

SAMPLE PAPER GROUP ZETA

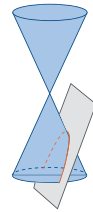
MATHEMATICS SECTION

Q1. Solve quadratic: $2x^2 - 7x + 3 = 0$.

- a) b)
- c) d)

Q2. [Illustration: parabola] Sketch $y = x^2 - 4x + 3$.

- a) b)
- c) d)



Q3. Differentiate: $y = 3x^2 + 5x - 7$.

- a) b)
- c) d)

Q4. Integrate: $\int (2x + 3) dx$.

- a) b)
- c) d)

Q5. If $\tan \theta = 3/4$, find $\sin \theta$ and $\cos \theta$.

- a) b)
- c) d)

Q6. Two coins tossed. Probability of 2 heads?

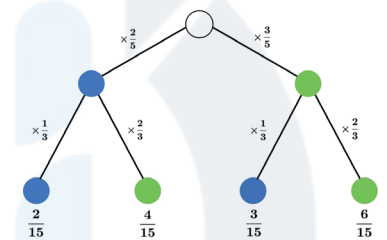
- a) b)
- c) d)

Q7. Find mean deviation of 10, 20, 30, 40, 50.

- a) b)
- c) d)

Q8. Evaluate determinant: $\begin{vmatrix} 2 & 3 \\ 1 & 4 \end{vmatrix}$.

- a) b)
- c) d)



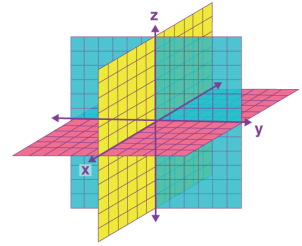
Q9. Solve inequality: $3x - 5 < 7$.

- a)  b) 

c)  d) 

Q10. Equation of line through (2,3), slope 2.

- a) b)
c) d)



Q11. Find sum of first 20 terms of AP with $a=3$, $d=5$.

- a) b)
c) d)

Q12. Matrix multiplication: $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$.

- a)  b) 

c)  d) 

Q13. Volume of cone with $r=7$, $h=10$.

- a)  b) 

c)  d) 



Q14. If $P(A)=0.4$, $P(B)=0.5$, $P(A \cap B)=0.2$, find $P(A \cup B)$.

- a) b)
c) d)

Q15. Evaluate $\log_n 16$.

- a) b)
c) d)

Q16. Solve system: $x+y=5$, $x-y=3$.

- a) b)
c) d)

Q17. What % lies within 1s?

- a) ☐ b) ☐
 c) ☐ d) ☐



Q18. Differentiate $\sin x \cos x$.

a)

c)

b)

d)

Q19. Find limit: $\lim_{x \rightarrow 0} (\sin x / x)$.

a)

c)

b)

d)

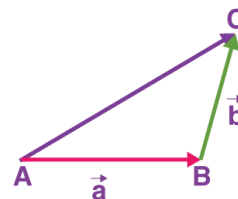
Q20. Find $|a+b|$ if $a=(3,4)$, $b=(1,2)$.

a)

c)

b)

d)



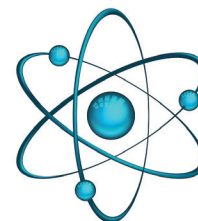
SCIENCE SECTION

Q21. State Newton's law of gravitation.

- a) b)
- c) d)

Q22. Difference between isotopes and isobars.

- a) b)
- c) d)



Q23. Write balanced equation of photosynthesis.

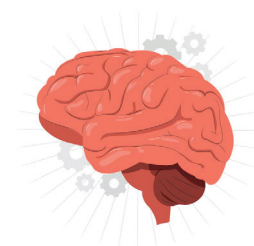
- a) b)
- c) d)

Q24. Define electrolysis with example.

- a) b)
- c) d)

Q25. Which part controls voluntary actions?

- a) b)
- c) d)



Q26. What is nuclear fusion?

- a) b)
- c) d)

Q27. State Ohm's law and its graph.

- a) b)
- c) d)

Q28. Define mutation.

- a) b)
- c) d)

Q29. Explain greenhouse effect.

- a) b)
- c) d)

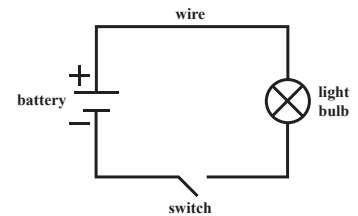
Q30. Calculate molarity of solution with 2 moles solute in 1L solution.

- a) b)
- c) d)



Q31. What happens in series resistance?

- a) b)
- c) d)



Q32. Define half-life of radioactive substance.

- a) b)
- c) d)

Q33. Name organelle with ribosomes attached.

- a) b)
- c) d)

Q34. Which planet has tilted axis $\sim 98^\circ$?

- a) b)
- c) d)



Q35. Explain law of conservation of mass with example.

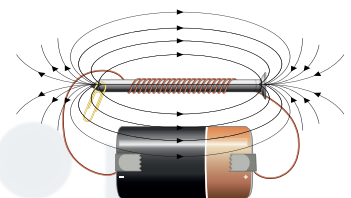
- a) b)
- c) d)

Q36. Define enzymes and give one example.

- a) b)
- c) d)

Q37. How increase strength of electromagnet?

- a) b)
- c) d)



Q38. What is resonance in physics?

- a) b)
- c) d)

Q39. Explain ozone depletion causes.

- a) b)
- c) d)

Q40. Which vitamin deficiency causes night blindness?

- a) b)
- c) d)

ENGLISH SECTION

Q41. Read passage 'A Piece of String'. What was author's intent?

- a) b)
- c) d)

Q42. Which is synonym of 'meticulous'?

- a) b)
- c) d)

Q43. Fill blank: He has been working here ____ five years. (since/for)

- a) b)
- c) d)

Q44. Odd one out:

- a) Pensive b) Elated
- c) Slowly d) Joyful

Q45. Which is antonym of 'permanent'?

- a) b)
- c) d)

Q46. Identify figure of speech: 'The silence was deafening'.

- a) b)
- c) d)

Q47. Fill blank: The committee ____ made its decision. (has/have)

- a) b)
- c) d)

Q48. Correct spelling:

- a) Privilege b) Privelege
- c) Privilage

Q49. Read passage 'The Necklace'. Why did Madame Loisel suffer?

- a) b)
- c) d)

Q50. Which pronoun replaces 'Ahmed and I'?

- a) b)
- c) d)

Q51. Fill blank: If he ____ harder, he could have passed. (study/studied)

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q52. Which is synonym of 'arduous'?

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q53. Identify tense: They had been waiting for two hours.

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q54. Choose best title for passage on honesty.

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q55. Which punctuation shows possession?

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q56. Odd one out:

- | | |
|------------|-------------|
| a) Teacher | b) Engineer |
| c) Slowly | d) Doctor |

Q57. Correct form: She is more intelligent ____ her friend. (then/than)

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q58. Which is antonym of 'generous'?

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q59. Identify figure of speech: 'The stars winked at us'.

- | | |
|----|----|
| a) | b) |
| c) | d) |

Q60. Which part of speech: Courage is admirable.

- | | |
|----|----|
| a) | b) |
| c) | d) |

GENERAL KNOWLEDGE SECTION

Q61. Which is smallest continent?

- a)
- c)

- b)
- d)



Q62. Who discovered electron?

- a)
- c)

- b)
- d)

Q63. Which war ended in 1918?

- a)
- c)

- b)
- d)

Q64. In which city is it located?

- a)
- c)

- b)
- d)



Q65. Capital of Australia?

- a)
- c)

- b)
- d)

Q66. Who was first Nobel Prize winner in Physics?

- a)
- c)

- b)
- d)

Q67. How many permanent members in UN Security Council?

- a)
- c)

- b)
- d)



United Nations

Q68. Which strait separates Asia and Africa?

- a)
- c)

- b)
- d)

Q69. Who wrote 'Paradise Lost'?

- a)
- c)

- b)
- d)

Q70. Which country hosted 2020 Summer Olympics?

- a)
- c)

- b)
- d)

Q71. Height of Mount Everest?

- a)
- c)

- b)
- d)



Q72. Who was first woman to win Nobel Prize?

- a)
- c)

- b)
- d)

Q73. Name currency of UK.

- a)
- c)

- b)
- d)

Q74. Identify country.

- a)
- c)

- b)
- d)



Q75. Who invented light bulb?

- a)
- c)

- b)
- d)

Q76. Capital city of Saudi Arabia?

- a)
- c)

- b)
- d)

Q77. Name line dividing N/S hemispheres.

- a)
- c)

- b)
- d)



Q78. Who developed periodic table?

- a)
- c)

- b)
- d)

Q79. Treaty signed at end of WW2?

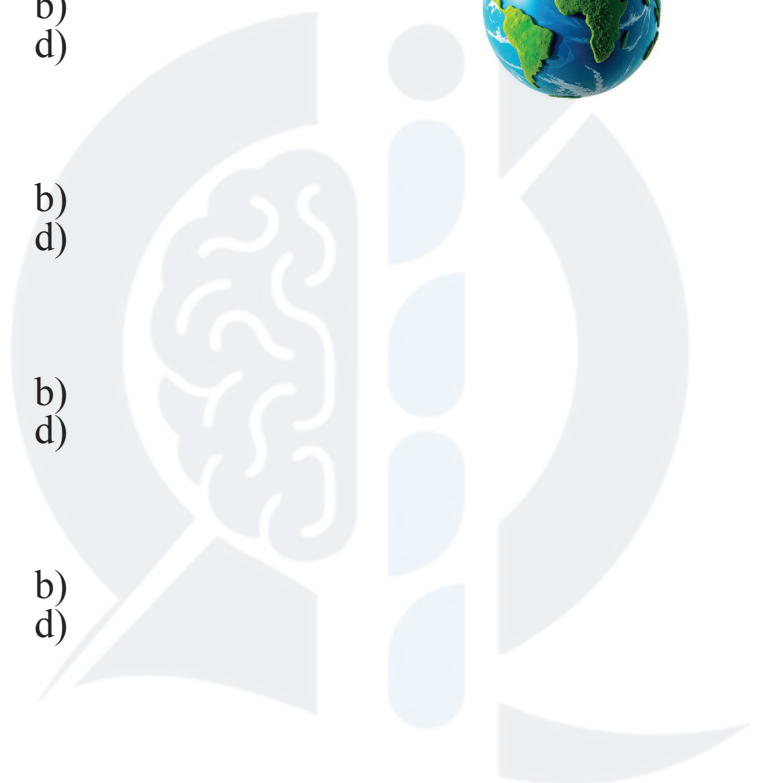
- a)
- c)

- b)
- d)

Q80. Who was first President of India?

- a)
- c)

- b)
- d)

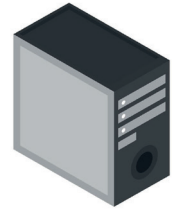


INFORMATION TECHNOLOGY SECTION

Q81. Expand CPU.

- a)
- c)

- b)
- d)



Q82. What is cloud computing?

- a)
- c)

- b)
- d)

Q83. Expand VPN.

- a)
- c)

- b)
- d)



Q84. Difference between compiler and interpreter.

- a)
- c)

- b)
- d)

Q85. Shortcut to undo in Windows?

- a)
- c)

- b)
- d)



Q86. Define phishing with example.

- a)
- c)

- b)
- d)

Q87. Which software is used for database management?

- a)
- c)

- b)
- d)

Q88. Name two mobile OS.

- a)
- c)

- b)
- d)



Q89. Expand SQL.

- a)
- c)

- b)
- d)

Q90. Function of cache memory?

- a)
- c)

- b)
- d)

Q91. Expand SMTP.

- a)
- c)

- b)
- d)



Q92. Shortcut to find text in Windows apps?

- a)
- c)

- b)
- d)

Q93. What is blockchain?

- a)
- c)

- b)
- d)

Q94. Maximum speed of USB 3.0?

- a)
- c)

- b)
- d)



Q95. Expand URL and IP.

- a)
- c)

- b)
- d)

Q96. Example of system software.

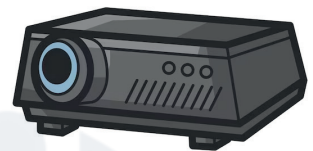
- a)
- c)

- b)
- d)

Q97. Device used for online presentations?

- a)
- c)

- b)
- d)



Q98. Define machine learning.

- a)
- c)

- b)
- d)

Q99. Expand HTTP/HTTPS.

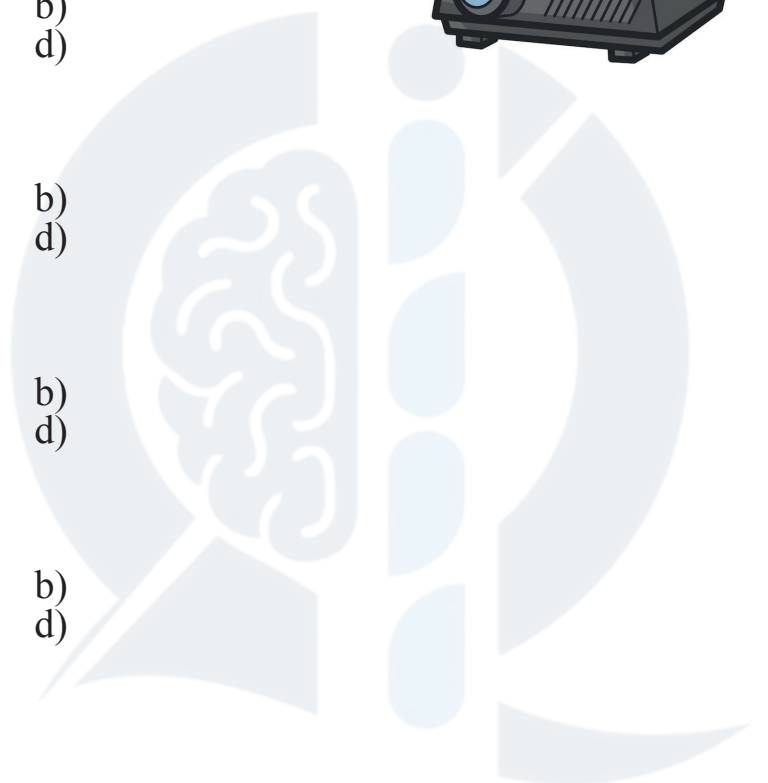
- a)
- c)

- b)
- d)

Q100. Which company developed iOS?

- a)
- c)

- b)
- d)



ANSWER KEY

MATHEMATICS SECTION

Q1: $x=3, x=1/2$

Reasoning: $2x^2-7x+3=0 \Rightarrow (2x-1)(x-3)=0$.

Q2: Parabola with vertex (2,-1)

Reasoning: Complete square: $(x-2)^2-1$.

Q3: $dy/dx = 6x+5$

Reasoning: Differentiate term-wise.

Q4: x^2+3x+C

Reasoning: $\int (2x)dx=x^2, \int 3dx=3x + C$.

Q5: $\sin\theta=3/5, \cos\theta=4/5$

Reasoning: Right triangle with legs 3,4, hyp 5.

Q6: $1/4$

Reasoning: Outcomes HH, HT, TH, TT $\Rightarrow P(HH)=1/4$.

Q7: 12

Reasoning: Mean=30; deviations sum= $|20|+|10|+0+10+20=60$; MD=60/5=12.

Q8: 5

Reasoning: Determinant = $2 \times 4 - 3 \times 1 = 5$.

Q9: $x < 4$

Reasoning: $3x-5 < 7 \Rightarrow 3x < 12 \Rightarrow x < 4$.

Q10: $y-3=2(x-2)$

Reasoning: Point-slope form with slope 2.

Q11: $S_n = (n/2)[2a+(n-1)d] \Rightarrow S_{20} = (20/2)[2 \cdot 3 + 19 \cdot 5] = 10(6+95) = 1010$

Reasoning: AP sum formula.

Q12: $[[4,4],[10,8]]$

Reasoning: Matrix multiply: $[[1 \cdot 2 + 2 \cdot 1, 1 \cdot 0 + 2 \cdot 2], [3 \cdot 2 + 4 \cdot 1, 3 \cdot 0 + 4 \cdot 2]]$.

Q13: $\approx 513.33 \text{ cm}^3$

Reasoning: $V = n\pi r^2 h = n \cdot (22/7) \cdot 49 \cdot 10 \approx 513.33$.

Q14: 0.7

Reasoning: $P(A \cap B) = P(A) + P(B) - P(A \cup B) = 0.4 + 0.5 - 0.2 = 0.7$.

Q15: 4

Reasoning: $\log_2 16 = 4$.

Q16: $x=4, y=1$

Reasoning: Add/subtract equations: $2x=8 \Rightarrow x=4$; then $y=1$.

Q17: $\approx 68\%$

Reasoning: Empirical rule: $\sim 68\%$ within 1s.

Q18: $\cos 2x$

Reasoning: Using $\sin x \cos x = \frac{1}{2} \sin 2x \Rightarrow \text{derivative} = \frac{1}{2} \cdot 2 \cos 2x$.

Q19: 1

Reasoning: Standard limit $\lim (\sin x/x) = 1$.

Q20: $\vec{O}((3+1)^2 + (4+2)^2) = \vec{O}(4^2 + 6^2) = \vec{O}52 \approx 7.211$

Reasoning: Vector addition then magnitude.

SCIENCE SECTION

Q21: $F = G \frac{m_1 m_2}{r^2}$

Reasoning: Universal gravitation law.

Q22: Isotopes: same Z diff A ; Isobars: same A diff Z

Reasoning: Definitions with nucleon/proton counts.

Q23: $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

Reasoning: Balanced photosynthesis.

Q24: Decomposition via electric current; e.g., electrolysis of water

Reasoning: Definition + example.

Q25: Cerebrum

Reasoning: Controls voluntary actions.

Q26: Fusion: combining light nuclei (e.g., $\text{H} + \text{H} \rightarrow \text{He}$) releasing energy

Reasoning: Definition.

Q27: $V = IR$; straight line through origin, slope = $1/R$

Reasoning: Ohm's law with $V-I$ graph.

Q28: Heritable change in DNA sequence

Reasoning: Definition.

Q29: Heat trapped by greenhouse gases raising temperature

Reasoning: Mechanism summary.

Q30: 2 M

Reasoning: Moles/volume = $2/1 = 2$ M.

Q31: $R_{\text{total}} = R_1 + R_2 + \dots$ (increases); current same in all

Reasoning: Series resistance behavior.

Q32: Time for activity to fall to half

Reasoning: Definition.

Q33: Rough ER

Reasoning: RER has ribosomes attached.

Q34: Uranus

Reasoning: Axial tilt $\approx 98^\circ$.

Q35: Mass conserved before/after reaction; e.g., closed-system reaction

Reasoning: Explanation.

Q36: Biological catalysts; e.g., amylase

Reasoning: Definition + example.

Q37: Increase turns, current, or use soft iron core

Reasoning: Ways to strengthen electromagnet.

Q38: Large amplitude oscillation at natural frequency

Reasoning: Definition.

Q39: CFCs, NO_x , halons cause ozone layer thinning

Reasoning: Causes.

Q40: Vitamin A

Reasoning: Night blindness = Vit A deficiency.



ENGLISH SECTION

Q41: Critique of suspicion and social judgment

Reasoning: Intent/theme explanation.

Q42: Precise

Reasoning: Synonym of meticulous.

Q43: for

Reasoning: 'for five years' with perfect continuous.

Q44: Slowly

Reasoning: Others are emotions/moods.

Q45: Temporary

Reasoning: Antonym of permanent.

Q46: Oxymoron/Hyperbole (accepted as oxymoronic expression)

Reasoning: Commonly treated as oxymoron-like emphasis.

Q47: has

Reasoning: Collective noun as a unit ® singular verb.

Q48: a

Reasoning: Correct spelling: Privilege.

Q49: Vanity and materialism led to suffering

Reasoning: Core reason.

Q50: We

Reasoning: 'Ahmed and I' ® We.

Q51: studied

Reasoning: Had he studied... (past perfect condition).

Q52: Strenuous

Reasoning: Synonym of arduous.

Q53: Past perfect continuous

Reasoning: 'Had been waiting' tense.

Q54: Honesty Prevails

Reasoning: Suitable concise title.

Q55: Apostrophe (')

Reasoning: Shows possession.

Q56: Slowly

Reasoning: Others are professions.

Q57: than

Reasoning: Comparative uses 'than'.

Q58: Stingy

Reasoning: Antonym of generous.

Q59: Personification

Reasoning: Stars 'winked' = personification.

Q60: Noun (abstract)

Reasoning: 'Courage' is abstract noun.



GENERAL KNOWLEDGE SECTION

Q61: Australia

Reasoning: Smallest continent by area.

Q62: J. J. Thomson

Reasoning: Discovered electron.

Q63: World War I

Reasoning: Ended in 1918.

Q64: New York City

Reasoning: Statue of Liberty in NYC.

Q65: Canberra

Reasoning: Capital of Australia.

Q66: Wilhelm Röntgen (Physics, 1901)

Reasoning: First Nobel Physics laureate.

Q67: 5

Reasoning: P5: China, France, Russia, UK, USA.

Q68: Suez (Isthmus/Canal) / Strait of Gibraltar separates Europe–Africa; correct for Asia–Africa: Suez canal/Red Sea connection

Reasoning: Common answer: Suez (via Isthmus).

Q69: John Milton

Reasoning: Author of Paradise Lost.

Q70: Japan

Reasoning: Tokyo 2020 (held 2021) in Japan.

Q71: 8,848.86 m (approx.)

Reasoning: Modern surveyed height around 8,848.86 m.

Q72: Marie Curie

Reasoning: First woman Nobel laureate.

Q73: Pound sterling (GBP)

Reasoning: UK currency.

Q74: Canada

Reasoning: Flag with maple leaf.

Q75: Thomas Edison

Reasoning: Credited with practical light bulb.

Q76: Riyadh

Reasoning: Capital of Saudi Arabia.

Q77: Equator

Reasoning: Divides Northern/Southern hemispheres.

Q78: Dmitri Mendeleev

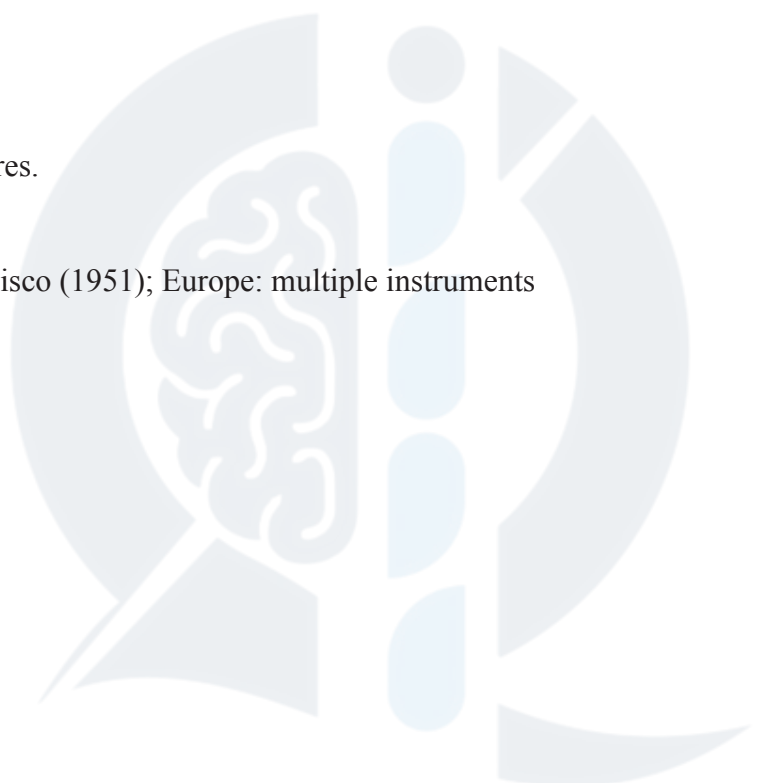
Reasoning: Developed periodic table.

Q79: No single treaty; Japan: Treaty of San Francisco (1951); Europe: multiple instruments

Reasoning: Post-WW2 settlements varied.

Q80: Rajendra Prasad

Reasoning: First President of India.



INFORMATION TECHNOLOGY SECTION

Q81: Central Processing Unit

Reasoning: CPU expansion.

Q82: On-demand computing resources over the internet

Reasoning: Cloud definition.

Q83: Virtual Private Network

Reasoning: VPN expansion.

Q84: Compiler translates whole program; interpreter line by line

Reasoning: Difference.

Q85: Ctrl+Z

Reasoning: Undo shortcut in Windows.

Q86: Fraud to steal data via deceptive messages/sites

Reasoning: Phishing definition.

Q87: MySQL/Oracle/PostgreSQL/MS SQL Server

Reasoning: DBMS examples.

Q88: Android, iOS

Reasoning: Common mobile OS.

Q89: Structured Query Language

Reasoning: SQL expansion.

Q90: Stores frequently used data for speed

Reasoning: Cache function.

Q91: Simple Mail Transfer Protocol

Reasoning: SMTP expansion.

Q92: Ctrl+F

Reasoning: Find shortcut.

Q93: Distributed ledger secured by cryptography

Reasoning: Blockchain definition.

Q94: Up to 5 Gbit/s (theoretical)

Reasoning: USB 3.0 speed.

Q95: Uniform Resource Locator; Internet Protocol

Reasoning: Expansions.

Q96: Operating system (e.g., Windows/Linux)

Reasoning: System software example.

Q97: Projector

Reasoning: Used for online presentations.

Q98: Algorithms that learn patterns from data

Reasoning: ML definition.

Q99: HyperText Transfer Protocol / Secure

Reasoning: HTTP/HTTPS expansions.

Q100: Apple

Reasoning: iOS developed by Apple.

