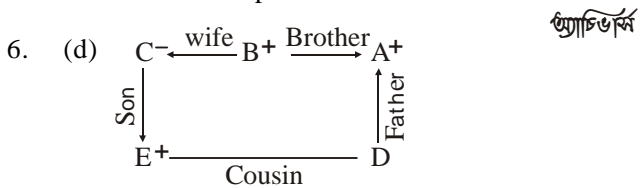


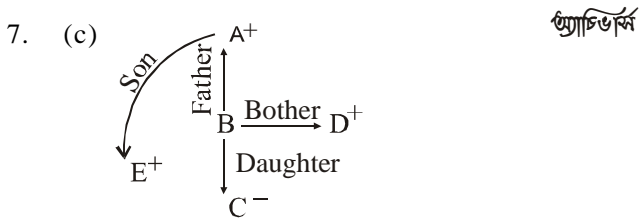
SSC CGL (Tier-I) Exam. Practice Set

Answers with Explanation

1. (a) Raw material of paper is pulp. Similarly, the raw material of rope is hemp.
2. (a) Critic evaluates book critically. Similarly, appraiser evaluates building.
3. (d) Cup is used to drink something with the help of lips. Similarly, bird collects grasses with the help of beaks to make nest.
4. (c) Umbrella protects us from rain. Similarly, dam checks flood.
5. (a) Scissors is used to cut cloth. Similarly, axe is used to chop wood.

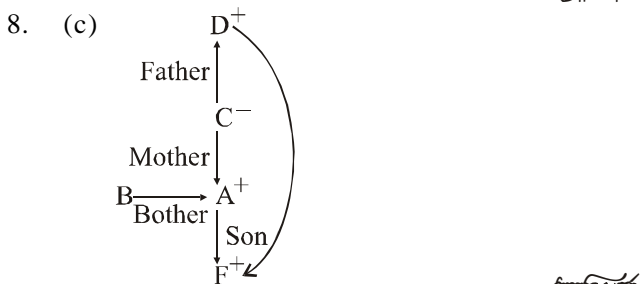


Though sex of D is not clear but clearly E+ is D's cousin.



Clearly, A is father of E, D and B of which E and D are sons and B's sex is not given and C is B's daughter hence two possibilities exist:

- (i) When B is female — then E (and also D) is maternal uncle of C. So option (3).
- (ii) When B is male — then E (and also D) is paternal uncle of C.
Hence C and E are niece and uncle respectively.
Option (3) is correct.



It is clear from above diagram that F is, son

of D's daughter C's son of A.
So, F is great grandson of D.

9. (c)

$+\Rightarrow -$	$\div\Rightarrow +$
$-\Rightarrow \times$	$\times\Rightarrow \div$

Option (a)
 $46 - 10 + 10 \times 5 = 92$
 or, $46 \times 10 - 10 \div 5 = 92$
 or, $460 - 2 \neq 92$

Option (b)
 $265 + 11 - 2 \times 14 = 22$
 or, $265 - 11 \times 2 \div 14 = 22$

or, $265 - \frac{22}{14} \neq 22$

Option (c)
 $66 \times 3 - 11 + 12 = 230$
 or, $66 \div 3 \times 11 - 12 = 230$
 or, $22 \times 11 - 12 = 230$
 or, $242 - 12 = 230$

10. (a)

$\times\Rightarrow +$	$-\Rightarrow \div$
$\div\Rightarrow -$	$+\Rightarrow \times$

Option (a)
 $25 + 10 - 5/10 \times 3 = 43$
 $\Rightarrow 25 \times 10 \div 5 - 10 + 3 = 43$
 $\Rightarrow 25 \times 2 - 10 + 3 = 43$
 $\Rightarrow 50 - 10 + 3 = 43$
 $\Rightarrow 53 - 10 = 43$

Option (b)
 $25 - 10 \times 5 + 10/3 = 72$
 $\Rightarrow 25 \div 10 + 5 \times 10 - 3 = 72$
 $\Rightarrow 2.5 + 50 - 3 = 72$
 $\Rightarrow 52.5 - 3 \neq 72$

Option (c)
 $25 \times 10/5 + 10 - 3 = 12$
 $\Rightarrow 25 + 10 - 5 \times 10 \div 3 = 12$

$\Rightarrow 25 + 10 - \frac{5 \times 10}{3} = 12$
 $\Rightarrow 25 + 10 - 16.66 = 12$
 $\Rightarrow 35 - 16.66 \neq 12$

Option (d)
 $25/10 + 5 \times 10/3 = 18$
 $\Rightarrow 25 - 10 \times 5 + 10 - 3 = 18$
 $\Rightarrow 25 - 50 + 10 - 3 = 18$
 $\Rightarrow 35 - 53 \neq 18$

11. (c)

$+\Rightarrow \times$	$-\Rightarrow \div$
$\times \Rightarrow -$	$\div \Rightarrow +$

$$16 \div 4 \times 10 - 5 + 8 = ?$$

$$\Rightarrow ? = 16 + 4 - 10 \div 5 \times 8$$

$$\Rightarrow ? = 16 + 4 - 2 \times 8$$

$$\Rightarrow ? = 16 + 4 - 16 = \boxed{4}$$

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12. (d)

$$(6)^2 = 36$$

and, $(6 + 1)^2 + 1 = 50$

Similarly,

$$(8)^2 = 64$$

and, $(8 + 1)^2 + 1 = 82$

13. (b)

$$(4)^2 = 16$$

and, $(4)^3 = 64$

Similarly,

$$(7)^2 = 49$$

and, $(7)^3 = 343$

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14. (b)

$$11 \times (11 - 1)$$

$$= 11 \times 10 = 110$$

Similarly,

$$15 \times (15 - 1)$$

$$= 15 \times 14 = 210$$

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15. (c)

There is no 'I' letter in the given word. Therefore, the word SUMMIT cannot be formed.

$\boxed{M} \boxed{E} \boxed{A} \boxed{S} \boxed{U} \boxed{R} \boxed{E} \boxed{M} \boxed{E} \boxed{N} \boxed{T} \Rightarrow \text{MASTER}$

$M \boxed{E} \boxed{A} \boxed{S} \boxed{U} \boxed{R} \boxed{E} \boxed{M} \boxed{E} \boxed{N} \boxed{T} \Rightarrow \text{EASTERN}$

$\boxed{M} \boxed{E} \boxed{A} \boxed{S} \boxed{U} \boxed{R} \boxed{E} \boxed{M} \boxed{E} \boxed{N} \boxed{T} \Rightarrow \text{MEAN}$

16. (a)

There is no 'R' letter in the given word. Therefore, the word ALERT cannot be formed.

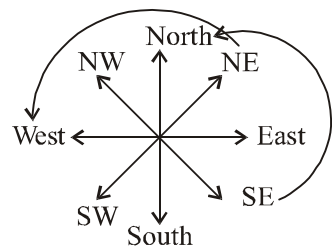
$\boxed{L} \boxed{E} \boxed{G} \boxed{A} \boxed{L} \boxed{I} \boxed{Z} \boxed{A} \boxed{T} \boxed{I} \boxed{O} \boxed{N} \Rightarrow \text{ALEGATION}$

$\boxed{L} \boxed{E} \boxed{G} \boxed{A} \boxed{L} \boxed{I} \boxed{Z} \boxed{A} \boxed{T} \boxed{I} \boxed{O} \boxed{N} \Rightarrow \text{GALLANT}$

$L \boxed{E} \boxed{G} \boxed{A} \boxed{L} \boxed{I} \boxed{Z} \boxed{A} \boxed{T} \boxed{I} \boxed{O} \boxed{N} \Rightarrow \text{NATAL}$

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17. (d)



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Clearly, South will move to the North-West.

18. (b)

Number of days from September 15, 2000 to September 15, 2001

$$= 365 + 1 = 366$$

$$366 \div 7 = 2 \text{ odd days}$$

$$\therefore \text{September 15, 2001}$$

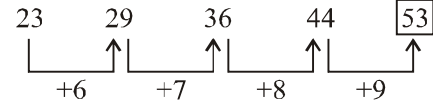
$$\Rightarrow \text{Saturday}$$

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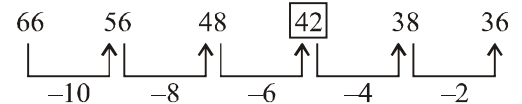
19. (b)

When it appears 6 : 30 in mirror, the real time would be 5 : 30.

20. (c)



21. (c)



22. (b)

R O S E

↓ ↓ ↓ ↓

6 8 2 1

C H A I R

↓ ↓ ↓ ↓ ↓

7 3 4 5 6

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Therefore,

S E A R C H

↓ ↓ ↓ ↓ ↓ ↓

2 1 4 6 7 3

23. (c)

Both the Premises are Universal Affirmative (A-type).

All men are women.

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All women are crazy.

A + A ⇒ A – type of Conclusion

“All men are crazy”.

This is Conclusion I.

Conclusion III is the Converse of it.

Conclusion IV is the Converse of Statement Q

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24. (c)

The product of the two diagonally opposite numbers is equal to the central number.

$$12 \times 5 = 60 \text{ and } 15 \times 4 = 60$$

$$3 \times 14 = 42 \text{ and } 7 \times 6 = 42$$

Similarly,

$$13 \times 6 = \boxed{78} \text{ and } 26 \times 3 = \boxed{78}$$

25. (d)

$$13 \times 2 = 26$$

$$26 \times 2 = \boxed{52}$$

$$24 \times 2 = 48$$

$$48 \times 2 = 96$$

$$16 \times 2 = 32$$

$$32 \times 2 = 64$$

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26. (a)

The Buddhas of Bamiyan were two 6th century monumental statues of standing

- buddha carved into the side of a cliff in the Bamyán valley in the Hazarajat region of central Afghanistan. They were dynamited and destroyed in March 2001 by the Taliban, on orders from leader Mullah Mohammed Omar, after the Taliban government declared that they were idols. On 8 September 2008 archeologists searching for a legendary 300-metre statue at the site of the already dynamited Buddhas announced the discovery of an unknown 19-metre (62-foot) reclining Buddha, a pose representing Buddha's passage into nirvana.
27. (b) Jallikattu is typically practised in the Indian state of Tamil Nadu as a part of Pongal celebrations on Mattu Pongal day. It is a traditional spectacle in which a bull is released into a crowd of people and multiple human participants attempt to grab the large hump of the bull with both arms and hang on to it while the bull attempts to escape. ଆଜ୍ଞାପତ୍ର
28. (a) The Indian Constitution borrowed such features as parliamentary form of government, introduction of Speaker and his role, the concept of single citizenship, the Rule of law, procedure of lawmaking, etc. from England. The Indian citizenship and nationality law and the Constitution of India provide single citizenship for all of India.
29. (c) Venus is sometimes called as Earth's twin planet, in terms of size and composition. Like the earth, Venus is covered with thick clouds and has an atmosphere. There is almost the same amount of gravity on Venus but the pressure on the planet is about 100 times bigger than on Earth. ଆଜ୍ଞାପତ୍ର
30. (c) Soma Mondal, chairperson of state-owned Steel Authority of India Limited (SAIL), was on March 26, 2021 elected the new chairperson of Standing Conference of Public Enterprises (SCOPE). ଆଜ୍ଞାପତ୍ର
31. (a) Some goods are known as inferior goods. With inferior goods, there is an inverse relationship between real income and the demand for the good in question. If real incomes rise, the demand for an inferior good will fall. If real incomes fall (in a recession, for instance), the demand for an inferior good will rise. Example: Bus travel. As people get richer, they are more likely to buy themselves a car, or use a taxi, rather than rely on the more inferior bus, so the demand for bus travel falls as real incomes rise.
32. (d) The Battle of Rajasthan is a battle (or series of battles) where the Hindu alliance defeated the Arab invaders in 738 CE and removed the Arab invaders and pillagers from the area east of the Indus River and protected whole India. The main Indian kings who contributed to the victory over the Arabs were the north Indian ruler Nagabhata of the Pratihara Dynasty and the south Indian Emperor Vikramaditya-II of the Chalukya dynasty in the 8th century.
33. (b) The Constitution was enacted by the Constituent Assembly on 26 November, 1949, and came into effect on 26 January, 1950. With its adoption, the Union of India officially became the modern and contemporary Republic of India and it replaced the Government of India Act 1935 as the country's fundamental governing document. ଆଜ୍ଞାପତ୍ର
34. (b) The deserts lie in the belt of the trade winds which blow from northeast in the northern hemisphere and southeast in the southern hemisphere. Therefore, the general direction of the trade winds is from the east to west. These winds shed their moisture on the eastern margins of the continents and by the time they reach the west they have lost their moisture. The hot desert climate is found around the tropics of Capricorn and Cancer, usually on the west side of continents. Examples are the Thar Desert in Pakistan and the Atacama desert in Chile. ଆଜ୍ଞାପତ୍ର
35. (a) The Battle of the Hydaspes River was fought by Alexander the Great in 326 BC against King Porus of the Hindu Paurava kingdom on the banks of the Hydaspes River (Jhelum River) in the Punjab near Bhera in what is now modern-day Pakistan. The battle resulted in a complete Macedonian victory and the annexation of the Punjab, which lay beyond the confines of the defeated Persian Empire, into the Alexandrian Empire. The battle is historically significant for opening up India for Greek political (Seleucid Empire, Indo-Greeks) and cultural influence (Greco-Buddhist art) which was to continue for many centuries.
36. (b) Union Minister for Health and Family Welfare, Dr Harsh Vardhan, addressed the 7th annual summit of NATHEALTH in virtual mode on March 26, 2021. The summit focused on 'Indian Health system expansion in post-COVID era'. ଆଜ୍ଞାପତ୍ର

37. (c) An oven that uses micro radiation waves as a source of heat in order to cook food as opposed to a fire source. Conceptualized in 1946, Dr. Perry Spencer allegedly discovered the heating properties of microwaves while studying the magnetron. A microwave oven, often colloquially shortened to microwave, is a kitchen appliance that heats food by dielectric heating accomplished with radiation used to heat polarized molecules in food. Microwave ovens heat foods quickly and efficiently because excitation is fairly uniform in the outer 25–38 mm of a dense (high water content) food item; food is more evenly heated throughout (except in thick, dense objects) than generally occurs in other cooking techniques. A microwave oven works by passing non-ionizing microwave radiation, usually at a frequency of 2.45 gigahertz (GHz)—a wavelength of 122 millimetres (4.80 in)—through the food. Microwave radiation is between common radio and infrared frequencies. অ্যাচিভমেন্ট
38. (c) The concept of Directive Principles of State Policy was borrowed from the Irish Constitution. Article 45 of the Irish Constitution outlines a number of broad principles of social and economic policy. Its provisions are, however, intended solely “for the general guidance of the Oireachtas”, and “shall not be cognizable by any Court under any of the provisions of this Constitution.”
39. (d) The Brahma Samaj was conceived at Kolkata in 1830 by Devendranath Tagore and Ram Mohan Roy as reformation of the prevailing Brahmanism of the time (specifically Kulin practices) and began the Bengal Renaissance of the 19th century. The Veda Samaj was an extremely important social reform in the Southern India established in Madras in the year 1864. Arya Samaj is a Hindu reform movement founded by Swami Dayananda on 10 April 1875 and its area of activity was mainly northern India. Prarthna Samaj, or “Prayer Society” in Sanskrit, was a movement for religious and social reform in Maharashtra based on earlier reform movements and traditions of Maharashtra. It started in Bombay and was inspired by the Brahma Samaj.
40. (a) Duncan Passage is a strait in the Indian Ocean. It is about 48 km (30 mi) wide; it separates Rutland Island (part of Great Andaman) to the north and Little Andaman to the south. West of Duncan Passage is the Bay of Bengal; east is the Andaman Sea. Several small islands and islets lie along the passage. অ্যাচিভমেন্ট
41. (a) Bauxite is an aluminium ore and is the main source of aluminium. This form of rock consists mostly of the minerals gibbsite $Al(OH)_3$, boehmite $-AlO(OH)$, and diaspore $-AlO(OH)$, in a mixture with the two iron oxides goethite and hematite, the clay mineral kaolinite, and small amounts of anatase TiO_2 . Bauxite was named after the village Les Baux in southern France, where it was first recognised as containing aluminium and named by the French geologist Pierre Berthier in 1821.
42. (c) In economics, economic equilibrium is a state of the world where economic forces are balanced and in the absence of external influences the (equilibrium) values of economic variables will not change. For example, in the standard text-book model of perfect competition, equilibrium occurs at the point at which quantity demanded and quantity supplied is equal. Equilibrium can change if there is a change in demand or supply conditions which are internal factor changes. In equilibrium, the price is endogenous because producers change their price. অ্যাচিভমেন্ট
43. (d) The World Theatre Day is celebrated all over the world on the 27 March since 1962 to promote the art form “theatre” across the world. অ্যাচিভমেন্ট
44. (c) A growth fertilizer will have a high N content and relatively low P and K content. Ammonium nitrate is the highest Nitrogen fertilizer you can buy, and it is potent stuff. It is usually rated as 33-0-0 or 34-0-0. The bag contains 33% or 34% Nitrogen and the other 66% or 67% is inert material. Other formulations of growth fertilizers will contain 5, 6 or even 7 times more Nitrogen than anything else.
45. (a) Lord Ripon’s Resolution of 18 May, 1882 is hailed as the Magna Carta of government and got for him the title of “father of local self-government in India. The resolution on local self-government recognised the twin considerations of local government: (i) administrative efficiency and (ii) political education. The Ripon Resolution, which focused on towns, provided for local bodies

consisting of a large majority of elected non-official members and presided over by a nonofficial chairperson.

46. (b) Dilwara temples of Mount Abu, Rajasthan, are famous for their Jain temples. These Jain temples were built by Tejpal, a Jain layman between the 11th and 13th centuries AD. The five legendary marble temples of Dilwara are a sacred pilgrimage place of the Jains. The Dilwara Jain temples are world famous for their stunning use of marble.
47. (b) Typhoid fever, also known as typhoid, is a common worldwide bacterial disease, transmitted by the ingestion of food or water contaminated with the feces of an infected person, which contain the bacterium *Salmonella typhi*, serotype Typhi.
48. (c) Girl Gang, a track by New Zealand singer Gin Wigmore, has been announced as the official song of the 2022 ICC Women's World Cup. The tournament is set to be hosted in New Zealand from March 4 to April 3, 2022.
49. (c) Kovalam is a beach town by the Arabian Sea in Thiruvananthapuram city, Kerala. Kovalam has three beaches separated by rocky outcroppings in its 17 km coastline; the three together form the famous crescent of the Kovalam beach.
50. (a) The fundamental rights were included in the First Draft Constitution (February 1948), the Second Draft Constitution (17 October, 1948) and final Third Draft Constitution (26 November, 1949) prepared by the Drafting Committee. The fundamental rights were included in the constitution right from its beginning because they were considered essential for the development of the personality of every individual and to preserve human dignity.
51. (b) Remainder = 4
 \Rightarrow Divisor = $3 \times 4 = 12$
 Again, divisor = $4 \times$ quotient
 $\Rightarrow 4 \times$ quotient = 12
 \Rightarrow Quotient = $\frac{12}{4} = 3$
 \Rightarrow Dividend = $3 \times 12 + 4 = 40$
52. (d) If the quotient in the first case be x .
 Then, number = $5x + 3$
 On Squaring, the number
 $= (5x + 3)^2$
 $= 25x^2 + 30x + 9$

On dividing by 5, remainder
 $= 9 - 5 = 4$

53. (d) Let the three odd consecutive natural numbers be $x, x + 2$ and $x + 4$.
 \therefore According to the question
 $x + x + 2 + x + 4 = 87$
 or $3x + 6 = 87$
 or $3x = 81 \therefore x = 27$
 \therefore Smallest number = 27
54. (c) Required maximum capacity of container
 $=$ HCF of 75 l and 45 l
 Now, $75 = 5 \times 5 \times 3$
 $45 = 5 \times 3 \times 3$
 \therefore HCF = 15 litres
55. (c) Suppose the numbers are $4x$ and $5x$ respectively
 According to question
 $x \times 4 \times 5 = 120$
 $\Rightarrow x = 6$
 \therefore Required numbers
 $= 4 \times 6 = 24$
 and $= 5 \times 6 = 30$
56. (a) $\frac{1}{9} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72}$
 $= \frac{1}{9} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \frac{1}{5 \times 6} + \dots + \frac{1}{8 \times 9}$
 $= \frac{1}{9} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \dots + \frac{1}{8} - \frac{1}{9} = \frac{1}{2}$
57. (c) $\frac{\frac{13}{4} - \frac{5}{6} \times \frac{4}{5}}{\frac{13}{3} \div \frac{1}{5} - \left(\frac{3}{10} + \frac{106}{5}\right)} - \left(\frac{3}{2} \times \frac{5}{3}\right)$
 $= \frac{\frac{13}{4} - \frac{2}{3}}{\frac{13 \times 5}{3} - \left(\frac{3 + 212}{10}\right)} - \frac{5}{2}$
 $= \frac{\frac{39 - 8}{12}}{\frac{65}{3} - \frac{215}{10}} - \frac{5}{2} = \frac{\frac{31}{12}}{\frac{650 - 645}{30}} - \frac{5}{2}$
 $= \frac{31}{12} \times \frac{30}{5} - \frac{5}{2}$
 $= \frac{31}{2} - \frac{5}{2} = \frac{31 - 5}{2} = \frac{26}{2} = 13$

58. (d) Let $4\frac{11}{15} = a$ and $\frac{15}{71} = b$

∴ Expression

$$= (a + b)^2 - (a - b)^2$$

$$= (a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab) = 4ab$$

$$= 4 \times 4\frac{11}{15} \times \frac{15}{71} = 4 \times \frac{71}{15} \times \frac{15}{71} = 4$$

59. (a) Students in class A $\Rightarrow x$
 Students in class B $\Rightarrow y$
 Students in class C $\Rightarrow z$
 For classes A and B,

$$\frac{83x + 76y}{x + y} = 79$$

$$\Rightarrow 83x + 76y = 79x + 79y$$

$$\Rightarrow 83x - 79x = 79y - 76y$$

$$\Rightarrow 4x = 3y$$

For classes B and C

$$\frac{76y + 85z}{y + z} = 81$$

$$\Rightarrow 76y + 85z = 81y + 81z$$

$$\Rightarrow 5y = 4z$$

$$\therefore 20x = 15y = 12z$$

$$\Rightarrow \frac{20x}{60} = \frac{15y}{60} = \frac{12z}{60}$$

$$\Rightarrow \frac{x}{3} = \frac{y}{4} = \frac{z}{5}$$

∴ Required average

$$= \frac{83 \times 3 + 76 \times 4 + 85 \times 5}{3 + 4 + 5}$$

$$= \frac{249 + 304 + 425}{12} = \frac{978}{12} = 81.5$$

60. (d) $a + b + c = 18 \times 3 = 54$
 and, $b + c + d = 16 \times 3 = 48$

$$\therefore a + b + c - b - c - d$$

$$\Rightarrow 54 - 48 = 6$$

$$\Rightarrow a - d = 6$$

$$\Rightarrow a - 19 = 6$$

$$\Rightarrow a = 19 + 6 = 25$$

61. (c) $\frac{m}{n} = \frac{3}{2}$ (Given)

$$\therefore \frac{4m + 5n}{4m - 5n} = \frac{4\left(\frac{m}{n}\right) + 5}{4\left(\frac{m}{n}\right) - 5}$$

$$= \frac{4 \times \frac{3}{2} + 5}{4 \times \frac{3}{2} - 5} = \frac{6 + 5}{6 - 5} = 11:1$$

62. (d) A : B = 3 : 5 = 12 : 20

$$B : C = 4 : 7 = 20 : 35$$

$$\therefore A : B : C = 12 : 20 : 35$$

63. (d) 15% of (A + B)

$$= 25\% \text{ of } (A - B)$$

$$\Rightarrow \frac{15}{100}(A + B) = \frac{25}{100}(A - B)$$

$$\Rightarrow 15(A + B) = 25(A - B)$$

$$\Rightarrow 15A + 15B = 25A - 25B$$

$$\Rightarrow 10A = 40B$$

$$\Rightarrow A = 4B$$

Now, let x% of B is equal to A

$$\therefore \frac{x}{100} \times B = A \Rightarrow \frac{x}{100} \times B = 4B$$

$$\therefore x = 400\%$$

64. (c) If the number be x, then

$$x \times \frac{75}{100} + 75 = x$$

$$\Rightarrow \frac{3x}{4} + 75 = x$$

$$\Rightarrow x - \frac{3x}{4} = 75$$

$$\Rightarrow \frac{x}{4} = 75$$

$$\Rightarrow x = 4 \times 75 = 300$$

$$\therefore 40\% \text{ of } 300$$

$$= \frac{300 \times 40}{100} = 120$$

65. (b) $\sqrt{1 - \frac{x^3}{100}} = \frac{3}{5}$

Squaring both sides,

$$1 - \frac{x^3}{100} = \frac{9}{25}$$

$$\Rightarrow \frac{x^3}{100} = 1 - \frac{9}{25} = \frac{25 - 9}{25} = \frac{16}{25}$$

$$\Rightarrow x^3 = \frac{16}{25} \times 100 = 64$$

$$\therefore x = \sqrt[3]{64} = \sqrt[3]{4 \times 4 \times 4} = 4$$

66. (c) $\frac{4x-3}{x} + \frac{4y-3}{y} + \frac{4z-3}{z} = 0$

$$\Rightarrow \frac{4x}{x} - \frac{3}{x} + \frac{4y}{y} - \frac{3}{y} + \frac{4z}{z} - \frac{3}{z} = 0$$

$$\Rightarrow \frac{3}{x} + \frac{3}{y} + \frac{3}{z} = 4 + 4 + 4 = 12$$

$$\Rightarrow \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{12}{3} = 4$$

67. (d) $r \sin \theta = 1$

$$r \cos \theta = \sqrt{3}$$

$$\Rightarrow \frac{\sin \theta}{\cos \theta} = \tan \theta = \frac{1}{\sqrt{3}}$$

$$\therefore \sqrt{3} \tan \theta + 1$$

$$= \sqrt{3} \times \frac{1}{\sqrt{3}} + 1 = 1 + 1 = 2$$

68. (c) $\frac{\cos \alpha}{\cos \beta} = a \Rightarrow \cos \alpha = a \cos \beta$

On squaring both sides,

$$\cos^2 \alpha = a^2 \cos^2 \beta$$

$$\Rightarrow 1 - \sin^2 \alpha = a^2 (1 - \sin^2 \beta) \dots(i)$$

Again, $\sin \alpha = b \sin \beta$

$$\Rightarrow \sin^2 \alpha = b^2 \sin^2 \beta$$

\therefore From equation (i),

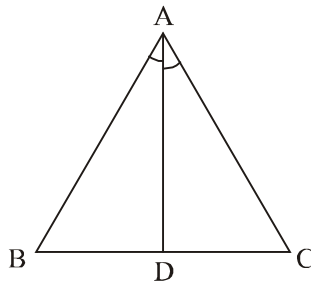
$$1 - b^2 \sin^2 \beta = a^2 - a^2 \sin^2 \beta$$

$$\Rightarrow a^2 \sin^2 \beta - b^2 \sin^2 \beta = a^2 - 1$$

$$\Rightarrow \sin^2 \beta (a^2 - b^2) = a^2 - 1$$

$$\Rightarrow \sin^2 \beta = \frac{a^2 - 1}{a^2 - b^2}$$

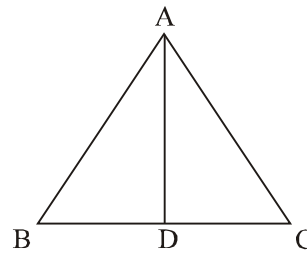
69. (a)



AD is the internal bisector of $\angle A$.

$$\therefore \frac{AB}{AC} = \frac{BD}{DC} = \frac{5}{7.5-5} = \frac{5}{2.5} = 2:1$$

70. (c)



$$\frac{AB}{AC} = \frac{BD}{DC}$$

\therefore AD is the bisector of $\angle A$.

$$\therefore \angle BAD = \frac{1}{2}(\angle BAC)$$

$$= \frac{180 - 70 - 50}{2} = \frac{60}{2} = 30^\circ$$

71. (b) Sides of triangle

Let $3x$, $4x$ and $5x$ units

Here, $(3x)^2 + (4x)^2 = (5x)^2$

\therefore It is a right angled triangle.

Now, Area of triangle

$$= \frac{1}{2} \times 3x \times 4x = 6x^2$$

$$\therefore 6x^2 = 72$$

$$\Rightarrow x^2 = \frac{72}{6}$$

$$\Rightarrow x = \sqrt{12} = 2\sqrt{3}$$

Perimeter of right angled triangle

$$= 3x + 4x + 5x$$

$$= 12x = 12 \times 2\sqrt{3}$$

$$= 24\sqrt{3} \text{ units}$$

$$\therefore \text{Perimeter of equilateral triangle} = 24\sqrt{3} \text{ units}$$

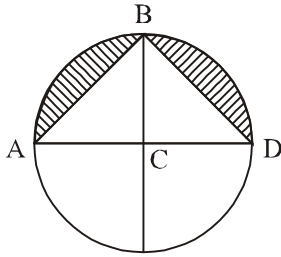
$$\text{Its side} = \frac{24\sqrt{3}}{3} = 8\sqrt{3} \text{ units}$$

$$\text{Area} = \frac{\sqrt{3}}{4} \times (\text{side})^2$$

$$= \frac{\sqrt{3}}{4} \times 8\sqrt{3} \times 8\sqrt{3}$$

$$= 48\sqrt{3} \text{ sq units.}$$

72. (c)



Let Radius of circle = a units
 \therefore Area of semi circle

$$= \frac{\pi a^2}{2} \text{ sq. units}$$

Both triangles $\triangle ABC$ and $\triangle BCD$ are isosceles and equal.

$$\therefore \text{Area of each triangle} = \frac{1}{2}a^2$$

\Rightarrow Area of both triangles

$$= 2 \times \frac{1}{2}a^2 = a^2 \text{ sq. units}$$

\therefore Area of shaded region

$$= \frac{\pi a^2}{2} - a^2 = a^2 \left(\frac{\pi}{2} - 1 \right) \text{ sq. units}$$

73. (c) $x + \frac{1}{x} = 1$ (Given)

$$\text{Expression} = \frac{x^2 + 3x + 1}{x^2 + 7x + 1}$$

$$= \frac{x + \frac{1}{x} + 3}{x + \frac{1}{x} + 7}$$

(Dividing numerator and denominator by x)

$$= \frac{1+3}{1+7} = \frac{4}{8} = \frac{1}{2}$$

$$74. (b) x = \frac{\sqrt{5}+1}{\sqrt{5}-1} = \frac{(\sqrt{5}+1)^2}{(\sqrt{5}-1)(\sqrt{5}+1)}$$

(Rationalising the denominator)

$$= \frac{5+1+2\sqrt{5}}{5-1} = \frac{6+2\sqrt{5}}{4}$$

$$= \frac{3+\sqrt{5}}{2}$$

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$$\therefore y = \frac{\sqrt{5}-1}{\sqrt{5}+1} = \frac{3-\sqrt{5}}{2}$$

$$\therefore x + y = \frac{3+\sqrt{5}}{2} + \frac{3-\sqrt{5}}{2}$$

$$= \frac{3+\sqrt{5}+3-\sqrt{5}}{2} = 3$$

$$xy = \frac{3+\sqrt{5}}{2} \times \frac{3-\sqrt{5}}{2} = \frac{9-5}{4} = 1$$

$$\therefore \frac{x^2 + xy + y^2}{x^2 - xy + y^2} = \frac{(x+y)^2 - xy}{(x+y)^2 - 3xy}$$

$$= \frac{(3)^2 - 1}{(3)^2 - 3} = \frac{9-1}{9-3} = \frac{8}{6} = \frac{4}{3}$$

$$75. (a) \frac{1}{a} - \frac{1}{b} = \frac{1}{a-b}$$

$$\Rightarrow \frac{b-a}{ab} = \frac{1}{a-b}$$

$$\Rightarrow (a-b)(a-b) = -ab$$

$$\Rightarrow a^2 - 2ab + b^2 = -ab$$

$$\Rightarrow a^2 - ab + b^2 = 0$$

$$\therefore a^3 + b^3 = (a+b)(a^2 - ab + b) = 0$$

76. (c) **Hardly** **when** is correct form of **connective**. Hence, **platform when the train came** in is the right usage.

77. (c) Here, use of **the** is improper.

The sentence is in **Past**. Hence, **I visited Delhi** is the right usage.

78. (d) **No error**

79. (b) **keep on (Phr. V.)** : to continue

keep off (Phr. V.) : to avoid eating; to avoid mentioning a particular subject

Here, **on** is the right usage.

80. (d) **turn down (Phr. V.)** : to refuse to consider an offer, a proposal etc.

turn off (Phr. V.) : to stop listening to

Here, **down** is the right usage.

81. (b) **confide (Verb)** : to tell somebody secrets and personal information that you do not want other people to know

confide in/to (Phr. V.) \rightarrow both can be used. Here, **to** is the right usage.

82. (b) **compare (Verb)** agrees with **Prep-to**

Here, **to** is the right usage.

83. (a) **prevail on somebody to do something** : to persuade somebody to do something

Here, **on** is the right usage.

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84. (b) **regretful**
contrite (Adj.) : very sorry for something bad that you have done; regretful.
85. (a) **shy** শ্রদ্ধাভঙ্গি
bashful (Adj.) : shy and easily embarrassed.
86. (c) **hostile**
belligerent (Adj.) : unfriendly and aggressive; hostile.
87. (d) **ins and outs** : full detail
• Jatin knows the **ins and outs** of repairing computers.
The best option is **full details.** শ্রদ্ধাভঙ্গি
88. (d) **end up in smoke** : efforts that come to nothing or are useless
• The whole discussion **ended up in smoke.**
The best option is **become useless finally.**
89. (d) **died in harness** : died while in service
• My friend, Rashi, **died in harness.**
The best option is **died while working.**
90. (c) **kicking his heels** : to be relaxed and enjoy
• She **kicked her heels** for hours sitting on a bench in the park.
The best option is **wasting time.** শ্রদ্ধাভঙ্গি
91. (a) **rigid (Adj.)** : very strict and difficult to change; inflexible.
pliable (Adj.) : easy to bend without breaking; flexible; easy to influence or control; pliant.
92. (b) **indifference (N.)** : a lack of interest.
alacrity (N.) : great willingness or enthusiasm.
93. (c) **inexact (Adj.)** : not accurate or exact.
impeccable (Adj.) : without mistakes or faults; perfect.
94. **misogynist** শ্রদ্ধাভঙ্গি
misogynist (N.) : a person who hates women
misogamist (N.) : a person who hates marriage
ambivert (N.) : a person who is both an introvert and an extrovert
misanthrope (N.) : a person who hates and avoids other people. শ্রদ্ধাভঙ্গি
95. (c) **itinerary**
itinerary (N.) : a plan of a journey, including the route and the place that you visit
travel kit (N.) : a kit for carrying toilet articles while travelling শ্রদ্ধাভঙ্গি
schedule (N.) : a time table; a plan that lists all the work you have to do and when you must do each thing
travelogue (N.) : a film/movie, broadcast or piece of writing about travel.
96. (b) **extensive (Adj.)** : covering a large area
97. (a) **open (Verb)**
98. (a) **urban (Adj.)** : connected with town or city
99. (a) **in (Prep.)**
100. (b) **led (Verb)** শ্রদ্ধাভঙ্গি

