## QUANTITATIVE APTITUDE

1. (3) By the Pythagoras theorem
$yx^2 = 225 - 144$
$\Rightarrow yx = \sqrt{81} = 9$ cm
$\therefore \cos Y = \frac{yx}{yz}$
$= \frac{9}{15} = \frac{3}{5}$

2. (1) $8x^3 + 80x^2 + 200x = 8x(x^2 + 10x + 25) = 8x(x+5)(x+5)$
$4x^4 + 16x^3 - 20x^2 = 4x^2(x^2 + 4x - 5)$
$= 4x^2(x+5)(x-1)$
$\therefore$ LCM $= 8x^2(x+5)^2(x-1)$

3. (4) Let, efficiency of man = m and efficiency of women = w
$(25m + 45w)15 = (15m + 60w)20$
$\Rightarrow 75m + 135w = 60m + 240w$
$\Rightarrow 15m = 105w$
$\Rightarrow \frac{m}{w} = \frac{7}{1}$
ATQ,
$(25m+45w)15 = (69m+67w)x$
$\Rightarrow (175+45)15 = (69\times7+67)x$
$\Rightarrow 220\times15 = 550\times x$
$\Rightarrow x = \frac{220\times15}{550} = \frac{15\times2}{5}$
$\Rightarrow x = 6$ days

4. (1) Ratio of speed of P and Q = 1500 : 1100 = 15 : 11
ATQ,
$\frac{1500}{15x} = \frac{1300}{11x} - 8$
$\Rightarrow 8 = \frac{1300}{11x} - \frac{100}{x}$
$\Rightarrow 8 = \frac{200}{11x}$
$x = \frac{25}{11}$
Time taken by P to run 1500 m
$= \frac{1500}{\frac{25}{11}\times15} = 44$ sec.

5. (1) $\tan A - \tan B - \tan C = \tan A \tan B \tan C$
$\Rightarrow \tan A - \tan A.\tan B.\tan C = \tan B + \tan C$
$\Rightarrow \tan A(1 - \tan B \tan C) = \tan B + \tan C$
$\Rightarrow t\ anA = \frac{\tan B + \tan C}{1 - \tan B \tan C}$
$\Rightarrow \tan A = \tan(B+C)$
$\Rightarrow A = B + C$

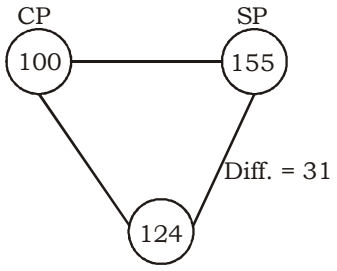
6. (4) ATQ,
K : L
175 : 350
Required percentage
$= \frac{175}{350}\times100 = 50\%$

7. (1) Volume of hemisphere $= \frac{2}{3}\pi r^3$
$= \frac{2}{3}\times\frac{22}{7}\times\frac{35}{2}\times\frac{35}{2}\times\frac{35}{2}$
$= \frac{1225\times55}{3\times2} = 11229.7\ cm^3$

8. (4) Let the worth of third variety of wheat = x Rs./kg.
ATQ, $80+100+3x = 75\times6$
$180+3x = 450$
$\Rightarrow 60+x = 150$
$\Rightarrow x = 90$

9. (1) Mean proportion of 6 and 54
$= \sqrt{6\times54} = \sqrt{324} = 18$
Required value $= 18 - 15 = 3$

10. (2) ATQ,




$\therefore$ Required profit $= \frac{31}{124}\times100 = 25\%$

11. (2) Weight % in 2018–2022 $= \frac{54\times100}{147+54+63+24} = \frac{5400}{208}$
$= 18.75\%$
peak consumption = 18.75%

12. (2) R = 6+0.37 = 6.37 cm
Outer covered surface area $= 2\pi R^2$
$= 2\times\frac{22}{7}\times6.37\times6.37$
$= 44\times\frac{91}{100}\times\frac{637}{100}$
$= \frac{2550548}{10000} = 255.0548\ cm^2$

13. (4) Given, $\tan^2\alpha = 3 + Q^2$
Now, $\sec\alpha + \tan^3\alpha\ \text{cosec}\ \alpha$
$= \sec\alpha + \frac{\sin\alpha}{\cos}.\tan^2\alpha\frac{1}{\sin\propto}$
$\sec\alpha(1+\tan^2\alpha)$
$= \sqrt{1+\tan^2\propto} = (1+\tan^2\alpha)$
$= (1+\tan^2\alpha)^{\frac{3}{2}} = (4+Q^2)^{\frac{3}{2}}$

14. (4) Height of equilateral triangle
$= \frac{\sqrt{3}}{2}a = 9\sqrt{3}$ cm
$\Rightarrow a = 18$ cm
Area of equilateral triangle
$= \frac{\sqrt{3}}{4}\times18\times18 = 81\sqrt{3}\ cm^2$

15. (3) Ratio of angles of triangle = 1 : 2 : 3
ATQ, 6 units = 180°
1 unit = 30°
3 units = 90°
$\therefore$ It is a right angle triangle

16. (4) Average production of P
$= \frac{30+50+20+40+10}{5}$
$= \frac{150}{5} = 30$
Average production of Q
$= \frac{20+40+30+50+30}{5} = \frac{170}{5}$
Average production of R
$= \frac{40+30+50+20+50}{5} = \frac{190}{5} = 38$
The highest average production is in R country.

17. (2) ATQ,
(100–77)% = 920
$\Rightarrow$ 23% = 920
$\Rightarrow$ 1% = 40
$\Rightarrow$ 100 = 4000

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18. (4) $7x+4\left\{x^2 \div \left(5x^2 \div 10\right)\right\} -$

$$3\left\{5\frac{1}{3} - x^3 \div \left(3x^2 \div x\right)^2\right\} = 0$$

$$\Rightarrow \quad 7x+4\left\{x^2 \div \left(\frac{5x}{10}\right)\right\} - 3\left\{\frac{16}{3} - \frac{x^2}{3}\right\} = 0$$

$\Rightarrow 7x + 8x - 16 + x^2 = 0$
$\Rightarrow x^2 + 15x - 16 = 0$
$\Rightarrow (x + 16)(x - 1) = 0$
$\Rightarrow x = 16, 1 = 17$
Difference of values of a = 1–(–16)

19. (1) $k = 42\times25\times54\times135$, 3a is divisible .
$k = 42\times25\times54\times27\times2\times27\times5$
$3^7\times14\times25\times2$
The greatest value of A = 7

20. (4) $x^2+y^2+2y+4x+5 = 0$
$x^2+y^2 = -4x-2y-5$
$= 2(-2x-y)-5$
$\therefore$ Values of x = –2 and y = –1

$$\therefore \frac{x+y}{x-y} = \frac{-2-1}{-2+1} = 3$$

21. (3) ATQ,

$$x\times\frac{30}{100}\times\frac{115}{100}\times\frac{60}{100} = 179400$$

$$x = \frac{179400\times100\times100}{13\times115\times6}$$

$$x = \frac{1794\times100000}{13\times69}$$

$x = 200000$

Alternatively:-

$$30\% = \frac{3}{10},\ 15\% = \frac{3}{20},\ 40\% = \frac{2}{5}$$

10 : 13
20 : 23
5 : 3
1000 : 897
897 unit = 179400
1 unit = 200
1000 unit = 200000

22. (2) $\dfrac{(x-y)^3+(y-z)^3+(z-x)^3}{6(x-y)(y-z)(z-x)}$

We know that
$a^3 + b^3 + c^3 = 3abc$
Whom $a + b + c = 0$
$x - y + y - z + z - x = 0$
$\therefore (x - y)^3 + y\ (y - z)\ (z - x)^3 =$
$3\ (x - 4)\ (y - z)\ (z - x)$

$$= \frac{3(x-y)(y-z)(z-x)}{6(x-y)(y-z)(z-x)} = \frac{1}{2}$$

Alternatively:-
$x = 0, y=1, z = 2$

$$\frac{(0-1)^3+(1-2)^3+(2-0)^3}{6(0-1)(1-2)(2-0)}$$

$$\Rightarrow \frac{-1-1+8}{6\times2} = \frac{6}{6\times2} \Rightarrow \frac{1}{2}$$

23. (3) ATQ,
$F_2 : F_4 = 450 : 150$
Required percentage =

$$\frac{450}{150}\times100$$

=
300%

24. (4) ATQ,
Final amount paid

$$= 2500\times\frac{95}{100}\times\frac{90}{100} =$$

2137.5

Alternatively:-
5%, 10% Discount

$$5\% = \frac{1}{20},\ 10\% = \frac{1}{10}$$

MP : SP
20 : 19
10 : 9
200 : 171
$\therefore$ 200 units = 2500

$$\text{and 171 units} = \frac{2500}{200}\times171$$

= 2137.5

25. (3) ATQ,
$2\pi R = 220$ cm

$$2\times\frac{22}{7}\times R = 220$$

R = 35 cm

1. (3) 2. (1) 3. (4) 4. (1) 5. (1)
6. (4) 7. (1) 8. (4) 9. (1) 10.(2)
11.(2) 12.(2) 13.(4) 14.(4) 15.(3)
16.(4) 17.(2) 18.(4) 19.(2) 20.(4)
21.(*) 22.(2) 23.(3) 24.(4) 25.(3)

## GENERAL AWARENESS

1. (3)
Pankaj Charan Das - Odissi
Sunanda Nair - Mohiniyattam
Raja Reddy - Kuchipudi

2. (3)
Arvind Krishna - CEO of IBM
Vijay Shekhar Sharma - CEO of Paytm
Lok Sabha Seats in Delhi - 7
Rajya Sabha Seats in Delhi - 3
Vidhan Sabha Seats in Delhi - 70

3. (3) The earth's layer is divided into four parts - Crust, Mantle, Outer Core and Inner Core. Earth's magnetic field is generated by the liquid outer Core.

4. (3)

5. (1) Guru Deba Prasad was Odissi dancer. The institute TRIDHARA organizes the Award festival. Kalidas Samman is an art award presented annually by the Madhya Pradesh Government. It was first awarded in 1980 and then in every alternate year. From 1986-87 onwards, it is given every year. In 2020, Sangeeta Kalanidhi and Aruna Sairam (music) were awarded. Bharat Muni Samman is given by Kalingagana Touryatrikam organization. In 2012, it was given to Hema Malini.

6. (3) Governor - Arif Mohammad Khan
Chief Minister - Pinarayi Vijayan
Lok Sabha Seats - 20
Rajya Sabha Seats - 9

7. (3) Newton - Force
Watt - Power
Joule - Energy

8. (1) Pallava (275 CE to 897 CE) - Simha Vishnu, Mahendra Verman I, Narasimha I, Chalukya (543 AD to 753 AD) - Pulakesin I, II, Kiritivarman I, Vikarmaditya I

9. (3) CPCL is formed as a joint venture in 1965 between the GOI, AMOCO and National Iranian Oil Company, having shareholding in ratios 74%, 13% and 13% respectively.
Chairman - Shrikant Madhav Vaidya
M.D. - Arvind Kumar

10. (3) **Dalton's Law -** The total pressure of a mixture of gases is equal to the sum of the partial pressure of the individual component gases.

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**Gay lussac's Law -** The pressure exerted by a gas varies directly with the absolute temperature of the gas.

**Charles's Law -** The volume of an ideal gas is directly proportional to the absolute temperature at constant pressure.

11. (1) Tripartite struggle also known as the Kannauj triangle wars for control of northern India took place in 9th century. Pratihara Rajputs annexed the Kannauj, as the result of war.

12. (1) Anthracite - The highest rank of coal. It is hard Coal. It is used for domestic fuel in either hand-fired stoves or automatic stoker furnaces.
Lignite is also known as brown coal. It has carbon content of 25-35% and is considered lowest rank of coal due to its relatively low heat content.

13. (2) ICC Women's Cricket World Cup, 2025 will be held in Malaysia and Thailand.

14. (2) Mariana Trench is the deepest trench on the Earth.
The Pacific Ocean, Atlantic Ocean, Indian Ocean, Southern Ocean and Arctic Ocean are five major oceans according to size.

15. (1) Quorum - the minimum number of members required to be present before a meeting is allowed to begin.
The Quorum to establish the sitting of the house is one-tenth of the total number of members of the House, for both Lok Sabha as well as Rajya Sabha.

16. (3) $M_1$ money supply - currency with public + demand deposits with Banks (saving account, current account).
$M_2$ money supply - $M_1$ + savings deposits of post office savings banks.
$M_3$ money supply - $M_1$ + Time deposits with the banking system.
$M_4$ - $M_3$ + Total deposits with Post Office saving organisations.

17. (4) India won 10 Golds in Olympics. The men's hockey won 8 gold (1928, 1932, 1936, 1948, 1952, 1956, 1964 and 1980) of them.
Abhinav Bindra (2008) in 10 meter air rifle shooting and Neeraj Chopra (2020) in Javelin throw won individual Golds.

18. (3) By Amending Article 326 of the Constitution, the age of voting was lowered from 21 to 18 years through 61th Amendment Act, 1988. It was introduced by B. Shankaranand.

19. (4) Second Five Year Plan (1956-1961) driven by P.C. Mahalanobis (The founder of Indian Statistical Institute). The planning commission has been replaced with NITI Aayog in 2014.

20. (3) Grammy Award for Best Contemporary World Music Album was first awarded in 2004 and last awarded in 2011. In 2011, Bela won for 'Throw Down Your Heart'. Golden Drum Project is an album by Mickey Hart, Zakkir Hussain, Siqiru Adepoju and Giovanni Hidalgo.

21. (4) **Article 76 -** Attorney General of India
Dhananjaya Y. Chandrachud - CJI
Rishi Sunak - PM of UK

22. (1) Coke cell protects plants from external injury to some extent.
Epidermal cells protect against invasion of bacteria and foreign particles and regulate the amount of water released from the body.
Guard cells control gas diffusion by regulating the opening and closure of stomatal pores.

23. (3) Uma Sharma - Kathak dancer.

24. (1) **Five Tamil Epics -**
i) Gilappatikaram - Kannaki and Kovalan
ii) Civaka Cintamani - Prince and his wives
iii) Kundalakesi - love, marriage, getting tired with partner and then murder.
iv) Mahimekalai - Koualan and Madhavi's daughter
v) Valaiyapadhi - A father who has two wives

25. (3) Canning - First viceroy of India.

1. (3) 2. (3) 3. (3) 4. (3) 5. (1)
6. (3) 7. (3) 8. (1) 9. (3) 10.(3)
11.(1) 12.(1) 13.(2) 14.(2) 15.(1)
16.(3) 17.(4) 18.(3) 19.(4) 20.(3)
21.(4) 22.(1) 23.(3) 24.(1) 25.(3)

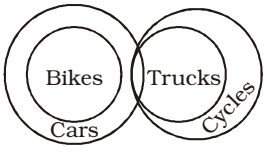
## GENERAL INTELLIGENCE & REASONING

1.(3)
N T S
↓–4 ↓+6 ↓+13
J Z F
↓–4 ↓+6 ↓+13
F F S
↓–4 ↓+6 ↓+13
B L F
↓–4 ↓+6 ↓+13
**X R S**

2.(1) The order of words in a dictionary is
3. Nation
4. National
5. Nationalism – third position
2. Nationality
1. Native
(Wrong answer by commission)

3.(1)
C O M P L E X
O C X E L P M
B A L A N C E
A B E C N A L
A I R L I N E
I A E NIL R

4.(4) The possible venn diagram is




5.(2) Only conclusion I and II follow.

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6.(3)

7.(1)

| | | | |
|---|---|---|---|
| A | Z | B | Y |
| ↓+1 | ↓–1 | ↓+1 | ↓–1 |
| B | Y | C | X |
| ↓+1 | ↓–1 | ↓+1 | ↓–1 |
| C | X | D | W |
| ↓+1 | ↓–1 | ↓+1 | ↓–1 |
| D | W | E | V |
| ↓+1 | ↓–1 | ↓+1 | ↓–1 |
| E | V | F | U |

8.(1) 17×2+24 = 58
26×2+37 = 89
15×2+17 = 47

9.(3) From fig (1) and (3)

$5 \overset{4-1}{\underset{6-2}{\nearrow\searrow}}$

5 ↔ 3
4 ↔ 6
1 ↔ 2

10.(3)

480, 240, 120, 60, 30, 15
×½ ×½ ×½ ×½ ×½

11.(1) $13\times\frac{6}{2} = 39$

$9\times\frac{4}{2} = 18$

$12\times\frac{8}{2} = 48$

12.(2) By hit and trial method
7×4÷14+12+30 = 50
Interchanging 7, 14
⇒ 14×4÷7+12+30 = 50
⇒ 8+12+30 = 50
⇒ 50 = 50

13.(4)

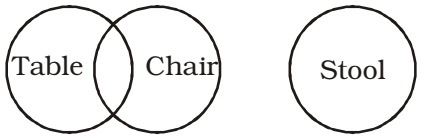
14.(4)

| | | | | | |
|---|---|---|---|---|---|
| C | A | B | L | E | S |
| ↓+2 | ↓+2 | ↓+2 | +2↘ | +2↓ | +2↙ |
| E | C | D | U | C | N |

| | | | | | |
|---|---|---|---|---|---|
| P | H | O | N | E | S |
| ↓+2 | ↓+2 | ↓+2 | +2↘ | +2↓ | +2↙ |
| R | J | Q | U | G | P |

| | | | | | |
|---|---|---|---|---|---|
| M | O | B | I | L | E |
| ↓+2 | ↓+2 | ↓+2 | +2↘ | +2↓ | +2↙ |
| O | Q | B | G | N | K |

15.(4) The possible venn diagram is




16.(3)

17.(2) By hit and trial method
95÷19+5×3–6 = 22
Interchanging + and ×
95÷19×5+3–6 = 22
25–3 = 22
22 = 22

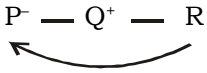
18.(1)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G | H | O | S | T | | V | V | S | M | M |
| | | | | | +2↗ | | | | | |
| | | | | | +3↗ | | | | | |
| | | | | | +4↗ | | | | | |
| | | | | | +5↗ | | | | | |
| | | | | | +6↗ | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| E | A | T | E | R | | T | H | X | F | K |
| | | | | | +2↗ | | | | | |
| | | | | | +3↗ | | | | | |
| | | | | | +4↗ | | | | | |
| | | | | | +5↗ | | | | | |
| | | | | | +6↗ | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| H | A | N | D | S | | U | G | R | F | N |
| | | | | | +2↗ | | | | | |
| | | | | | +3↗ | | | | | |
| | | | | | +4↗ | | | | | |
| | | | | | +5↗ | | | | | |
| | | | | | +6↗ | | | | | |

19.(2) By hit and trial method
P÷Q×R,




P is the sister of R.

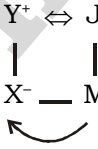
20.(2) 16×2–2 = 30
44×2–2 = 86 ≠ 84
14×2–2 = 26

21.(4) 18×2–2 = 34
(45–15)×4 = 120
(27–8)×4 = 76
(56–48)×4 = **32**

22.(3) Interchanging + and – 6 and 9
(I) 6–5×9+8÷2
⇒ 9+5×6–8÷2
⇒ 9+30–4 = **35**
(II) 6–4+9×5÷3
⇒ 9+4–6×5÷3
⇒ 13–10 = **3**

23.(I) The right answer is 1
Dogs live in kennel.
Similarly, Bees live in hive.

24.(3) X @ Y $ J * M,




25.(2) F $\overset{+5}{}$ K $\overset{+16}{}$ A
C $\overset{+7}{}$ J $\overset{+16}{}$ Z–odd
P $\overset{+5}{}$ U $\overset{+16}{}$ K
C $\overset{+5}{}$ H $\overset{+16}{}$ X

1. (3) 2. (1) 3. (1) 4. (4) 5. (2)
6. (3) 7. (1) 8. (1) 9. (3) 10.(3)
11.(1) 12.(2) 13.(4) 14.(4) 15.(4)
16.(3) 17.(2) 18.(1) 19.(2) 20.(2)
21.(4) 22.(3) 23.(1) 24.(3) 25.(2)

## ENGLISH LANGUAGE AND COMPREHENSION

15. (2) Remove "be" as it is redundant in the sentence. *You must hurry " is the correct expression.

16. (1) "beating" should replace "beat". Stand is followed by '$V_1$+ing'

1. (3) 2. (2) 3. (4) 4. (2) 5. (2)
6. (1) 7. (2) 8. (4) 9. (4) 10.(4)
11.(2) 12.(4) 13.(2) 14.(1) 15.(2)
16.(1) 17.(2) 18.(2) 19.(1) 20.(4)
21.(4) 22.(4) 23.(1) 24.(3) 25.(2)

| **Words** | **Meaning in English** | **Meaning in Hindi** |
|---|---|---|
| Enlightening | Providing or tending to provide knowledge, understanding, or insight. *Ex:- A very enlightening discussion.* | ज्ञानवर्धक |
| Mesmerizing | spellbinding, enthralling, attractive | सम्मोहित करने वाला |
| Nuisance | A person, thing or situation that annoys you or causes you trouble. | परेशानी पैदा करने वाला व्यक्ति |
| Serrated | having a row of points in V-shapes along the edge. | दाँतेदार |

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