
- Second Law: Heat flows from hot to cold naturally

LIGHT

Reflection

- **Laws:** Angle of incidence = Angle of reflection
- **Mirrors:**
  - Plane: Virtual, erect, same size image
  - Concave: Can form real/virtual images
  - Convex: Always virtual, diminished images

Refraction

- **Snell's Law**: $n_1 \sin\theta_1 = n_2 \sin\theta_2$
- **Lenses:**
  - **Convex:** Converging, used in camera, telescope
  - **Concave:** Diverging, used to correct myopia

Wave Nature

- **Electromagnetic spectrum:** Radio, Microwave, Infrared, Visible, UV, X-ray, Gamma
- **Visible light:** VIBGYOR (Red has longest wavelength)

ELECTRICITY

Basic Concepts

- **Current:** Flow of electric charge ($I = Q/t$)
- **Voltage:** Potential difference (V)
- **Resistance:** Opposition to current flow (R)

Ohm's Law

- $V = IR$ (Voltage = Current × Resistance)
- **Power:** $P = VI = I^2R = V^2/R$

Circuit Elements

- **Series**: Same current, voltage divides
- **Parallel**: Same voltage, current divides

TOPIC 2: CHEMISTRY

ATOMIC STRUCTURE

Basic Particles

- Proton: Positive charge, mass ≈ 1 amu
- Neutron: No charge, mass ≈ 1 amu
- Electron: Negative charge, negligible mass

Atomic Models

- Rutherford: Nuclear model, electrons orbit nucleus
- Bohr: Electrons in fixed orbits, energy levels
- Modern: Wave-mechanical model, orbitals

Periodic Table

- Periods: Horizontal rows (7 periods)
- Groups: Vertical columns (18 groups)
- Trends: Atomic size decreases across period, increases down group

CHEMICAL BONDING

Types of Bonds

- **Ionic:** Transfer of electrons (Na^+Cl^-)
- **Covalent:** Sharing of electrons (H_2O, CH_4)
- **Metallic:** Sea of electrons in metals

Molecular Shapes

- **Linear:** CO_2, Bent: H_2O
- **Tetrahedral:** CH_4, Trigonal: BF_3

ACIDS, BASES & SALTS

Definitions

- **Arrhenius:** Acids give H^+, bases give OH^-
- **Bronsted-Lowry:** Acids donate protons, bases accept protons

pH Scale

- **Range:** 0-14
- **Acidic:** pH < 7, Neutral: pH = 7, Basic: pH > 7
- **Examples:** Lemon (pH 2), Water (pH 7), Soap (pH 9)

Important Reactions

- **Neutralization:** Acid + Base → Salt + Water
- **Metal + Acid:** → Salt + Hydrogen gas
- **Carbonate + Acid:** → Salt + Water + CO_2

METALS & NON-METALS

Properties

- **Metals:** Lustrous, malleable, ductile, conduct electricity
- **Non-metals:** Dull, brittle, poor conductors

Reactions

- **Metal + Oxygen:** → Metal oxide (basic)
- **Non-metal + Oxygen:** → Non-metal oxide (acidic)
- **Reactivity Series:** K > Na > Ca > Mg > Al > Zn > Fe > Cu > Ag > Au

TOPIC 3: BIOLOGY

LIFE PROCESSES

Nutrition

- **Autotrophic:** Make own food (plants - photosynthesis)
- **Heterotrophic:** Depend on others for food (animals)
- **Photosynthesis:** $6CO_2 + 6H_2O$ + Light energy → $C_6H_{12}O_6 + 6O_2$

Respiration

- **Aerobic:** With oxygen, complete breakdown, 38 ATP
- **Anaerobic:** Without oxygen, incomplete breakdown, 2 ATP
- **Equation:** $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + Energy

Transportation

- **Plants:** Xylem (water), Phloem (food)
- **Animals:** Blood, lymph
- **Human circulation:** Heart (4 chambers), double circulation

Excretion

- **Plants:** Through stomata, lenticels
- **Animals:** Kidneys, lungs, skin, liver
- **Human excretory system:** Kidneys filter blood, remove urea

🔬 GENERAL SCIENCE - COMPLETE TOPICS

HUMAN BODY SYSTEMS

Digestive System

- Path: Mouth → Esophagus → Stomach → Small intestine → Large intestine
- Enzymes: Amylase (starch), Pepsin (protein), Lipase (fats)
- Absorption: Mainly in small intestine

Respiratory System

- Path: Nose → Trachea → Bronchi → Bronchioles → Alveoli
- Gas exchange: O_2 in, CO_2 out through alveoli
- Breathing: Diaphragm controls

Circulatory System

- Heart: 4 chambers, pumps blood
- Blood vessels: Arteries (away from heart), Veins (to heart), Capillaries
- Blood components: RBC, WBC, Platelets, Plasma

Nervous System

- Central: Brain, Spinal cord
- Peripheral: Nerves throughout body
- Functions: Control, coordination, response to stimuli

REPRODUCTION

Types

- Asexual: Single parent (budding, fragmentation, spores)
- Sexual: Two parents, genetic variation

Human Reproduction

- Male system: Testes produce sperm
- Female system: Ovaries produce eggs
- Fertilization: Sperm + Egg → Zygote
- Development: Zygote → Embryo → Fetus → Baby

HEREDITY & EVOLUTION

Mendel's Laws

- Law of Dominance: Dominant trait expressed
- Law of Segregation: Traits separate in gametes
- Law of Independent Assortment: Different traits inherited independently

Evolution

- Darwin's Theory: Natural selection, survival of fittest
- Evidence: Fossils, comparative anatomy, embryology
- Human evolution: Apes → Early humans → Modern humans

🌍 CURRENT AFFAIRS & GENERAL AWARENESS

TOPIC 1: INDIAN POLITY - CURRENT UPDATES

🌍 CURRENT AFFAIRS & GENERAL AWARENESS

Recent Constitutional Amendments

- 103rd Amendment (2019): 10% reservation for economically weaker sections
- 104th Amendment (2020): Extended reservation for SC/ST in Lok Sabha and state assemblies till 2030
- Important Supreme Court Cases: Recent landmark judgments

Government Schemes (2023-2025)

- PM Kisan Samman Nidhi: ₹6000 per year to farmers
- Ayushman Bharat: Health insurance for poor families
- Digital India: Digital transformation initiatives
- Make in India: Manufacturing and employment generation
- Atmanirbhar Bharat: Self-reliant India mission

Recent Elections & Political Updates

- State Elections: Recent assembly election results
- Lok Sabha Elections: Current composition and major parties
- Regional Parties: State-wise dominant parties

TOPIC 2: ECONOMY - CURRENT TRENDS

Economic Indicators (2024-2025)

- **GDP Growth Rate:** Current economic growth statistics
- **Inflation Rate:** Consumer Price Index trends
- **Unemployment Rate:** Current employment scenario
- **Fiscal Deficit:** Government revenue vs expenditure

Banking & Finance

- **RBI Policies:** Current repo rate, bank rate
- **Digital Payments:** UPI, digital wallets growth
- **Banking Reforms:** Recent changes in banking sector
- **Stock Market:** BSE, NSE performance trends

Budget 2024-25 Highlights

- **Tax Changes:** Income tax slabs, exemptions
- **Infrastructure Spending:** Roads, railways, airports
- **Social Sector:** Education, health allocations
- **Defense Budget:** Military expenditure

TOPIC 3: SCIENCE & TECHNOLOGY

Space Achievements

- **ISRO Missions:** Chandrayaan, Mangalyaan updates
- **Satellite Launches:** Recent successful launches
- **International Cooperation:** Space partnerships
- **Future Missions:** Planned space explorations

Defense Technology

- **Indigenous Weapons:** Make in India defense projects
- **Missile Systems:** Agni, Prithvi, BrahMos series
- **Naval Technology:** Aircraft carriers, submarines
- **Air Force:** Fighter jets, helicopters

Digital Technology

- **5G Implementation:** Rollout across India
- **Artificial Intelligence:** Government AI initiatives
- **Cybersecurity:** National cybersecurity policies
- **Startups:** Unicorn companies in India

Government Schemes (2023-2025)

- PM Kisan Samman Nidhi: ₹6000 per year to farmers
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- Make in India: Manufacturing and employment generation
- Atmanirbhar Bharat: Self-reliant India mission

TOPIC 4: ENVIRONMENT & CLIMATE

Climate Change Initiatives

- Paris Agreement: India's commitments
- Renewable Energy: Solar, wind power targets
- Electric Vehicles: Government promotion policies
- Carbon Neutrality: Net-zero emission goals

Environmental Issues

- Air Pollution: Major cities' air quality index
- Water Conservation: River cleaning projects
- Forest Conservation: Afforestation programs
- Wildlife Protection: Tiger reserves, sanctuaries

TOPIC 5: SPORTS & AWARDS

Recent Sporting Achievements

- **Olympics Performance:** Medal winners and their achievements
- **Commonwealth Games:** India's recent performance
- **Cricket:** IPL, international matches highlights
- **Other Sports:** Badminton, hockey, athletics achievements

National Awards (2023-2024)

- **Padma Awards:** Padma Vibhushan, Padma Bhushan, Padma Shri recipients
- **Bharat Ratna:** Recent recipients
- **Sports Awards:** Rajiv Gandhi Khel Ratna, Arjuna Awards
- **Gallantry Awards:** Param Veer Chakra, Ashok Chakra

💡 REASONING SHORTCUTS & TRICKS

TOPIC 1: MATHEMATICAL REASONING SHORTCUTS

Number Series Quick Methods

- **Arithmetic Progression:** Common difference method
  - Example: 5, 8, 11, 14, ? (difference = 3, answer = 17)
- **Geometric Progression:** Common ratio method
  - Example: 2, 6, 18, 54, ? (ratio = 3, answer = 162)
- **Square/Cube Series:**
  - $1^2, 2^2, 3^2, 4^2, ? \rightarrow 1, 4, 9, 16, 25$
- **Mixed Operations:** +, -, ×, ÷ patterns

Quick Calculation Tricks

- **Multiplication by 11:**
  - $23 \times 11 = 2(2+3)3 = 253$
- **Squares ending in 5:**
  - $25^2 = 2 \times 3$ and 25 = 625
- **Percentage to Fraction:**
  - 12.5% = 1/8, 16.67% = 1/6

TOPIC 2: LOGICAL REASONING SHORTCUTS

Syllogism Quick Method

- Venn Diagram Approach: Draw circles for each statement
- Possibility vs Definitely: Distinguish between "can be" and "must be"

Blood Relations Shortcuts

- Generation Method: Count levels up/down from reference person
- Gender Identification: Use keywords to identify male/female

Direction & Distance Tricks

- Right Hand Thumb Rule: For direction changes
- Pythagorean Theorem: For shortest distance calculation

📖 ENGLISH LANGUAGE (For Technical Posts)

TOPIC 1: GRAMMAR ESSENTIALS

Parts of Speech

- **Noun:** Person, place, thing, idea
  - **Types:** Proper, common, collective, abstract
- **Pronoun:** Replaces noun (I, you, he, she, it, we, they)
- **Verb:** Action or state of being
  - **Types:** Main verbs, helping verbs, linking verbs
- **Adjective:** Describes noun (good, beautiful, large)
- **Adverb:** Describes verb, adjective, or another adverb (quickly, very, well)

📖 ENGLISH LANGUAGE (For Technical Posts)

Tenses

- Present: Simple, continuous, perfect, perfect continuous
- Past: Simple, continuous, perfect, perfect continuous
- Future: Simple, continuous, perfect, perfect continuous

Voice

- Active: Subject performs action (Ram writes a letter)
- Passive: Subject receives action (A letter is written by Ram)

Common Errors

- Subject-Verb Agreement: Singular subject + singular verb
- Preposition Usage: At, in, on, by, with, from
- Article Usage: A, an, the

TOPIC 2: VOCABULARY BUILDING

Synonyms (Same Meaning)

- Happy = Joyful, Cheerful, Delighted
- Angry = Furious, Irate, Enraged
- Beautiful = Gorgeous, Stunning, Attractive
- Intelligent = Smart, Clever, Brilliant

Antonyms (Opposite Meaning)

- Hot ↔ Cold, Big ↔ Small, Fast ↔ Slow
- Love ↔ Hate, Accept ↔ Reject, Expand ↔ Shrink

One Word Substitution

- Bibliophile: Person who loves books
- Carnivorous: Flesh-eating
- Democracy: Government by the people
- Optimist: Person who looks at bright side

Idioms & Phrases

- Break the ice: Start conversation
- Piece of cake: Very easy
- Hit the nail on the head: Exactly right
- Burn the midnight oil: Work late at night

💻 COMPUTER KNOWLEDGE (For Technical Posts)

TOPIC 1: COMPUTER FUNDAMENTALS

Basic Components

- **Hardware:** Physical parts (CPU, RAM, Hard disk, Monitor)
- **Software:** Programs and applications
- **Input Devices:** Keyboard, mouse, scanner, microphone
- **Output Devices:** Monitor, printer, speakers

💻 COMPUTER KNOWLEDGE (For Technical Posts)

Memory Types

- **Primary Memory:** RAM (volatile), ROM (non-volatile)
- **Secondary Memory:** Hard disk, SSD, CD, DVD, USB
- **Cache Memory:** High-speed temporary storage

CPU Functions

- **ALU:** Arithmetic Logic Unit (calculations)
- **Control Unit:** Controls operations
- **Registers:** Temporary storage in CPU

TOPIC 2: OPERATING SYSTEMS

Functions of OS

- **Process Management:** Running multiple programs
- **Memory Management:** Allocating RAM to programs
- **File Management:** Organizing files and folders
- **Device Management:** Controlling hardware devices

Types of OS

- **Windows:** Most popular desktop OS
- **Linux:** Open-source, secure
- **MacOS:** Apple's operating system
- **Android:** Mobile operating system
- **iOS:** Apple's mobile OS

TOPIC 3: MS OFFICE

MS Word

- Formatting: Font, size, bold, italic, underline
- Paragraph: Alignment, spacing, indentation
- Tables: Insert, format, merge cells
- Mail Merge: Combining documents with data

MS Excel

- Formulas: SUM, AVERAGE, MAX, MIN, COUNT
- Functions: IF, VLOOKUP, HLOOKUP
- Charts: Column, bar, pie, line charts
- Data Analysis: Sorting, filtering, pivot tables

MS PowerPoint

- Slides: Creating, formatting presentations
- Animations: Entrance, exit, emphasis effects
- Slide Transitions: Effects between slides
- Templates: Pre-designed presentations

💻 COMPUTER KNOWLEDGE (For Technical Posts)

TOPIC 4: INTERNET & NETWORKING

Internet Basics

- **WWW:** World Wide Web, collection of websites
- **URL:** Uniform Resource Locator (web address)
- **Browser:** Software to access internet (Chrome, Firefox, Edge)
- **Search Engine:** Google, Bing, Yahoo

Networking Concepts

- **LAN:** Local Area Network (within building)
- **WAN:** Wide Area Network (across cities/countries)
- **Wi-Fi:** Wireless internet connection
- **Bluetooth:** Short-range wireless communication

Internet Security

- **Antivirus:** Protection from malware
- **Firewall:** Network security barrier
- **Password Security:** Strong, unique passwords
- **Phishing:** Fraudulent attempts to steal information

🎯 EXAM STRATEGY & TIME MANAGEMENT

SECTION-WISE TIME ALLOCATION

- Mathematics: 15-20 minutes (practice quick calculations)
- Reasoning: 10-15 minutes (pattern recognition is key)
- General Knowledge: 8-12 minutes (either you know or you don't)
- General Science: 12-15 minutes (concept-based questions)
- English: 8-10 minutes (grammar rules and vocabulary)

QUESTION SELECTION STRATEGY

1. First Round (30 minutes): Attempt easy and known questions
2. Second Round (20 minutes): Attempt moderate difficulty questions
3. Final Round (10 minutes): Attempt remaining questions or review

GUESSING STRATEGY

- Negative marking: -0.5 for wrong answers
- Guess only if: You can eliminate 2 options
- Never guess: If all 4 options seem equally likely

RECOMMENDED STUDY MATERIALS

BOOKS BY SUBJECT

Mathematics

- R.S. Aggarwal - Quantitative Aptitude ★★★★★
- Fast Track Objective Arithmetic - Rajesh Verma ★★★★
- Magical Book on Quicker Maths - M. Tyra ★★★★

Reasoning

- A Modern Approach to Verbal & Non-Verbal Reasoning - R.S. Aggarwal ★★★★★
- Analytical Reasoning - M.K. Pandey ★★★★

General Knowledge

- Lucent's General Knowledge ★★★★★
- Manorama Yearbook (Latest Edition) ★★★★
- Arihant General Knowledge ★★★★

General Science

- NCERT Books (Class 8-10) ★★★★★
- Lucent's General Science ★★★★
- Objective General Science - Pramod Kumar ★★★

ONLINE RESOURCES

- YOUTUBE CHANNELS: STUDY IQ, UNACADEMY, ADDA247
- MOBILE APPS: TESTBOOK, GRADEUP, OLIVEBOARD
- WEBSITES: JAGRAN JOSH, GKTODAY, CURRENT AFFAIRS

⚡ LAST MINUTE REVISION CHECKLIST

Mathematics Formulas

- SI = PRT/100, CI = $P[(1+R/100)^t - 1]$
- Speed = Distance/Time
- Profit% = (Profit/CP) × 100
- Area of circle = πr^2, Circumference = $2\pi r$

Important Facts

- Longest river: Ganga (2525 km)
- Highest peak: Kanchenjunga (8586 m)
- Largest state: Rajasthan (area), UP (population)
- Father of Nation: Mahatma Gandhi
- National bird: Peacock, National animal: Tiger

Current Affairs (Keep Updated)

- President: Droupadi Murmu
- Prime Minister: Narendra Modi
- Chief Justice of India: (Check current)
- RBI Governor: Shaktikanta Das (verify current status)

Science Facts

- Hardest substance: Diamond
- Lightest gas: Hydrogen
- Largest planet: Jupiter
- Speed of light: 3×10^8 m/s
- Normal human body temperature: 98.6°F or 37°C

SUCCESS MANTRAS

Study Schedule

- Daily: 6-8 hours of focused study
- Weekly: 1 full mock test + topic-wise tests
- Monthly: Complete syllabus revision
- Last month: Only practice and revision

Health & Motivation

- Physical fitness: Essential for physical tests
- Mental health: Stay positive and confident
- Regular breaks: Avoid burnout
- Proper sleep: 7-8 hours daily

Exam Day Tips

- Reach early: Avoid last-minute rush
- Read instructions: Carefully understand exam pattern
- Stay calm: Don't panic if some questions seem difficult
- Time management: Keep track of time regularly

IMPORTANT CONTACTS & WEBSITES

Official Websites

- Indian Army: www.joinindianarmy.nic.in
- Indian Navy: www.indiannavy.nic.in
- Indian Air Force: www.indianairforce.nic.in

Helpline Numbers

- Army Recruitment: Check official website for latest numbers
- Technical Support: Available during application process

🎖️ MOTIVATION CORNER

Inspiring Quotes

"The future belongs to those who prepare for it today."

"Success is not final, failure is not fatal: it is the courage to continue that counts."

"Your only limit is your mind."

Success Stories

- Remember that thousands of candidates clear Agniveer every year
- Dedication and consistent preparation are the keys to success
- Focus on your strengths while improving weak areas

📋 FINAL CHECKLIST

Before Starting Preparation

- ✅ Understand exam pattern completely
- ✅ Collect all required study materials
- ✅ Create a realistic study schedule
- ✅ Set up a distraction-free study environment

During Preparation

- ✅ Complete each topic thoroughly
- ✅ Practice daily with mock tests
- ✅ Keep updating current affairs
- ✅ Regular revision of completed topics

Before Exam

- ✅ Complete at least 50 mock tests
- ✅ Revise all important formulas and facts
- ✅ Prepare all required documents
- ✅ Plan your journey to exam center

On Exam Day

- ✅ Carry admit card and ID proof
- ✅ Reach exam center early
- ✅ Stay calm and confident
- ✅ Manage time effectively

💪 Remember: Agniveer is not just an exam, it's your pathway to serve the nation. Prepare with dedication, appear with confidence, and success will be yours!

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Best of Luck! Jai Hind! 🎯