

1. (c)
 2. (b)
 3. (b): Additive inverse of 2 = -2 ($\because 2 + (-2) = 0$)
 Multiplicative inverse of 2 = $\frac{1}{2}$ ($\because 2 \times \frac{1}{2} = 1$)
 \therefore Required sum = $-2 + \frac{1}{2} = \frac{-3}{2}$.

4. (a): Additive inverse of a rational number "a" is "-a".
 \therefore Additive inverse of $-\frac{3}{4}$ is $-\left(-\frac{3}{4}\right) = \frac{3}{4}$.

5. (d): $\frac{1}{4} = 0.25, \frac{1}{3} = 0.33 \dots$
 (a) $\frac{\frac{1}{4} + \frac{1}{3}}{2} = \frac{7}{12 \times 2} = \frac{7}{24}, \frac{1}{4} < \frac{7}{24} < \frac{1}{3}$
 (b) $0.25 < 0.29 < 0.33 \dots$
 (c) $\frac{\frac{1}{4} + \frac{7}{24}}{2} = \frac{6+7}{24 \times 2} = \frac{13}{48} \therefore$ All are correct.

6. (c): $\frac{-5}{16} + \frac{7}{12} = \frac{-15+28}{48} = \frac{13}{48}$
 Additive inverse of $\frac{13}{48}$ is $-\frac{13}{48}$.

7. (c)
 8. (b): Reciprocal of $\frac{-23}{85}$ is $\frac{-85}{23}$.
 $\therefore \frac{7}{8} \times \left(\frac{-85}{23}\right) = \frac{7 \times (-85)}{8 \times 23} = \frac{-595}{184} = -3 \frac{43}{184}$

9. (b): $\frac{-1+0}{2} = -\frac{1}{2}$ lies between -1 and 0
 $\Rightarrow -1 < \frac{-1}{2} < 0$
 Now, $\frac{0-\frac{1}{2}}{2} = \frac{-1}{4} \Rightarrow -1 < \frac{-1}{2} < \frac{-1}{4} < 0$
 $\therefore \frac{-1}{4}$ lies between -1 and 0.

10. (b): The additive inverse of 5 is -5.
 The multiplicative inverse of 5 is $\frac{1}{5}$.
 $\therefore -5 + \frac{1}{5} = \frac{-25+1}{5} = \frac{-24}{5}$

11. (d): $\left(\frac{-5}{9} \div \frac{2}{3}\right) = \frac{-5}{9} \times \frac{3}{2} = \frac{-5}{6}$
 Reciprocal of $-\frac{5}{6}$ is $-\frac{6}{5}$.

12. (c): Sum of the numbers = additive inverse of -3
 $= -(-3) = 3$.
 One of the numbers = $\left(\frac{1}{2} + \frac{1}{3} - \frac{1}{5}\right) = \frac{15+10-6}{30} = \frac{19}{30}$
 The other number = Sum - one number
 $= 3 - \frac{19}{30} = \frac{90-19}{30} = \frac{71}{30}$

13. (b): Let the rational number be x.
 Sy, reciprocal of x is $1/x$.
 Now, according to question, $9 \times \frac{1}{x} = 6 \times \frac{1}{17}$
 $\Rightarrow x = \frac{9 \times 17}{6} = \frac{51}{2} = 25 \frac{1}{2}$

14. (c)
 15. (a)
 16. (d): For any rational number a , $a \div 0$ is not defined.
 So, rational numbers are not closed under division.
 $\therefore A$ is false and R is true.

17. (b): If a, b, c are rational numbers, then associativity of rational numbers under addition is $a + (b + c) = (a + b) + c$.

18. (b): (i) Rational numbers are of the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$.
 \therefore Hence, $\frac{-5}{0}$ is not a rational number.

(ii) Reciprocal of $\frac{1}{a}$ is not defined, when $a = 0$.

(iii) $1 \div \left(\frac{-1}{4}\right) = 1 \times \frac{-4}{1} = -4$

(iv) $x \div (y + z) = \frac{x}{(y+z)}$

19. (b): We have, $\frac{1}{5} \times \frac{20}{20} = \frac{20}{100}$ and $\frac{1}{4} \times \frac{25}{25} = \frac{25}{100}$ Thus, $\frac{22}{100}$ lies between $\frac{1}{5}$ and $\frac{1}{4}$.

20. (b): Given numbers are $-1/1$ and $-2/1$.
 Multiplying numerator and denominator of both the numbers by 10, we get $\frac{-10}{10}$ and $\frac{-20}{10}$.
 Now, $\frac{-4}{5} = \frac{-4 \times 2}{5 \times 2} = \frac{-8}{10}$
 So, it is clear that $-4/5$ does not lie between -1 and -2.

21. (d)
 22. (c)
 23. (d)
 24. (b)
 25. (a):
 26. (d)
 27. (c): Pasteurisation of milk is a preservation technique which prevents it from being spoilt for a longer time period. It was introduced by Louis Pasteur in 1863. It involves heating of milk upto around 70°C and then suddenly cooling it.

28. (b): Algae differ from fungi in being autotrophic. Algae are simple plant-like organisms that can be found easily in aquatic or moist habitats. Fungi lack chlorophyll, so, they cannot make their own food.

29. (c): Entamoeba histolytica lives in the large intestine of humans and causes amoebic dysentery. It is transmitted through contaminated food and water.

30. (b): Malaria is caused by malarial parasite called Plasmodium which is a protozoan. The carrier of these microbes is female Anopheles mosquito. Malarial parasite requires two hosts - human and mosquito to complete its life cycle.

31. (a)
 32. (b)
 33. (a)
 34. (a): Jupiter
 35. (d)
 36. (c): Stars mainly consist of hydrogen and helium. The source of light and heat energy of star is the fusion of hydrogen to form helium.

37. (a): Light year is the unit for measuring astronomical distances.
 $1 \text{ light year} = 9.5 \times 10^{12} \text{ km}$

38. (d): Star which appears blue will be much hotter than Sun.

39. (a)
 40. (d): Geosynchronous satellites are used for communication, weather forecast and remote sensing.

- 41. (B)
- 42. (D)
- 43. (D)
- 44. (B)
- 45. (B)
- 46. (A)

From the unfolded figure of dice, we find that number opposite to 2 is 4, for 5 it is 3 and for 1 it is 6. From this result we can definitely say that figure (b), (c) and (d) can not be the answer figure as number lying on the opposite pair of surface are present on the adjacent surfaces.

- 47. (D)
- 48. (D)
- 49. (A) From the figures (i), (ii) we find that numbers 6, 1, 5 and 2 appear on the adjacent surfaces to the number 3. Therefore, number 4 will be opposite to number 3.
- 50. (C)