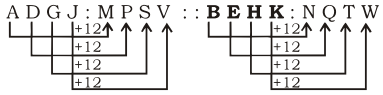
# ANSWER SET - 02

**01.** (2) **02.** (3) **03.** (4) **04.** (1) **05.** (3)
**06.** (1) **07.** (4) **08.** (1) **09.** (1) **10.** (2)
**11.** (2) **12.** (2) **13.** (2) **14.** (3) **15.** (4)
**16.** (2) **17.** (3) **18.** (4) **19.** (2) **20.** (2)
**21.** (3) **22.** (2) **23.** (1) **24.** (1) **25.** (3)
**26.** (1) **27.** (1) **28.** (4) **29.** (3) **30.** (3)
**31.** (4) **32.** (1) **33.** (4) **34.** (2) **35.** (1)
**36.** (4) **37.** (3) **38.** (3) **39.** (3) **40.** (3)
**41.** (4) **42.** (3) **43.** (4) **44.** (1) **45.** (3)
**46.** (4) **47.** (3) **48.** (3) **49.** (1) **50.** (3)
**51.** (2) **52.** (4) **53.** (4) **54.** (1) **55.** (3)
**56.** (2) **57.** (2) **58.** (4) **59.** (2) **60.** (2)
**61.** (4) **62.** (2) **63.** (2) **64.** (1) **65.** (4)
**66.** (3) **67.** (3) **68.** (3) **69.** (4) **70.** (4)
**71.** (3) **72.** (2) **73.** (4) **74.** (3) **75.** (1)
**76.** (2) **77.** (1) **78.** (1) **79.** (1) **80.** (1)
**81.** (1) **82.** (2) **83.** (3) **84.** (4) **85.** (2)
**86.** (1) **87.** (1) **88.** (2) **89.** (1) **90.** (4)
**91.** (4) **92.** (1) **93.** (2) **94.** (1) **95.** (2)
**96.** (4) **97.** (4) **98.** (1) **99.** (1)
**100.** (4)

# EXPLANATION - 02

**01.** Scissors are used to cut cloth. Similarly, Razor is used to shave beard.

**02.** A D G J : M P S V :: **B E H K** : N Q T W




**03.** UP SET SET UP

Similarly,

TIP TOP TOP TIP

**04.** $7^3 - 6^2 = 343 - 36 = 307$
$5^3 - 4^2 = 125 - 16 = \mathbf{109}$

**05.** Except the Pair of words Head-Cap, all other two words are antomyms to each other.

**06.** Except 206 all other numbers are perfect cubes.
$125 = 5 \times 5 \times 5$
$27 = 3 \times 3 \times 3$
$8 = 2 \times 2 \times 2$

**07.** $s \xrightarrow{-1} r \xrightarrow{-1} Q \xrightarrow{-1} P$
$n \xrightarrow{-1} m \xrightarrow{-1} L \xrightarrow{-1} K$
$g \xrightarrow{-1} f \xrightarrow{-1} E \xrightarrow{-1} D$
$\mathbf{t \xrightarrow{-1} s \xrightarrow{-2} U \xrightarrow{+1} V}$

**08.** $66 - 56 = \mathbf{10}$
$101 - 90 = 11$
$41 - 30 = 11$
$33 - 22 = 11$

**09.** $10.5 + \mathbf{4.5} = 15.0$
$15.0 + \mathbf{6.5} = 21.5$
Similarly,
$32.5 + \mathbf{4.5} = 37.0$
$37.0 + \mathbf{6.5} = 43.5$

**10.** Daily 2 | Weekly 1 | Fortnightly 4 | Monthly 3 | Bimonthly 5

**11.** $(2)^2 = 4$
$(2 + 4)^2 = (6)^2 = \mathbf{36}$
$(6 + 6)^2 = (12)^2 = 144$
$(12 + 8)^2 = (20)^2 = 400$
$(20 + 10)^2 = (30)^2 = 900$
$(30 + 12)^2 = (42)^2 = 1764$

**12.** 2 10 30 68 **130**
+8 +20 +38 **+62**
+12 +18 **+24**
+6 **+6**

**13.** $4 \xrightarrow{+4} 8 \xrightarrow{+5} 13 \xrightarrow{+6} 19 \xrightarrow{+7} \boxed{\mathbf{26}}$
$E \xrightarrow{+4} I \xrightarrow{+5} N \xrightarrow{+6} T \xrightarrow{+7} \boxed{\mathbf{A}}$

**14.** MASTER

**15.** D E A **B** C

School B is on the left of school C.

**16.** Only son of Fatima's grandfather means Fatima's father.
Therefore, Fatima is the sister of Mustafa.

**17.** $27 = 3 \times 3 \times 3$
Two years ago
$27 - 2 = 25 = 5 \times 5$
Next perfect cube
$64 = 4 \times 4 \times 4$
$\therefore \quad 64 - 27 = 37$ years

**18.** Number of persons do not play any Games
$= [60 - (9 + 8 + 10 + 7 + 11 + 12)]$
$= 60 - 57 = 3$

**19.** First Column $\frac{7 \times 4}{2} = 14$

Second Column $\frac{9 \times 8}{3} = 24$

Third Column $\frac{10 \times 6}{4} = 15$

**20.** D, A, C, B

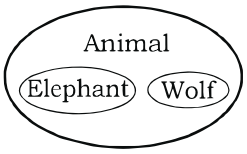
**21.** G I V E and B A T
$\downarrow \downarrow \downarrow \downarrow$ $\downarrow \downarrow \downarrow$
5 1 3 7 9 2 4

Therefore,

G A T E
$\downarrow \downarrow \downarrow \downarrow$
5 2 4 7

**22.** $8^2 - 5^2 + 3^2 = 48$
$3^2 - 7^2 + 6^2 = -4$ (Ignore the '–' sign)
$4^2 - 7^2 + 6^2 = \mathbf{3}$

**23.** Elephant is different from Wolf. But both are animals.




**24.** From both the statements it is clear that people who live in the big city face problems in travelling. Therefore, only conclusion I follows. Nothing has been stated about traffic jam.

**25.** $2^3 - 2^2 - 1^2 = 8 - 4 - 1 = 3$
$3^3 - 3^2 - 2^2 = 27 - 9 - 4 = 14$
$4^3 - 4^2 - 3^2 = 64 - 16 - 9 = 39$
$5^3 - 5^2 - 4^2 = 125 - 25 - 16 = \mathbf{84}$
$6^3 - 6^2 - 5^2 = 216 - 36 - 25 = 155$

**26.** Efficiency of P $= \frac{1}{9}$

Efficiency of Q $= \frac{1}{9} \times \frac{150}{100} = \frac{1}{6}$

$\therefore$ Q will finish the work in 6 days

**27.** $x^4 + \frac{1}{x^4} = 119$

$\Rightarrow x^2 + \frac{1}{x^2} = \sqrt{119 + 2} = 11$

$\therefore x - \frac{1}{x} = \sqrt{11 - 2} = \pm 3$

If $x - \frac{1}{x} = P$ then $x^3 - \frac{1}{x^3}$
$= P^3 + 3P$

$\therefore x^3 - \frac{1}{x^3} = (3)^3 + 3 \times 3 \Rightarrow 36$

or

$(-3)^3 + 3 \times (-3) \Rightarrow -36$

**28.** Let, side of equilateral $\Delta = x$

Area $= \frac{\sqrt{3}}{4} x^2$

New side $= x - 2$

New area $= \frac{\sqrt{3}}{4} (x - 2)^2$

Now we have,

$\frac{\sqrt{3}}{4}[(x^2] - (x - 2)^2] = 4\sqrt{3}$

$\Rightarrow x^2 - (x^2 - 4x + 4) = 16$
$4x - 4 = 16$
$x = 5$

**29.** $\sin^6\theta + \cos^6\theta \Rightarrow (\sin^2\theta)^3 + (\cos^2\theta)^3$
$\Rightarrow (\sin^2\theta + \cos^2\theta)(\sin^4\theta + \cos^4\theta - \sin^2\cos^2\theta)$

$\Rightarrow (\sin^2\theta)^2+(\cos^2\theta)^2-\sin^2\theta\cos^2\theta$

$\Rightarrow (\sin^2\theta+\cos^2\theta)^2-2\sin^2\theta\cos^2\theta-\sin^2\theta\cos^2\theta$

$\Rightarrow 1-3\sin^2\theta\cos^2\theta$

**30.** If PQRS is cyclic quadrilateral
Then,
$\angle S + \angle Q = 180°$
$\angle Q = 180° - 130° = 50°$
$\therefore$ (PRQ = 90°) (Angle in a semicircle is right angle)
$\angle RPQ = 180° - 90° - 50° = 40°$

**31.** $\because \angle SPQ = 90°$
$\therefore \angle PSQ = 180° - 90° - 35°$
$\Rightarrow 55°$
$\therefore \angle PSQ = \angle PRQ = x° = 55°$

**32.** Curved surface Area of cone
$= \pi rl$
$\therefore \quad l = \sqrt{r^2+h^2} = \sqrt{7^2+24^2}$
$= 25$

$\therefore \quad \pi rl = \frac{22}{7} \times 7 \times 25 = 550 \text{ cm}^2$

$\therefore$ Total surface area = 550 +
$\frac{22}{7} \times 7 \times 7 = 704 \text{ cm}^2$

**33.** Let the current age of elder brother = x
Then,
The current age of younger brother = x – 8
After 10 years
Age of elder brother = x + 10
Age of younger brother = x – 8 + 10 = x + 2
ATQ,
$\therefore$ x + 10 + x + 8 = 2(x + x – 8)
$\Rightarrow$ 2x + 12 = 2(2x – 8)
$\Rightarrow$ 2x + 12 = 4x – 16
$\Rightarrow$ 2x = 28
$\Rightarrow$ x = 14
So we have
Age of elder brother = 14 years
Age of younger brother = 14 – 8
= 6 years

Required ratio = $\frac{6}{14} = 3 : 7$

**34.** Required Bricks

$= \frac{20\times100\times100\times100 \text{ cm}^3}{25\times12.5\times8 \text{ cm}^3}$

= 8000

**35.** Ratio in which money should be distributed = $\frac{1}{4} : \frac{1}{5} : \frac{1}{6}$
= 30 : 24 : 20
= 15 : 12 : 10
= 37 (× 15)
Ratio in which money is distributed
= 4 : 5 : 6
= 15 (× 37)
So,Excess amount received by C
= 37 × 6 – 15 × 10
= 222 – 150
= ₹72

**36.** Winner got = 84%
Losser got = 16%
$\therefore$ Difference = 84 – 16 = 68%
$\therefore$ 68% = 476

$100\% = \frac{476}{68} \times 100 = 700$

So total number of votes polled = 700

**37.** If a + b + c = 1

So, let $a = \frac{1}{3}, b = \frac{1}{3}, c = \frac{1}{3}$,

$\therefore$ Least value of $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}$

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

= 9

**38.** Total number of students
$= \sqrt[3]{29791} = 31$

**39.** Let the container initially contains 16 litres of liquid.
Let 'a' litre of liquid be replaced with water.
Quantity of water in the new mixture

$\Rightarrow \left(6-\frac{6a}{16}+a\right)l$

Quantity of milk in the new mixture

$\Rightarrow \left(10-\frac{10a}{16}\right)l$

$\therefore \quad 6-\frac{6a}{16}+a = 10-\frac{10a}{16}$

$\Rightarrow a-\frac{6a}{16}+\frac{10a}{16} = 4$

$\Rightarrow a+\frac{4a}{16} = 4 \Rightarrow \frac{20a}{16} = 4$

$a = \frac{64}{20} = \frac{16}{5}$

$\therefore$ Part of mixture replaced

$= \frac{1}{16} \times \frac{16}{5} = \frac{1}{5}$

**40.** $\because$ Diameter is being doubled, then area will be 4 times
So, it will take to empty the same tank $= \frac{40}{4} = 10$ min tues.

**41.** Let, Sameer speed in still water = x km/hr

$\therefore \quad \frac{D}{x+12} = 24$
$D = 24 (x + 12)$ ..(i)

$\frac{D}{x-12} = 36$
$D = 36 (x + 12)$ ..(ii)
$\therefore \quad 24(x + 12) = 36(x – 12)$
$2(x + 12) = 3(x – 12)$
$2x + 24 = 3x – 36$
$x = 60$ km/hr

**42.** C.P. of goods $= 2500 \times \frac{80}{100} \times \frac{95}{100}$
= ₹19000
Final C.P. = ₹19000 + ₹2000
= ₹21000
S.P. = 25000
% gain $= \frac{25000-21000}{21000} \times 100$

$= \frac{400}{21} = 19.05\%$

**43.** We know that $P = \frac{100A}{100+rt}$

$A = \frac{P(100+rt)}{100}$

Let, after t year debt will be equal.
So, we have

$\frac{800(100+6t)}{100} = \frac{600(100+10t)}{100}$

$400 + 24t = 300 + 30t$
$6t = 100$

$t = \frac{100}{6} = \frac{50}{3} = 16\frac{2}{3}$ years

**44.** Volume of water = 20 × 15 × 6
= 18000 $m^3$
400 persons required in one day
= 4000 × 150 litre
= 600000 litre
= 600 $m^3$
$\therefore$ Required number of days

$= \frac{1800}{600} = 3$ days

**45.** Ram = Shyam $\times \frac{75}{100}$

Ratio of S.P. of Ram and Shyam's article $\frac{\text{Ram}}{\text{Shyam}} = \frac{3}{4}$

$\Rightarrow$ Ram = Hari $\times \frac{125}{100}$

Ratio of S.P. of Ram and Hari's Article

$\therefore \quad \frac{\text{Ram}}{\text{Hari}} = \frac{5}{4}$

$\therefore$ Ram : Shyam : Hari
= 15 : 20 : 12

$\therefore$ Required % $= \frac{20-12}{20} \times 100$

= 40%

**46.** Ratio of Expenses on
Rice : Fish : Oil = 12 : 17 : 3

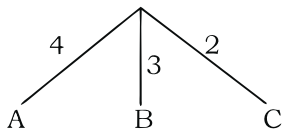
$= \underset{\downarrow 120\%}{120} : \underset{\downarrow 130\%}{170} : \underset{\downarrow 150\%}{30} = 320$

New ratio= 144 221 45
Old expense = 320
New expense = 410

$\therefore$ % increase $= \frac{410-320}{320} \times 100$

$= \frac{90}{320} \times 100 = 28\frac{1}{8}\%$

**47.** Total work = 72

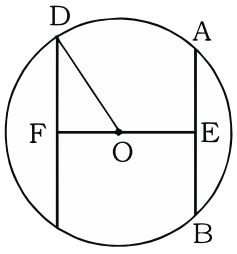



18 days 24 days 36 days
1st Round (3 days) work will complete = 4 + 3 + 2 = 9
So, 72 unit will complete

$\Rightarrow \frac{72}{9} \Rightarrow 8$ days

As they are working alternately, so number of days to complete the work
= 8 × 3 = 24 days

**48.**




In figure, AB = 16 cms, OE = 15 cms

In $\Delta$OEA
$OE^2 + AE^2 = OA^2$
$OA^2 = 15^2 + 8^2 = 17^2$
OA = 17
$\therefore$ OA = OD = 17 cms
And OF = 8 cms

In $\Delta$OFD
$OF^2 + DF^2 = OD^2$
$DF^2 = 17^2 - 8^2 = 15^2$
DF = 15 cms
$\therefore$ Length of chord = 15 × 2
= 30 cms

**49.** $a^3 + b^3 = (a + b)^3 - 3ab(a + b)$

$\therefore \quad \cos^3\theta + \sec^3\theta$
$= (\cos\theta + \sec\theta)^3 - 3\cos\theta \sec\theta$
$(\cos\theta + \sec\theta)$

After putting the value $\cos\theta + \sec\theta = \sqrt{3}$

$= \left(\sqrt{3}\right)^3 - 3\cos\theta \times \frac{1}{\cos\theta} \times \sqrt{3} = 0$

**50.** Putting x = 2 and y = 3, it satisfies the equations.
So x + y = 2 + 1 = 3.

**51.** The average of production of rice

$= \frac{8+10+4+4+2}{5} = \frac{28}{5}$

= 5.6 lakh tonnes

**52.** Total production of rice
= 8 + 10 + 4 + 4 + 2 = 28
Total production of wheat
= 16 + 2 + 4 + 2 + 6 = 30
$\therefore$ Ratio = 28 : 30 = 14 : 15

**53.** The difference between the production of rice and wheat in the state
A =16 – 8 = 8 lakh tonnes
The difference between the production of rice and wheat in the state
B =10 – 2 = 8 lakh tonnes
The difference between the production of rice and wheat in the state
E = 6 – 2 = 4 lakh tonnes
$\therefore$ The difference is maximum in A
and B both.

**54.** (1) 80 = 10 × 8
Clearly, 347 XY is divisible by 10. So y = 0
Now, 347 X 0 is divisible by 8.
Hence X = 2 or 6
If X = 2, number 34720 which is divisible by 80.
If X = 6 number 34760 which is not divisible by 80
$\therefore \quad$ X + Y = 2 + 0 = 2

**55.** (3) Let the work will completed in x days.
According to the questions,

$\frac{x}{20} + \frac{x-6}{24} + \frac{x}{30} = 1$

$\Rightarrow \frac{6 \times 4 + 5(x-6) + 4x}{120} = 1$

$\Rightarrow$ 24 + 5x – 30 + 4x = 120
9x = 126
x = 14 days.

**56.** The part of the earth and its atmosphere in which living organisms exist or that is capable of supporting life is known as Biosphere. Biomass is a biological material derived from living organisms. Lithosphere is the outer part of the earth, consisting of the crust and upper mantle, about 100 kilometres (62 miles) thick.
Hydrosphere is the water surrounding the surface of the globe, including water of the oceans and the water in the atmosphere.

**57.** Umbra is a region of complete shadow resulting from the total obstruction of light by an opaque object, mainly the shadow cast by the moon on to the earth during solar eclipse. It is also known as the darker inner region of a sunspot.
People living in this region will experience total eclipse.
Penumbra is a shaded region surrounding the dark central portion of a sunspot. In an eclipse a space of partial illumination between the perfect shadow on all sides and the full light is the Penumbra. People of this area will experience partial eclipse.
Antumbra is the region from which the occluding body appears entirely contained within the disc of the light source. Observer will experience annular eclipse, in which a bright ring is visible around the eclipsing body.

**58.** Extrusive rocks are derived from Magma (molten silicate material) that was poured out or ejected at the Earth's surface.
Both lava flow and pyroclastic debris (fragmented volcanic material) are extrusive. They are commonly glassy (obsidian), andesite, gabbro and Perodite.

**60.** The Sunderbans is a natural region in Bengal comprising Bangladesh and Eastern India.
It is the largest forest in the world. It covers 10,000 kms of which 60% is in Bangladesh and remaining in India. Mangroves are survivors. Their roots are submerged in water. These trees thrive in hot, muddy, salty conditions. Their roots hold the mangrove upright in the shifting

sediments where land and water meet.

**61.** Endoscopy is a technique with the help of which we can look inside the body for medical reasons. Optic fibres are used in endoscopy.

**67.** Biodiesel is an alternative fuel for diesel engine that is produced by chemically reacting a vegetable oil or animal fat with an alcohol such as methanol or ethanol.

Oil + alcohol → biodiesel + glycerin

The chemical reaction that converts a vegetable oil or animal fat to biodiesel is called transesterification .

**73.** The retina contains two types of photorecepters, rods and cones. Rods cells are more sensitive than cones. The rod system has very low spatial resolution but is extremely sensitive to light.The cone system has very high spatial resolution but is relatively insensitive to light.

The properties of the cone system also allow us to see colour.

**78. (1)** It is observed that liquid drop tend to contract and appear spherical when it is set free from external forces like gravity, etc. Surface tension is the property among liquids due to which they tend to occupy minimum surface area. That's why water droplet appears spherical because for a given volume, a sphere has minimum surface area. Due to this property of surface tension liquid surface stretches and behaves like a stretched membrane.

**79. (1)** Scalars are quantities that have magnitude only; they are independent of direction. Vectors have both magnitude and direction. Momentum is the product of the mass and velocity of an object (p = mv). Momentum is a vector quantity, since it has a direction as well as a magnitude. The rest of quantities in option pressure, work and energy have magnitude but not direction.

**80. (1)** Effective length is the length of point of suspension to the centre of gravity(mass) of a body. Let it be l when the girl is sitting and l' when girl stands up. Here l > l'. Thus, the time period of swing will decrease because time period of swing is given by formula

$$T = 2\pi\sqrt{\frac{l}{g}}$$

So, it is clear from above formula that the time period of system is directly proportional to effective length.

**81. (1)** Washing machine works on the principle of centrifugation. Centrifugation is a process that involves the use of the centrifugal force for the separation of mixtures with a centrifuge, used in industry and in laboratory settings. More-dense components of the mixture migrate away from the axis of the centrifuge, while less-dense components of the mixture migrate towards the axis.

**82. (2)** The velocity after time t is given by

$v = u + gt$

Here, $u = 0$, $t = 2s$, $g = 9.8\ m/s^2$

$\therefore v = 0 + (9.8 \times 2) = 19.6\ m/s$