CLASS IX

Physics

Q.1

Gravitational force between two objects is: $F = \frac{G \times m_1 \times m_2}{r^2}$

New mass of the first object $m_1' = \frac{m_1}{2}$

New mass of the second object $m_2' = 3m_2$

New distance (r') = 2r

Substituting these new values into the force formula gives:

F' = (3/8)F

Correct Answer: C

Q.2 According to the law of flotation, the buoyant force matches the weight of the object. This means a denser liquid pushes more of the object out of the surface. Therefore, a larger volume remaining outside the liquid indicates a higher liquid density.

In Liquid 1 fraction outside = 1/9 ≃ 0.111,

In Liquid 2 fraction outside = 2/11 ≃ 0.181.

In Liquid 3 fraction outside = 3/7 ≃ 0.428

Comparing these decimals shows that 0.111 < 0.181 < 0.428.

This confirms that the fractional volumes follow the order: 1/9 < 2/11 < 3/7.

The densities follow the same order : $d_1 < d_2 < d_3$.

Correct Answer: D

Q.3 When objects fall freely near the Earth's surface without air resistance, they all experience the exact same acceleration due to gravity (g ≃ 9.8 m/s²), completely independent of their individual masses.

The other options depend on mass:

$\text{Momenta} = \text{mass} \times \text{velocity}$; $\text{Potential Energy} = \text{mass} \times g \times \text{height}$

$\text{Kinetic Energy} = \frac{1}{2} \times \text{mass} \times \text{velocity}^2$ (velocity is the same for objects falling through the same height.)

Because the copper sphere (11 kg) and aluminium sphere (3.5 kg) have different masses, their momentum, potential energy, and kinetic energy will all be different at a height of 2 meters. Only their acceleration stays identical.

Correct Answer: A

Q.4 Based on the law of conservation of energy, the total mechanical energy (Potential Energy + Kinetic Energy) remains constant at every point of the fall.

At the initial maximum height 'h', the body is at rest, meaning it possesses 100% Potential Energy $(E = m \times g \times h)$ and 0% Kinetic Energy.

When the body falls to the exact midpoint of its journey (height = h/2), its Potential Energy drops to exactly half of the initial value: $m \times g \times \left(\frac{h}{2}\right)$

The lost half of the potential energy converts completely into kinetic energy.

Therefore, at height h/2, the energy is split evenly: half potential and half kinetic.

Correct Answer: (c) half potential and half kinetic energy.

Correct Answer: C

Q.5 This situation is an example of Newton's First Law of Motion (Inertia). Initially, both the water tanker and the water inside travel forward together at a uniform speed.

When brakes are suddenly applied, the rigid tanker stops moving almost instantly.

However, the water inside is a fluid and maintains its forward momentum due to the inertia of motion. As a result, the water surges forward inside the tank.

Correct Answer: B

Q.6 Let us look at the second equation of motion: $s = u \times t + \frac{1}{2} \times a \times t^2$

Where "s" is displacement, 'u' is initial velocity, 't' is time, and 'a' is acceleration.

The object starts its motion from a state of rest, its initial velocity (u) equals 0. The equation simplifies down to:

$s = 0.5 * a * t^2$

If the acceleration 'a' is constant (uniform), then the numbers 0.5 and 'a' form a constant multiplier.

This gives the proportional relationship: $s \propto t^2$

Therefore, displacement is proportional to the square of time only when the object moves with a uniform (constant) acceleration.

Correct Answer: B

Q.7 When the trains start they are 440 km apart.

In one hour, by 09:00 AM, Vande Bharat travels 120 km and stops. Rajdhani travels 80 km. The gap between them is now 240 km.

Till 09:30 AM: Vande Bharat stays stationary at the 120 km mark but Rajdhani travels another 40 km.

The remaining gap now becomes 200 km.

After Vande Bharat starts moving again and the combined relative speed of the two trains is 200 kmph (120 + 80).

To cover the final 200 km gap at a combined speed of 200 kmph takes exactly 1 hour.

So the trains cross each other at 10:30 AM. (9:30 AM + 1 hour)

Correct Answer: D

Q.8 Tightening or loosening a guitar string changes the tension force acting across it.

The fundamental frequency (or perceived pitch) of a vibrating string depends directly on its tension; higher tension increases the frequency of the sound waves produced.

Before performing, a guitarist adjusts this tension to change the pitch of the strings. This ensures the instrument is perfectly in tune and matches the musical frequencies of the other instruments in the band.

Correct Answer: C

Q.9 An electric bulb contains a very thin, coiled wire called a filament, typically constructed from tungsten metal due to its high melting point.

This thin filament possesses high electrical resistance. When an electric current passes through it, the resistance causes the filament to heat up drastically.

It reaches a state of incandescence (white-hot heat) causing it to glow intensely and emit visible light.

Correct Answer: B

Q.10 A shadow forms when an object blocks paths of light. The size and shape of a shadow are entirely dependent on the position and angle of the light source relative to the object.

As the Earth rotates, the Sun's apparent position in the sky continuously changes throughout the day. Because the angle and direction of the incoming sunlight alter continuously between morning, noon, and afternoon, both the physical dimensions (size) and the outline (shape) of the tree's shadow change.

Correct Answer: C

Chemistry

Q.11 Magnesium burns in air to form magnesium oxide (MgO). MgO dissolves in water to form magnesium hydroxide [Mg(OH)2], which is basic. Hence, red litmus turns blue.

Correct Answer: B

Q.12 First, ammonium chloride is separated by sublimation. Then, common salt is dissolved in water, sand is removed by filtration, and finally salt is recovered by evaporation.

Correct Answer: B

Q.13 A metal that reacts with dilute HCl is more reactive than hydrogen. A metal that does not react is less reactive than hydrogen.

Correct Answer: C

Q.14 The solubility of gases in water increases with pressure and decreases with temperature. Therefore, dissolved oxygen is maximum at low temperature and high pressure.

Correct Answer: C

Q.15 Compounds are ammonia, sodium bicarbonate, carbon monoxide, distilled water, calcium chloride, and methanol (6 compounds). Blood and air are mixtures, while oxygen and iron are elements.

Correct Answer: D

Q.16 Mass of 100 mL solution = 100 × 1.20 = 120 g.

W/W%=24×100/120=20%

Correct Answer: B

Q.17 NH_4^+ has 7 electrons from nitrogen + 4 electrons from four hydrogen atoms - 1 electron (positive charge) = 10 electrons.

Correct Answer: A

Q.18 Non-metals are sulphur, oxygen, carbon, bromine, nitrogen, and iodine (6 non-metals Silicon is a metalloid.

Correct Answer: B

Q.19 Force of attraction is maximum in solids, intermediate in liquids, and minimum in gases. Therefore: Gold > Ethanol > Helium.

Correct Answer: D

Q.20 A saturated solution contains the maximum amount of solute that can dissolve at a given temperature.

Correct Answer: A

Mathematics

Q.21 x+y=360 ..... (i)

65% of x = 85% of y

$$\Rightarrow \frac{65x}{100} = \frac{85y}{100}$$

$$\therefore \quad 13x = 17y$$

$$\Rightarrow x = \frac{17y}{13}$$

$\therefore$ On putting the value of x in equation (i)

x+y=360

$$\Rightarrow \frac{17y + 13y}{13} = 360$$

$$\Rightarrow \frac{30y}{13} = 360$$

$$\Rightarrow y = \frac{360 \times 13}{30}$$

$$y = 156$$

Largest number be $x = 204$

Correct Answer: A

Q.22 $2(\ell+b)=\ell\times b$

$b=\frac{13}{2}$

$2\left(\ell+\frac{13}{2}\right)=\ell\times\frac{13}{2}$

$2\times\left(\frac{2\ell+13}{2}\right)=\frac{13\ell}{2}$

$4\ell+26=13\ell$

$9\ell=26$

$\ell=\frac{26}{9}$

Correct Answer: B

Q.23 $\angle A+\angle B=360^\circ-160^\circ$

$\Rightarrow \angle A+\angle B=200^\circ$

$\Rightarrow 2[\angle PAB+\angle PBA]=200^\circ$

$\Rightarrow \angle PAB+\angle PBA=100^\circ$

$\angle APB=180^\circ-100^\circ=80^\circ$

Correct Answer: B

Q.24 Let the first and second side of parallelogram be 4x and 3x.

Perimeter of parallelogram = 56

14x = 56

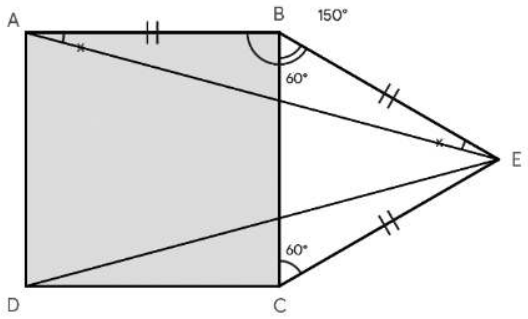
$x=\frac{56}{14}$

x = 4

Deffirence = 4x - 3x = x = 4cm

Correct Answer: B

Q.25



ΔBEC is equilateral triangle

$\therefore BE = EC = BC = AB$

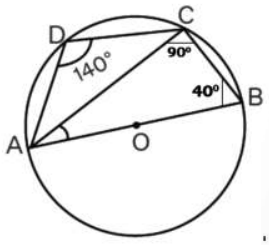
$x + 150^\circ + x = 180^\circ$

$2x = 30^\circ$

$x = 15^\circ$

Correct Answer: C

Q.26



AB is diameter

$\therefore \angle ACB = 90^\circ$

$\angle D + \angle B = 180^\circ$

$140^\circ + \angle B = 180^\circ$

$\angle B = 40^\circ$

$\therefore$ In ΔACB,

$\therefore \angle BAC + 90^\circ + 40^\circ = 180^\circ$

$\angle BAC = 50^\circ$

Correct Answer: B

Q.27 999 is greater than $(31)^2$

$\Rightarrow (32)^2 - 999 = 1024 - 999 = 25$

Least Number 25 should be added in 999 to get perfect square.

Correct Answer: C

Q.28 $5x - 9 = 121$

$5x = 130$

$x = 26$

Correct Answer: B

Q.29 $(x + y)^3 = 125$

$x^3 + y^3 + 3xy(5) = 125$

$x^3 + y^3 + 15xy = 125$

$x^3 + y^3 + 15xy - 125 = 0$

Correct Answer: A

Q.30 $x = 4$

$\Rightarrow (4)^2 - 7(4) + a = 0 \Rightarrow 16 - 28 + a = 0$

$\Rightarrow a - 12 = 0 \qquad \Rightarrow a = 12$

Correct Answer: A

Q.31 $\left(\frac{3x}{4} - \frac{2y}{3}\right)^2 = \frac{9x^2}{16} + \frac{4x^2}{9} - 2\left(\frac{3x}{4}\right)\left(\frac{2y}{3}\right)$

$= \frac{9x^2}{16} + \frac{4x^2}{9} + (-xy)$

Missing term = -xy

Correct Answer: D

Q.32 $\left(\frac{4}{9}\right)^{4-7} = \left(\frac{4}{9}\right)^{2p-1}$

On comparing exponents

2p-1 = -3

2p = -2

p = -1

Correct Answer: C

Q.33 $\frac{5^{2x+1}}{5^2} = 5^3$

$\Rightarrow 5^{2x+1} = 5^5$

On comparing exponents

$\Rightarrow$ 2x+1 = 5

$\Rightarrow$ 2x = 4

$\Rightarrow x = 2$

Correct Answer: B

Q.34 $\Rightarrow 15x^2 - 26x + 8$

$\Rightarrow 15x^2 - 20x - 6x + 8$

$\Rightarrow 5x(3x - 4) - 2(3x - 4)$

$\Rightarrow (3x - 4)(5x - 2)$

Correct Answer: B

Q.35 $\left(x-\frac{1}{x}\right)^2=\left(\sqrt{6}\right)^2$

$\Rightarrow x^2+\frac{1}{x^2}-2=6$

$\Rightarrow x^2+\frac{1}{x^2}=8$

Correct Answer: D

Q.36 = $(x + 3)^3 - (x - 3)^3$

= $[x^3 + 27 + 3(x^2)(3) + 3(x)(9)] - [x^3 - 27 - 3(x^2)(3) + 3(x)(9)]$

= $x^3 + 27 + 9x^2 + 27x - x^3 + 27 + 9x^2 - 27x$

= $18x^2 + 54$

Correct Answer: D

Q.37 $(256)^{0.16}\times(256)^{0.09}=(256)^{0.16+0.09}=(256)^{0.25}$

= $(256)^{\frac{25}{100}}=\left(4^4\right)^{\frac{1}{4}}=4$

Correct Answer: A

Q.38 $a^x = b$ ..... (i)

$b^y = c$ ..... (ii)

$c^z = a$ ..... (iii)

= Put $b = a^x$ in (ii)

= $a^{xy} = c$ (iv)

= Put $c = a^{xy}$ in (iii)

$\therefore a^{xyx} = a^1 \Rightarrow xyz = 1$

Correct Answer: B

Q.39 $0.12\overline{3}=\frac{123-12}{900}=\frac{111}{900}$

Correct Answer: D

Q.40 $x^2 - 3x + 1 = 0$

On dividing by x

$\frac{x^2-3x+1}{x}=\frac{0}{x}$

$\Rightarrow x-3+\frac{1}{x}=0$

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

Correct Answer: D

Q.41 $2^x - 2^{x-1} = 16$

$= 2^x - \frac{2^x}{2} = 16$

$= 2^x\left(\frac{1}{2}\right) = 16$

$\Rightarrow 2^x = 32$

$\Rightarrow 2^x = 2^5$

$\Rightarrow x = 5$

$\therefore x^2 = 25$

Correct Answer: D

Q.42 $2(-1)^3 + (-1)^2 - 5(-1) + 7$

$= -2 + 1 + 5 + 7 = 11$

Correct Answer: A

Q.43 $\frac{1}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2} = \frac{\sqrt{5}+2}{1} = 2+\sqrt{5}$

On comparing

$2+\sqrt{5} = a+\sqrt{5}$

$a = 2$

Correct Answer: B

Q.44 Let, PM || AB || CD

$\Rightarrow \angle BAP + \angle APM = 180^\circ$

$108^\circ + \angle APM = 180^\circ$

$\angle APM = 72^\circ$

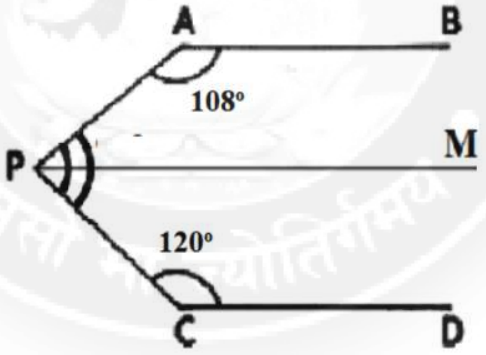
$\Rightarrow \angle MPC + \angle PCD = 180^\circ$

$\angle MPC + 120^\circ = 180^\circ$

$\angle MPC = 60^\circ$ °

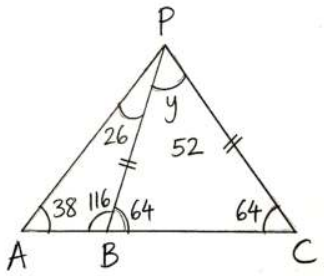
$\Rightarrow \angle APC = \angle APM + \angle MPC$

$= 72^\circ + 60^\circ = 132^\circ$



Correct Answer: C

Q.45



In ΔPAB

$26^\circ + 38^\circ + \angle PBA = 180^\circ$

$\angle PBA = 116^\circ$

$\angle PBA + \angle PBC = 180^\circ$

$\angle PBC = 180^\circ - 116^\circ = 64^\circ$

$\Delta PBC, PB = PC$

$\angle PBC = 64^\circ = \angle PCB$

$\angle PBC + \angle PCB + \angle BPC = 180^\circ$

$\therefore \quad 64^\circ + 64^\circ + y = 180^\circ$

$y = 52^\circ$

Correct Answer: B

Q.46 Let Milk = 9x and Water = 2x

$2x = 14$

$x = 7$

Then milk = 9 (7) = 63 liters

Correct Answer: C

Q.47 Let No. of Boys = 6x and Girls = 5x

$6x + 5x = 660$

$11x = 660 \Rightarrow x = 60$

Then Boys = 360 and Grils = 300

60 More girls to add to make ratio 1 : 1

Correct Answer: B

Q.48 $\frac{60x}{100} = \frac{30 \times 200}{100}$

$\Rightarrow x = 100$

Correct Answer: C

Q.49 Let the no. be 100

$\therefore$ After 30% increase,

$$100+\frac{30\times100}{100}=130$$

$\therefore$ After 30% decrease

$$\frac{130\times30}{100}=39$$

$\therefore$ 130 - 39 = 91

The net change is $=\frac{91-100}{100}\times100=-9\%$ So, 9%decrease

Correct Answer: A

Q.50

$$\frac{x_1+x_2+x_3+x_4+x_5}{5}=28$$

$\Rightarrow$ 20+25 + 30+ 35 + x_5 = 28×5

$\Rightarrow$ $110+5=140$

$\therefore$ x_5=30

Correct Answer: B

Biology

Q.51 Mature mammalian red blood cells (RBCs) lack a nucleus, mitochondria, and most other organelles to make more room for hemoglobin. Plant root hair cells are living plant cells and do contain a nucleus. (Note: While root hair cells also have a cell wall, vacuole, and mitochondria, the nucleus is the key organelle present in root hair cells but absent in mature mammalian RBCs.)

Correct Answer: B

Q.52 The presence of a cell wall, chloroplasts (for photosynthesis), and a large central vacuole are characteristic features of a typical plant cell. The absence of centrioles is also a feature of most higher plant cells (centrioles are found in animal cells and some lower plants/fungi). Therefore, the cell is most likely from a plant.

Correct Answer: C

Q.53 The description matches stratified squamous epithelium. Cells are flat, scale-like, and arranged in multiple layers to protect against abrasion. This tissue is found in the outer layer of the skin (epidermis). (The inner lining of the stomach has columnar epithelium; alveoli have simple squamous; trachea has ciliated columnar.)

Correct Answer: C

Q.54 The changes described—growth spurt, deepening of voice, and facial hair—are male secondary sexual characteristics. These are directly stimulated by the hormone testosterone, which is produced by the testes during puberty.

Correct Answer: C

Q.55 The cell membrane's selectively permeable (or semi-permeable) nature allows only certain substances to pass through while regulating the entry and exit of others. If this property is lost, the membrane would become freely permeable, meaning all substances would freely enter and leave the cell, disrupting homeostasis.

Correct Answer: A

Q.56 Bone tissue is classified as connective tissue because:

- It contains collagen (for flexibility) and calcium salts (for hardness) in its matrix.

- It has cells (osteocytes) embedded in a matrix (the defining feature of connective tissue).

- It provides support and protection (a function of connective tissue).

Since all statements are correct, the answer is (d) All of the above.

Correct Answer: D

Q.57 In many male birds, sperm is produced but there is no external copulatory organ (penis). Fertilization occurs internally when the male and female bring their cloacas together (cloacal kiss) to transfer sperm. The sperm then travels to fertilize the egg inside the female's body.

Correct Answer: A

Q.58 The hormone responsible for the development of secondary sexual characteristics in males (such as deepening of voice, growth of facial/body hair, and muscle development) is testosterone, produced by the testes.

Correct Answer: B

Q.59 The "Adam's apple" is the prominent bulge of the thyroid cartilage of the larynx (voice box). During adolescence in males, the larynx grows larger and the vocal cords lengthen and thicken, causing the voice to deepen and the Adam's apple to become more prominent.

Correct Answer: B

Q.60 Adolescence is the transitional stage between childhood and adulthood. It is characterized by rapid physical growth, hormonal changes, and significant psychological/mental development. (Adolescence begins with puberty, not ends with it; it occurs before menopause; and it occurs in both males and females.)

Correct Answer: C

Mental Ability

Q.61 $2 \times 2 + 1 = 5$

$5 \times 2 + 1 = 11$

$11 \times 2 + 1 = 23$

$23 \times 2 + 1 = 47$

$47 \times 2 + 1 = 95$

So the missing number is 95.

Correct Answer: B

Q.62 $Z(-2) = X$

$X(-3) = U$

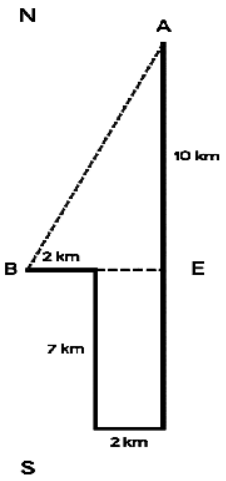
$U(-4) = Q$

$Q(-5) = L$

$L(-6) = F$

Correct Answer: A

Q.63



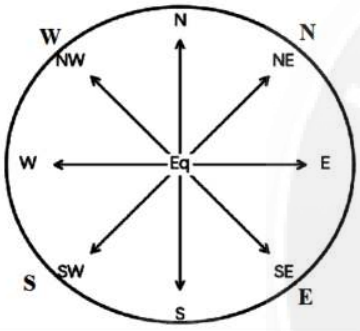
Start from Point B

$AB^2 = (4)^2 + (3)^2 = 25$

AB = 5 km

Correct Answer: C

Q.64



Correct Answer: B

Q.65 63 days ÷ 7=9 Weeks

Friday → Friday

Correct Answer: A

Q.66 Wood

Correct Answer: B

Q.67 My uncle's daughter refers Ramu's cousin. The "brother of my uncle's daughter" is brother of that cousin

∴ The man is Ramu's cousin.

Correct Answer: D

Q.68 L (+1) → M

U (-1) → T

C (+1) →D

K (-1) → J

N (+1)→O

O (-1)→N

W (+1) →X

Applying the Pattern to SHINE

S (+1) →T

H (-1) →G

I (+1)→J

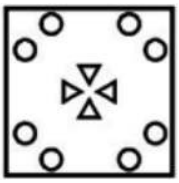
N (-1)→M

E (+1)→F

Correct Answer: B

Q.69 3

Correct Answer: C

Q.70 

Correct Answer: A

Q.71 D × F means D is daughter of F,

∴ F is the parent of D.

F + E means F is sister of E.

∴ F is the mother of D

∴ E is F's brother or sister,

∴ E is maternal uncle or aunt of D.

Correct Answer: C

Q.72 $11^2-1^2=120$

$7^2-2^2 = 49 - 4 = 45$

$5^2-3^2 = 25 - 9 = 16$

Correct Answer: C

Q.73 Compare '561' (very hard work) and '752' (hard get good)

∴ Common word is hard & common digit is 5

∴ Hard = 5

Compare '561' (very hard work) and '268' (do good work)

∴ Common word is work & common digit is 6

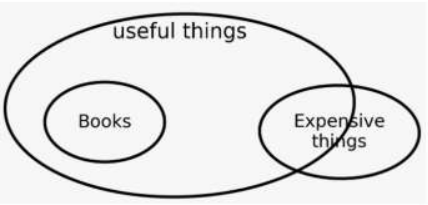
∴ Work = 6

∴ 561 is very hard work

∴ Very = 1

Correct Answer: C

Q.74



Correct Answer: B

Q.75 Remaining days in March : 31 - 5 = 26 days

days in April : 30 days

days in May : 31 day

days in June : 5 days

$\therefore$ Total = 92 day

$$\text{Day} = \frac{92}{7} = 13 \text{ weeks} + 1 \text{ odd day}$$

$\therefore$ monday + 1 = Tuesday

Correct Answer: B