

SSC Higher Secondary Level Exam. Practice Set

Answers with Explanation

1. (d) Room is a part of the house. Similarly, nation is a part of the world. শ্রুতিভঙ্গি
2. (c) Scientific study of plants is called Botany. Similarly, scientific study of insects is called Entomology.
3. (a) The water in river flows. The water in pool remains stagnant.
4. (b) 'Demand' is of greater intensity than suggestion. Similarly, Snatch is of greater intensity than Take.
5. (c) Mother gives birth to child. Similarly, cloud causes rain.
6. (a) Camera contains a lens. Similarly flash contains bulb.
7. (d) Architect is responsible for the construction of building. Similarly, statues are carved out by Sculptor.
8. (c) The lack of blood is called Anaemia. Similarly, the absence of Government is called Anarchy.
9. (b) Light propagates in the form of rays. Similarly, sound travels in the form of waves.
10. (b) A pair of scissors is used to cut cloth. Similarly, axe is used to cut wood.

11. (c)

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

শ্রুতিভঙ্গি

$$16 \times 8 \div 4 - 3 + 9 = ?$$

$$\Rightarrow ? = 16 - 8 + 4 \div 3 \times 9$$

$$\Rightarrow ? = 16 - 8 + \frac{4}{3} \times 9$$

$$\Rightarrow ? = 16 - 8 + 12$$

$$\Rightarrow ? = 28 - 8 = 20$$

12. (d) **Option (a)**
 15 C 15 B 8 F 4 B 6 C 3
 $\Rightarrow 15 \div 15 + 8 < 4 + 6 \div 3$
 $\Rightarrow 1 + 8 < 4 + 2$

Option (b)
 15 B 5 G 8 B 4 G 6 F 3
 $\Rightarrow 15 + 5 - 8 + 4 - 6 < 3$
 $\Rightarrow 24 - 14 < 3$

Option (c)
 15 A 5 E 8 C 4 B 6 E 3 শ্রুতিভঙ্গি
 $\Rightarrow 15 > 5 \times 8 \div 4 + 6 \times 3$
 $\Rightarrow 15 > 10 + 18$

Option (d)

$$15 \text{ C } 5 \text{ F } 8 \text{ C } 4 \text{ B } 6 \text{ C } 3$$

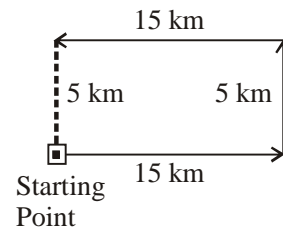
$$\Rightarrow 15 \div 5 < 8 \div 4 + 6 \div 3$$

$$\Rightarrow 3 < 2 + 2$$

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13. (b) Except the number-pair 21-40, the second number is twice of the first number.
14. (b) Except 84, all other numbers are multiples of 13.
 $91 = 13 \times 7$
 $26 = 13 \times 2$
 $78 = 13 \times 6$
 But, $84 = 13 \times 6 + 6$
15. (b) Except 59, all other numbers are multiples of 3.
 $96 = 3 \times 32$
 $12 = 3 \times 4$
 $48 = 3 \times 16$
 But, $59 = 3 \times 20 - 1$

16. (d)

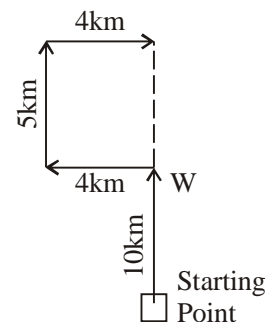


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It is clear from the diagram that Amit was 5 km away from the starting point.

17. (a) Day before yesterday was Thursday.
 Today is Saturday.
 Tomorrow will be Sunday.

18. (c)



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Required distance
 $= 10 + 5 = 15 \text{ km.}$

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

20. (d) The given number series is based on the following pattern:

$$10 + 90 = 100$$

$$100 + (90 + 10) = 200$$

$$200 + (90 + 20) = 310$$

$$310 + (90 + 30) = \boxed{430}$$

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21. (b) The given number series is based on the following pattern :

$$1438 - (3 \times 3) = 1429$$

$$1429 - (3 \times 4) = 1417$$

$$1417 - (3 \times 5) = 1402$$

$$1402 - (3 \times 6) = \boxed{1384}$$

22. (c) 36 28 24 22 21

\downarrow \uparrow \downarrow \uparrow \downarrow \uparrow
 -8 -4 -2 -1

23. (a) G O L D → I Q N F

\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow
 +2 +2 +2 +2

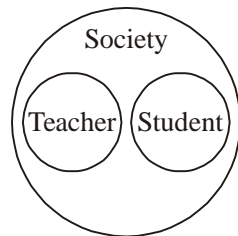
Similarly,

W I N D → Y K P F

\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow
 +2 +2 +2 +2

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24. (b) Teachers are different from students. But both are included in the society.



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25. (c) B ⇒ 57, 65, 79, 88, 96
 E ⇒ 01, 14, 20, 32, 43
 A ⇒ 02, 10, 24, 33, 41
 D ⇒ 56, 69, 75, 87, 99

Option	B	E	A	D
(a)	97	32	14	56
(b)	88	41	20	57
(c)	57	32	41	87
(d)	75	14	20	57

প্র্যাচিভর্ন

26. (a) On August 29, 1931, Gandhi sailed for England in the S S Rajputana to attend the Second Round Table Conference, He went as the sole representative of the Indian National Congress. He was accompanied by Sarojini Naidu and also Madan Mohan Malaviya, Ghanshyam Das Birla, Muhammad Iqbal, Sir Mirza Ismail Diwan of Mysore, S.K. Dutta and Sir Syed Ali Imam. The conference failed to reach agreement, either constitutionally or on communal representation.

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27. (b) Jamini Roy (1887-1972), one of the most celebrated artists of modern India, is especially admired for his painting that brought solace to the viewers in a tormented time of history. He gave a novel and daring direction to the art of colonial India by evolving his idiom of expression out of Bengal's folk painting, discarding at once both of the dominating trends of his days, namely, Western academicism, then insipid and decadent, and Neo-Bengal school, which tended to become cold and fragile. And as the time marched, his concept of art's agelessness has gained importance in the context of the present generation artists' new search for the roots.

28. (d) Indian Penal Code is the main criminal code of India. It is a comprehensive code, intended to cover all substantive aspects of criminal law. It was drafted in 1860 and came into force in colonial India during the British Raj in 1862. It has since been amended several times and is now supplemented by other criminal provisions.

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29. (c) Bandipur National Park, established in 1973 as a tiger reserve under Project Tiger, is a national park located in the south Indian state of Karnataka. It was once a private hunting reserve for the Maharaja of the Kingdom of Mysore. Bandipur is located in Gundlupet taluq of Chamarajanagar district. Together with the adjoining Nagarhole National Park, Mudumalai National Park and Wynad Wildlife Sanctuary, it is part of the Nilgiri Biosphere Reserve

- totaling 2,183 km² making it the largest protected area in southern India. শ্রীচিভর্ষ
30. (c) India became independent on 15 August 1947 and was left with a legacy of non-decimal coinage. One rupee was divided into 16 annas or 64 pice, with each anna therefore equal to 4 pice. In 1957, India shifted to the decimal system, but for a short period both decimal and non-decimal coins were in circulation. To distinguish between the two pice, the coins minted between 1957 and 1964 have the legend “Naya Paisa” (“new” paisa). The denominations in circulation were 1, 2, 5, 10, 20, 25, 50 (naya paise) and one rupee which remained as the same pre-decimal value. Therefore pre-decimal coins of one, half and quarter rupees could remain in circulation after decimalisation. The rupee remained unchanged in value and nomenclature. It, however, was now divided into 100 ‘paisa’ instead of 16 annas or 64 pice. For public recognition, the new decimal paisa was termed ‘Naya Paisa’ till 1 June 1964 when the term ‘Naya’ was dropped. শ্রীচিভর্ষ
31. (d) Infrared imaging is used extensively for military and civilian purposes. Military applications include target acquisition, surveillance, night vision, homing and tracking. Non-military uses include thermal efficiency analysis, environmental monitoring, industrial facility inspections, remote temperature sensing, short-ranged wireless communication, spectroscopy, and weather forecasting. Infrared astronomy uses sensor-equipped telescopes to penetrate dusty regions of space, such as molecular clouds; detect objects such as planets, and to view highly red-shifted objects from the early days of the universe. There are two main types of remote sensing: passive remote sensing and active remote sensing. Reflected sunlight is the most common source of radiation measured by passive sensors. Examples of passive remote sensors include film photography, infrared, charge-coupled devices, and radiometers. শ্রীচিভর্ষ
32. (b) Nanasaheb Peshwa, also known as Balaji Baji Rao, was the son of Baji Rao from his marriage with Kashibai and one of the Peshwa of the Maratha Empire. He contributed heavily to the development of the city of Pune, India. He was appointed as Peshwa by Chattrapati Shahu himself. Nanasaheb lost his cousin, Sadashivrao Bhau (the son of Chimaji Appa), and his eldest son, Vishwasrao, at the [Third Battle of Panipat]. শ্রীচিভর্ষ
33. (d) The right to property, also known as the right to protection of property, is a human right and is understood to establish an entitlement to private property. Right to property was originally a fundamental right, but is now a legal right.
34. (c) Alluvial soil constitutes the largest soil group in India, constituting 80% of the total land surface. It is derived from the deposition of silt carried by rivers and are found in the Great Northern plains from Punjab to the Assam valley. Alluvial soils are generally fertile but they lack nitrogen and tend to be phosphoric. শ্রীচিভর্ষ
35. (c) A country devalues its currency in order to promote exports. A key effect of devaluation is that it makes the domestic currency cheaper relative to other currencies. There are two implications of devaluation. First, devaluation makes the country’s exports relatively less expensive for foreigners. Second, the devaluation makes foreign products relatively more expensive for domestic consumers, thus discouraging imports. This may help to increase the country’s exports and decrease imports, and may therefore help to reduce the current account deficit. One typical example is Thailand in 1998 Asian financial crisis. The baht was pegged at 25 to the US dollar before the crisis. During the crisis, the slowdown in export growth caused Thailand to abandon the dollar peg and devalue its currency in order to promote exports. শ্রীচিভর্ষ
36. (c) Haryana chief minister Manohar Lal Khattar virtually launched the first of its kind Educational Chatbot “Apka Mitra” & online admission platform for under graduate courses in govt.-aided and self financial colleges for the new academic session 2020-2021.
37. (c) The Man Booker Prize for Fiction is a literary prize awarded each year for the best original full-length novel, written in the English language, by a citizen of the Commonwealth of Nations, Ireland, or Zimbabwe. It is one of the awards given in the field of fiction writing.
- Note:** The Man Booker Prize for Fiction is a
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- literary prize awarded each year for the best original novel, written in the English language and published in the UK. Paul Beatty was awarded the 2016 Booker Prize for his novel *The Sellout*, receiving 50,000 pounds (\$61,000), and becoming the first American author to be awarded the prize. *অ্যাচিভমেন্ট*
38. (b) 'The 3 Mistakes of My Life' is the third novel written by Chetan Bhagat. The book was published in May 2008. The novel follows the story of three friends and is based in the city of Ahmedabad, Gujarat. The movie version of the novel is *Kai Po Che!*
39. (d) Dadabhai Naoroji was a Member of Parliament (MP) in the United Kingdom House of Commons between 1892 and 1895, and the first Asian to be a British MP. Elected for the Liberal Party in Finsbury Central at the 1892 general election, he was the first British Indian MP. He refused to take the oath on the Bible as he was not a Christian, but was allowed to take the oath of office in the name of God on his copy of *Khordeh Avesta*. In Parliament, he spoke on Irish Home Rule and the condition of the Indian people. In his political campaign and duties as an MP, he was assisted by Muhammad Ali Jinnah, the future Muslim nationalist and founder of Pakistan. *অ্যাচিভমেন্ট*
40. (d) Article 85 of the Indian Constitution states that six months must not intervene between the last sitting in one session and the first sitting in the succeeding session. In other words, the interval between two sessions must not exceed six months.
41. (a) Kharif crops refer to the planting, cultivation and harvesting of any domesticated plant sown in the rainy (monsoon) season on the Asian subcontinent. Such crops are planted for autumn harvest and may also be called the summer or monsoon crop in India and Pakistan. Kharif crops are usually sown with the beginning of the first rains in July, during the southwest monsoon season. In Pakistan the kharif season starts on April 16th and lasts until October 15th. In India the kharif season varies by crop and state, with kharif starting at the earliest in May and ending at the latest in January, but is popularly considered to start in June and to end in October. Examples include Millet, Paddy, etc. *অ্যাচিভমেন্ট*
42. (c) The Reserve Bank of India was set up on the basis of the recommendations of the Hilton Young Commission. The Reserve Bank of India Act, 1934 (II of 1934) provides the statutory basis of the functioning of the Bank, which commenced operations on April 1, 1935. The Reserve Bank of India was nationalised with effect from 1st January, 1949 on the basis of the Reserve Bank of India (Transfer to Public Ownership) Act, 1948. All shares in the capital of the Bank were deemed transferred to the Central Government on payment of a suitable compensation. *অ্যাচিভমেন্ট*
43. (b) Cements (e.g., Portland cement) harden because of hydration, chemical reactions that occur independently of the mixture's water content; they can harden even underwater or when constantly exposed to wet weather. The chemical reaction that results when the anhydrous cement powder is mixed with water produces hydrates that are not watersoluble.
44. (d) Ecological productivity refers to the primary fixation of solar energy by plants and the subsequent use of that fixed energy by plant-eating herbivores, animal-eating carnivores, and the detritivores that feed upon dead biomass. Ecologists refer to the productivity of green plants as primary productivity. Deserts, tundra, and the deep ocean are the least productive ecosystems, typically having an energy fixation of less than 0.5×10^3 kilocalories per square meter per year (thousands of kcal/m²/yr; it takes one calorie to raise the temperature of one gram of water by 34°F [1°C] under standard conditions, and there are 1,000 calories in a kcal). Grasslands, montane and boreal forests, waters of the continental shelf, and rough agriculture typically have productivities of $0.5-3.0 \times 10^3$ kcal/m²/yr. Moist forests, moist prairies, shallow lakes, and typical agricultural systems have productivities of $3-10 \times 10^3$ kcal/m²/yr. The most productive ecosystems are fertile estuaries and marshes, coral reefs, terrestrial vegetation on moist alluvial deposits, and intensive agriculture, which can have productivities of $10-25 \times 10^3$ kcal/m²/yr.
45. (d) Radha M Nair announced her first book titled "Breaking the Cocoon@40" portrays her life experience in the advertising world of Mumbai where she started her career as a copy writer during early forties. *অ্যাচিভমেন্ট*

46. (a) The real benchmarking of the government policy on decentralization in India is attributed to Lord Ripon who, in his famous resolution on local self-government on May 18, 1882, recognized 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 non-official chairperson.

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47. (d) The speaker is elected in the very first meeting of the Lok Sabha after the general elections for a term of 5 years from amongst the members of the Lok Sabha. He/she is supposed to resign from his/her original party because as a speaker, he/she has to remain impartial.

48. (b) Hazaribagh: Mica and coal are the major minerals found in this district of Jharkhand; Neyveli: was developed after mining of lignite started under the Neyveli Lignite Corporation (NLC) in 1956; Jharia: famous for its rich coal resources used to make Coke; Rourkela: rich in iron ores, manganese, dolomite and limestone.

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49. (c) Gobind Swarup Father of India's Radio Astronomy passed away at the age of 91 due to age related complications in Ruby Hall Clinic, Pune. He was the founding director of National Centre for Astrophysics of Tata Institute of Fundamental Research. He is the recipient of Padma Shree(1973).

50. (b) An onion has a modified form of stem called a bulb, or more specifically a tunicate bulb. In this type of modified stems, the stem is enclosed by a covering of leaves and it is underground. The bulb contains a few outside layers that are dry and membranous that encircle the bulb, which is where tunicate comes from. Nutrients for the plant are stored within the bulb.

51. (c) Tricky Approach
Taking approximate values, we have

$$\frac{3 \times 4126 \times 3}{64 \times 2835} = 0.2046 \approx 0.2$$

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52. (a)
$$\frac{\frac{79}{14}}{5 + \frac{3}{3 + \frac{5}{3}}}$$

$$= \frac{\frac{79}{14}}{5 + \frac{3}{9+5}} = \frac{\frac{79}{14}}{\frac{3}{3}}$$

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$$= \frac{\frac{79}{14}}{5 + \frac{3}{14}} = \frac{\frac{79}{14}}{\frac{70+9}{14}}$$

$$= \frac{79}{14} \times \frac{14}{79} = 1$$

53. (a)
$$\frac{3\sqrt{7}}{\sqrt{5} + \sqrt{2}}$$

$$= \frac{3\sqrt{7}(\sqrt{5} - \sqrt{2})}{(\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2})}$$

(Rationalising the denominator)

$$= \frac{3\sqrt{7}(\sqrt{5} - \sqrt{2})}{5 - 2}$$

$$= \sqrt{7}(\sqrt{5} - \sqrt{2})$$

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$$= \sqrt{35} - \sqrt{14}$$

Similarly,

$$\frac{5\sqrt{5}}{\sqrt{2} + \sqrt{7}} = \frac{5\sqrt{5}(\sqrt{7} - \sqrt{2})}{(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2})}$$

$$= \frac{5\sqrt{5}(\sqrt{7} - \sqrt{2})}{7 - 2}$$

$$= \sqrt{5}(\sqrt{7} - \sqrt{2}) = \sqrt{35} - \sqrt{10}$$

$$\frac{2\sqrt{2}}{\sqrt{7} + \sqrt{5}} = \frac{2\sqrt{2}(\sqrt{7} - \sqrt{5})}{(\sqrt{7} + \sqrt{5})(\sqrt{7} - \sqrt{5})}$$

$$= \frac{2\sqrt{2}(\sqrt{7} - \sqrt{5})}{7 - 5}$$

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$$= \sqrt{2}(\sqrt{7} - \sqrt{5}) = \sqrt{14} - \sqrt{10}$$

∴ Expression

$$= (\sqrt{35} - \sqrt{14}) - (\sqrt{35} - \sqrt{10}) + (\sqrt{14} - \sqrt{10})$$

$$= \sqrt{35} - \sqrt{14} - \sqrt{35} + \sqrt{10} + \sqrt{14} - \sqrt{10} = 0$$

54. (c) Male employees = x

Female employees = y

$$\therefore (x + y) 12000 = x \times 15000 + y \times 8000$$

$$\Rightarrow (x + y) \times 12 = 15x + 8y$$

$$\Rightarrow 12x + 12y = 15x + 8y$$

$$\Rightarrow 3x = 4y$$

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$$\Rightarrow \frac{x}{y} = \frac{4}{3} \Rightarrow x : y = 4 : 3$$

55. (c) If the total number of students be x, then

$$x = \frac{90x}{100} + \frac{85x}{100} - 150$$

$$\Rightarrow 100x = 90x + 85x - 15000$$

$$\Rightarrow 175x - 100x = 15000$$

$$\Rightarrow 75x = 15000$$

$$\Rightarrow x = 200$$

56. (d) $x + \frac{1}{x} = 3$

On squaring both sides,

$$x^2 + \frac{1}{x^2} + 2 = 9$$

$$x^2 + \frac{1}{x^2}$$

$$= 9 - 2 = 7$$

... (i)

Again,

$$\left(x + \frac{1}{x}\right)^3 = 3^3$$

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$$\Rightarrow x^3 + \frac{1}{x^3} + 3\left(x + \frac{1}{x}\right) = 27$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times 3 = 27$$

$$\therefore x^3 + \frac{1}{x^3} = 27 - 9 = 18 \dots (ii)$$

$$\therefore \left(x^3 + \frac{1}{x^3}\right)\left(x^2 + \frac{1}{x^2}\right)$$

$$= 18 \times 7 = 126$$

$$\Rightarrow x^5 + x + \frac{1}{x^5} + \frac{1}{x} = 126$$

$$\Rightarrow x^5 + \frac{1}{x^5} = 126 - 3 = 123$$

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57. (a) $\frac{a}{b} = \frac{2}{3} = \frac{8}{12}$

$$\frac{b}{c} = \frac{4}{5} = \frac{12}{15} \text{ [Making b equal]}$$

$$\therefore \text{Required ratio} = \frac{8+12}{12+15} = \frac{20}{27}$$

58. (a) Expression

$$= \frac{8 \sin \theta + 5 \cos \theta}{\sin^3 \theta + 2 \cos^3 \theta + 3 \cos \theta}$$

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Dividing numerator and denominator by $\cos \theta$,

$$= \frac{8 \tan \theta + 5}{\tan \theta \cdot \sin^2 \theta + 2 \cos^2 \theta + 3}$$

$$= \frac{8 \tan \theta + 5}{2 \sin^2 \theta + 2 \cos^2 \theta + 3}$$

$$= \frac{8 \tan \theta + 5}{2(\sin^2 \theta + 2 \cos^2 \theta) + 3}$$

$$= \frac{8 \times 2 + 5}{5} = \frac{21}{5}$$

59. (b) Expression

$$= \frac{1}{7} + \left(999 + \frac{692}{693}\right) \times 99$$

$$= \frac{1}{7} + 999 \times 99 + \frac{692}{693} \times 99$$

$$= \frac{1}{7} + (1000 - 1)99 + \frac{692}{7}$$

$$= \frac{1}{7} + \frac{692}{7} + 99000 - 99$$

$$= \frac{693}{7} + 99000 - 99$$

$$= 99 + 99000 - 99 = 99000$$

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60. (c) $3034 - (1002 \div 20.04)$

$$= 3034 - \frac{1002}{20.04}$$

$$= 3034 - \frac{1002}{2004} \times 100$$

$$= 3034 - 50 = 2984$$

61. (a) Expression

$$= \sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{108 + \sqrt{169}}}}}$$

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$$= \sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{108 + 13}}}}$$

$$\begin{aligned} &= \sqrt{8 + \sqrt{57 + \sqrt{38 + \sqrt{121}}}} \\ &= \sqrt{8 + \sqrt{57 + \sqrt{38 + 11}}} \\ &= \sqrt{8 + \sqrt{57 + \sqrt{49}}} \\ &= \sqrt{8 + \sqrt{57 + 7}} = \sqrt{8 + \sqrt{64}} \\ &= \sqrt{8 + 8} = \sqrt{16} = 4 \end{aligned}$$

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62. (d) LCM of 2, 4, 5 and 10 = 20

$$\therefore \sqrt[3]{8} = \sqrt[20]{8^{10}}; \sqrt[4]{13} = \sqrt[20]{13^5}$$

$$\sqrt[5]{16} = \sqrt[20]{16^4}; \sqrt[10]{41} = \sqrt[20]{41^2}$$

Clearly, $\sqrt[3]{8}$ is the largest.

63. (c) Let the numbers be $4x$ and $5x$.

Their LCM = $20x$

According to the question,

$$20x = 180$$

$$\Rightarrow x = \frac{180}{20} = 9$$

\therefore Smaller number

$$= 4x = 4 \times 9 = 36$$

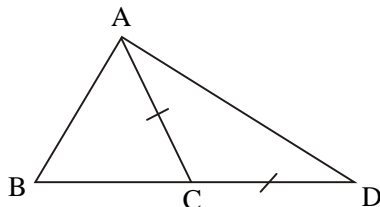
64. (c) $\left(x + y + \frac{x \times y}{100}\right)\%$ Tricky approach

Single equivalent percentage increase in price

$$= \left(10 + 10 + \frac{10 \times 10}{100}\right)\% = 21\%$$

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65. (a)



$$\begin{aligned} \angle ACD &= 180^\circ - \angle ACB \text{ (Linear Pair)} \\ &= 180^\circ - 72^\circ = 108^\circ \end{aligned}$$

$$\angle CAD = \angle ADC = \frac{72}{2} = 36^\circ$$

$$\therefore \angle ABC = 180^\circ - 109^\circ - 36^\circ = 35^\circ$$

66. (b) Using Rule 8,

$$2p + \frac{1}{p} = 4$$

$$\Rightarrow p + \frac{1}{2p} = 2$$

$$\therefore \left(p + \frac{1}{2p}\right)^3$$

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$$= p^3 + \frac{1}{8p^3} + 3 \cdot p \cdot \frac{1}{2p} \left(p + \frac{1}{2p}\right)$$

$$\Rightarrow 8 = p^3 + \frac{1}{8p^3} + \frac{3}{2} \times 2$$

$$\Rightarrow p^3 + \frac{1}{8p^3} = 8 - 3 = 5$$

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67. (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),

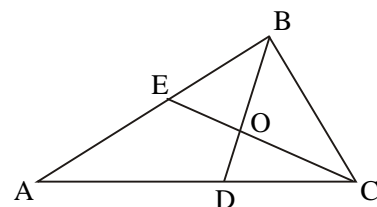
$$1 - b^2 \sin^2 \beta = a^2 - a^2 \sin^2 \beta$$

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

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

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

68. (c)



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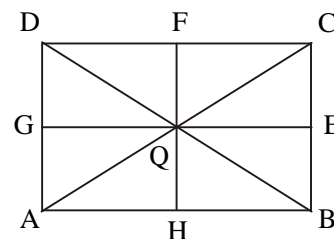
Point 'O' is the centroid of triangle ABC.

$$\therefore OE = \frac{1}{3} CE$$

$$\Rightarrow 7 = \frac{1}{3} CE$$

$$\therefore CE = 21 \text{ cm}$$

69. (a)



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Using Pythagoras theorem,

$$\dots^2 + QB^2 = QA^2 + QC^2$$

$$\Rightarrow QD^2 + 16 = 9 + 25$$

$$\Rightarrow QD^2 = 34 - 16 = 18$$

$$\Rightarrow QD = \sqrt{18} = 3\sqrt{2} \text{ cm}$$

70. (d) Smallest number of six digits = 100000

108) 100000 (925

$$\begin{array}{r} 972 \\ 280 \\ \hline 216 \\ 640 \\ \hline 540 \\ 100 \end{array}$$

∴ Required number

$$= 100000 + (108 - 100)$$

$$= 100008$$

71. (b) Let $0.1 = a \Rightarrow 0.2 = 2a$

and $0.02 = b \Rightarrow 0.04 = 2b$

∴ Expression

$$= \frac{a^3 + b^3}{8a^3 + 8b^3}$$

$$= \frac{a^3 + b^3}{8(a^3 + b^3)} = \frac{1}{8} = 0.125$$

72. (a) Let the income of A, B and C be ₹3x, ₹7x and ₹4x respectively and their expenses be ₹4y, ₹3y and ₹5y respectively.

$$\therefore 3x = 2400$$

$$\Rightarrow x = 800$$

$$\therefore 4y = 2400 - 300 = 2100$$

$$\Rightarrow y = 525$$

$$\therefore \text{B's saving} = (7x - 3y)$$

$$= ₹(7 \times 800 - 3 \times 525)$$

$$= ₹(5600 - 1575)$$

$$= ₹4025$$

$$\text{and C's savings} = ₹(4x - 5y)$$

$$= ₹(3200 - 2625) = ₹575$$

73. (b) $3x + \frac{1}{2x} = 5$

On multiplying both sides by $\frac{2}{3}$,

$$2x + \frac{1}{3x} = \frac{10}{3}$$

Cubing both sides,

$$8x^3 + \frac{1}{27x^3} + 3 \times 2x \times \frac{1}{3x} \left(2x + \frac{1}{3x} \right) = \frac{1000}{27}$$

$$\Rightarrow 8x^3 + \frac{1}{27x^3} + 2 \times \frac{10}{3} = \frac{1000}{27}$$

$$\Rightarrow 8x^3 + \frac{1}{27x^3} = \frac{1000}{27} - \frac{20}{3}$$

$$= \frac{1000 - 180}{27} = \frac{820}{27} = 30\frac{10}{27}$$

74. (b)

$$? = \frac{\sqrt{10 + \sqrt{25 + \sqrt{108 + \sqrt{154 + 15}}}}}{\sqrt[3]{2 \times 2 \times 2}}$$

$$= \frac{\sqrt{10 + \sqrt{25 + \sqrt{108 + \sqrt{169}}}}}{2}$$

$$= \frac{\sqrt{10 + \sqrt{25 + \sqrt{108 + 13}}}}{2}$$

$$= \frac{\sqrt{10 + \sqrt{25 + \sqrt{121}}}}{2}$$

$$= \frac{\sqrt{10 + \sqrt{25 + 11}}}{2}$$

$$= \frac{\sqrt{10 + \sqrt{36}}}{2} = \frac{\sqrt{10 + 6}}{2}$$

$$= \frac{\sqrt{16}}{2} = \frac{4}{2} = 2$$

75. (c) ∴ $x + x + 2 + x + 4 = 147$

$$\Rightarrow 3x + 6 = 147$$

$$\Rightarrow 3x = 147 - 6 = 141$$

$$\Rightarrow x = \frac{141}{3} = 47$$

∴ Middle Number

$$= x + 2 = 47 + 2 = 49$$

76. (c) The use of preposition 'the' is superfluous.

77. (d) No error

78. (b) **Alphabet** = a set of letters or symbols in a fixed order used for writing a language.

Hence, (the) alphabet ... should be used here.

79. (b) **Subjunctive Mood** → expresses a wish

Use of **if-clauses** → expresses an unreal or imaginary condition.

The **Past Tense** of the **Subjunctive** uses the **Verb were**.

Hence, **were** is the right usage.

80. (a) **addicted (Adj.)**: unable to stop doing something as a habit

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- an Adj. + to → Gerund (Verb + ing)** will be used.
- Hence, **addicted to smoking** is the right usage.
81. (d) **lest (Conj.)**: in case; for fear that **should (Mod.V)** is used with **lest**
Hence, **you should forget** is the right usage.
82. (c) I am surprised. (**Passive**)
The sentence is in **Simple Present Tense. (Active)**
83. (c) Let this be done by me. (**Passive**)
The sentence is in **Simple Present Tense. (Active)**
84. (b) A fox was caught by the tiger. (**Passive**)
The sentence is in **Simple Past Tense. (Active)**
85. (b) Mrs. Shanker said, "I know what it is to be depressed." → (D.S.)
- | | | | | | | | |
|----------|------|---------|--|------|------|------|--------|
| ↓ | ↓ | ↓ | | ↓ | ↓ | ↓ | ↓ |
| Rep.V. | Pro. | Verb | | H.V. | Inf. | H.V. | (Adj.) |
| (Mrs.) | | (S.pr.) | | | | | |
| Shanker) | | | | | | | |
- Mrs. Shanker said that she knew what it was to be depressed. → (I.S.)
- | | | | | | | | | |
|-------------|---------|------|------|--|------|------|------|------|
| ↓ | ↓ | ↓ | ↓ | | ↓ | ↓ | ↓ | ↓ |
| Rep. | V.Conj. | Pro. | Verb | | H.V. | Inf. | H.V. | Adj. |
| () (S.Past) | | | | | | | | |
86. (d) He said that we are all born to die. → (I.S.)
- | | | | | | | |
|-------------|------|------|---|---------|------|---|
| ↓ | ↓ | ↓ | ↓ | | ↓ | ↓ |
| Rep.V.Conj. | Pro. | H.V. | | Inf. | Verb | |
| (He +) | | | | (S.Pr.) | | |
- He said, "We are all born to die." → (D.S.)
- | | | | | | |
|--------|------|------|---|---------|------|
| ↓ | ↓ | ↓ | | ↓ | ↓ |
| Rep.V. | Pro. | H.V. | | Inf. | Verb |
| (we) | | | + | (S.Pr.) | |
- The statement is a **Universal Truth**. Hence, there is no change in the **Tense** of the **Verb**.
87. (a) Here, **friendly (Adjective)**: is the right usage.
88. (c) Here, **nor** is the right usage.
Neither ... nor are **Correlatives**.
89. (d) Here **to (Prep.)** is the right usage.
90. (a) Here, **at (Prep.)** is the right usage.
91. (c) mad
insane (Adjective): seriously, mentally ill and unable to live in normal society.
92. (d) dais
podium (Noun): pedestal; a small platform that person stands on while giving a speech etc; rostrum.
93. (b) charm
charisma (Noun): the powerful personal quality that some people have to attract and impress other people.
94. (d) **goodwill (Noun)**: friendly or helpful feeling
malice (Noun): a feeling of hatred that causes a desire to harm
ecstasy (Noun): bliss; a feeling of great happiness
happiness (Noun): cheerfulness
honour (Noun): great respect and admiration
95. (b) **ordinary (Adjective)**: not unusual
eminent (Adjective): renowned; well-known; famous and respectful
renowned (Adjective): eminent; well-known; famous
special (Adjective): extraordinary
ignorant (Adjective): lacking knowledge or information; not educated
96. (c) **amphibians**
amphibians (N.): any animal that can live both on land and in water
terrestrial (Adj.): living on the land (plants and animals)
aquatic (Adj.): growing/living in, on or near water
parasitic (Adj.): living on another animal/plant and getting its food from it
97. (d) **cartography**
cartography (N.): the art/process of drawing/making maps
calligraphy (N.): beautiful handwriting that you do with a special pen/brush
palaeography (N.): the study of ancient writing systems
metallurgy (N.): the scientific study of metals and their uses
98. (a) **draw**
99. (b) The correctly spelt word is **biscuit**.
100. (b) The correctly spelt word is **suggestion**.