

PRACTICE PAPER – XII

MATHEMATICS

Q1.

The distance of the point (x, y) from y-axis is

- (a) x
- (b) y
- (c) $|x|$
- (d) $|y|$

Q2.

The straight line $3x + y = 9$ divides the segment joining the points $(1, 3)$ and $(2, 7)$ in the ratio.

- (a) $4 : 2$
- (b) $3 : 4$
- (c) $4 : 5$
- (d) $5 : 6$

Q3.

If the angles of triangle ABC are in A.P., then

- (a) $c^2 = a^2 + b^2 + ab$
- (b) $a^2 + c^2 - ac = b^2$
- (c) $c^2 = a^2 + b^2$
- (d) none of these

Q4.

The area of triangle is 80 cm^2 and its perimeter is 8 cm. The radius of its inscribed circle is

- (a) 10 cm
- (b) 20 cm
- (c) 5 cm
- (d) none of these

Q5.

The straight line $3x + 4y = 20$ and the circle $x^2 + y^2 = 16$

- (a) touch each other
- (b) intersect in the two distinct points
- (c) neither touch nor intersect in two points
- (d) none of these

Q 6.

Slope of a line is not defined if the line is

- (a) parallel to x-axis
- (b) parallel to the line $x - y = 0$
- (c) parallel to the line $x + y = 0$
- (d) parallel to y-axis

Q 7.

The number of values of Θ which lie between 0 and 2π and satisfy the equation $\sin^4 - 2 \sin^2\theta - 1 = 0$ is

- (a) 1
- (b) 2
- (c) 3
- (d) none of these

Q 8.

If $\cos (2 \sin^{-1}x) = 1/9$, then $x =$

- (a) $2/3$
- (b) $-2/3$
- (c) $\pm 2/3$
- (d) none of these

Q 9.

The image of the point (α, β) is the line $x + y = 0$ is

- (a) $(-\alpha, \beta)$
- (b) (β, α)
- (c) $(-\beta, -\alpha)$
- (d) none of these

Q 10.

$\tan^{-1} 1/7 + 2 \tan^{-1} 1/3 =$

- (a) $3\pi/4$
- (b) $\pi/4$
- (c) $\pi/2$
- (d) none of these

Q 11.

If $a = 4$, $b = 3$ and $A = 60^\circ$, then c is a root of the equation

- (a) $x^2 - 3x - 7 = 0$
- (b) $x^2 + 3x + 7 = 0$
- (c) $x^2 - 3x + 7 = 0$
- (d) $x^2 + 3x - 7 = 0$

Q 12.

The vertex of the parabola $y^2 = 4a(x + a)$ is

- (a) $(0, 0)$
- (b) $(-a, 0)$
- (c) $(a, 0)$
- (d) $(0, a)$

Q 13.

Slope of any line parallel to x-axis is

- (a) 1
- (b) -1
- (c) 0
- (d) not defined

Q 14.

$bc \cos^2 A/2 + ca \cos^2 B/2 + ab \cos^2 C/2$, is equal to

- (a) $(s - a)^2$
- (b) $(s - b)^2$
- (c) $(s - c)^2$
- (d) s^2

Q 15.

If in a ΔABC , $a \cos A = b \cos B$, then the triangle is a/an

- (a) equilibrium
- (b) right angled
- (c) isosceles
- (d) either isosceles or right angle

Q 16.

The period of function $f(x) = \sin^2 + \tan x$ is

- (a) π
- (b) 2π
- (c) 3π
- (d) none of these

Q 17.

if $x = \{49(n-1) : n \in \mathbb{N}\}$ and $y = \{2^{3n} - 7n : n \in \mathbb{N}\}$, then

- (a) $x=y$
- (b) $x \subset y$
- (c) $y \subset x$
- (d) none of these

Q 18.

If $P = \{n^3 + (n+1)^3 + (n+2)^3 : n \in \mathbb{N}\}$, and $Q = \{9N : n \in \mathbb{N}\}$, then

- (a) $P = Q$
- (b) $P \subset Q$
- (c) $Q \subset P$
- (d) none of these

Q 19.

If $[\log_4 [\log_2 (x)]] = 1$, then the value of x is

- (a) 23
- (b) 43
- (c) $2 \times 3 \times 4$
- (d) none of these

Q 20.

Derivative of $\cos(\sin x)$ with respect to $\sin x$ is

- (a) $-\sin(\sin x) \cos x$
- (b) $-\sin(\sin x)$
- (c) $-\sin(\sin x)/\cos x$
- (d) none of these

Q 21.

If $x \sin (a + y) = \sin y$, then dy/dx is equal to

- (a) $\sin^2 (a + y) / \sin a$
- (b) $\sin a / \sin^2 (a + y)$
- (c) $\sin (a + y) / \sin a$
- (d) $\sin a / \sin (a + y)$

Q 22.

The range of the function $f(x) = \cos [x]$, where $-\pi/2 < x < \pi/2$, is

- (a) $\{-1, 1, 0\}$
- (b) $\{\cos 1, 1, \cos 2\}$
- (c) $\{\cos 1, -\cos 1, 1\}$
- (d) none of these

Q 23.

The domain of the function $f(x) = 1/[x] + \sqrt{2-x}$ is

- (a) $[0, 2]$
- (b) $[0, 1]$
- (c) $[1, 2]$
- (d) $[1, 2]$

Q 24.

Let $f(x) = x^3$, then $f(x)$ has a

- (e) local maxima at $x = 0$
- (f) local minima at $x = 0$
- (g) point of inflexion at $x = 0$
- (h) none of these

Q 25.

$$x \rightarrow \frac{\pi}{4} \quad \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sec x - \sqrt{2}}{x - \frac{\pi}{4}}$$

- (a) $\sqrt{2}$
- (b) $-\sqrt{2}$
- (c) 0
- (d) None of these

Q 26.

If $I = \int_1^2 \frac{dx}{\sqrt{1+x}}$ and $J = \int_1^2 \frac{dx}{x}$, then

- (a) $I > J$
- (b) $I < J$
- (c) $I = J$
- (d) None of these

Q 27.

$\int \frac{\sec x \operatorname{cosec} x}{\log \tan x} dx =$

- (a) $\log (\tan x)$
- (b) $\tan (\log x)$
- (c) $\tan \{\log(\log x)\}$
- (d) $\log \log (\tan x) I$

Q 28.

If $f(x) = 1/3x + 1$, then $f'(0)$ is equal to

- (a) Vanishes
- (b) is positive
- (c) is negative
- (d) does not exist

Q 29.

If $y = \sin^{-1} x$ and $z = \cos^{-1} \sqrt{1 - x^2}$, then dy/dx is equal to

- (a) $\cos^{-1} x$
- (b) $1/\sqrt{1 - x^2}$
- (c) $\sqrt{1 - x^2}$
- (d) 1

Q 30.

$\int_{-\pi}^{\pi} (\cos px - \sin qx)^2 dx$ is equal to

- (a) 0
- (b) $\frac{\pi}{2}$
- (c) π
- (d) 2π

Q 31.

$\int (e^{a \log x} + e^{x \log a}) dx$ is equal to

- (a) $\frac{x^{a+1}}{a+1} + \frac{a^x}{\log a}$
- (b) $\frac{1}{a} e^{a \log x} + \frac{1}{\log a} e^{x \log a}$
- (c) $\frac{x^a}{\log a} + \frac{a^x}{\log x}$
- (d) None of these

Q 32.

The number of vectors of unit length perpendicular to vectors $\vec{u} = \vec{i} + \vec{j}$ and $\vec{v} = \vec{j} + \vec{k}$ is

- (a) One
- (b) Three
- (c) Two
- (d) Infinite

Q 33.

Let $\vec{r} = 2\hat{i} + 2\hat{j} + 5\hat{k}$ and A, B be the points (1, 2, 5) and (-1, -2, -3) respectively. If $\vec{BA} \times \vec{r} = 4\vec{i} + 6\vec{j} + 2\lambda\hat{k}$, then $\lambda =$

- (a) 0
- (b) 1
- (c) 2
- (d) -2

Q 34.

$\int \frac{1}{a+x^{1/3}} dx =$

- (a) $\left(\frac{x^{2/3}}{2} + x^{1/3} + \log(1 + x^{1/3}) \right)$
- (b) $\left(\frac{x^{2/3}}{2} - x^{1/3} + \log(1 + x^{1/3}) \right)$
- (c) $\left(\frac{x^{2/3}}{2} - x^{1/3} - \log(1 + x^{1/3}) \right)$
- (d) none of these

Q 35.

The area $\{(x,y) : x^2 \leq y \leq \sqrt{x}\}$ is equal to

- (a) 1/6
- (b) 1/3
- (c) 2/3
- (d) none of these

Q 36.

If $\vec{A} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{B} = -\hat{i} + 2\hat{j} + \hat{k}$, $\vec{C} = 3\hat{i} + \hat{j}$, then t s.t. $\vec{A} + t\vec{B}$ is at right angle to \vec{C} , will be equal to

- (a) 5
- (b) 4
- (c) 6
- (d) 2

Q 37.

Area of the parallelogram whose adjacent sides are \vec{a} and \vec{b} is

- (a) $\vec{a} \cdot \vec{b}$
- (b) $\vec{a} \times \vec{b}$
- (c) $|\vec{a} \cdot \vec{b}|$
- (d) $\frac{1}{2} |\vec{a} \times \vec{b}|$

Q 38.

$\int (1 - \cos x) \operatorname{cosec}^2 x \, dx$ is equal to

- (a) $\tan \frac{x}{2} + c$
- (b) $\cot \frac{x}{2} + c$
- (c) $\frac{1}{2} \tan \frac{x}{2} + c$
- (d) $2 \tan \frac{x}{2} + c$

Q 39.

$(3 \vec{a} \times 2\vec{b}) \cdot \vec{c} + (3\vec{b} \times 2\vec{c}) \cdot \vec{a} + (4 \vec{c} \times 3\vec{b}) \cdot \vec{a}$ is equal to

- (a) 0
- (b) $24 [\vec{a} \vec{b} \vec{c}]$
- (c) $24 [\vec{b} \vec{a} \vec{c}]$
- (d) None of these

Q 40.

$\vec{a} \times (\vec{b} \times \vec{c})$ is equal to

- (a) $(\vec{a} \cdot \vec{b}) \vec{c} - (\vec{a} \cdot \vec{c}) \vec{b}$
- (b) $(\vec{a} \cdot \vec{b}) \vec{b} - (\vec{a} \cdot \vec{c}) \vec{c}$
- (c) $(\vec{b} \cdot \vec{c}) \vec{a} - (\vec{b} \cdot \vec{a})$
- (d) None of these

Q 41.

If $x, y \in \mathbb{R}$, xy rational, y irrational and x rational, then

- (a) $x > 0$
- (b) $x < 0$
- (c) $x = 0$
- (d) $x \neq 0$

Q 42.

If α and β are two distinct complex numbers such that $|\alpha| = |\beta|$ and $\operatorname{Re}(\alpha) > 0$, $\operatorname{Im}(\beta) < 0$, then $\alpha + \beta/\alpha - \beta$ may be

- (a) zero
- (b) purely imaginary
- (c) real and positive
- (d) real and negative

Q 43.

If $a > 0$, then the equation $ax^2 + 1 = 0$ has

- (a) real roots
- (b) rational roots
- (c) irrational roots
- (d) non-real roots

Q 44.

The roots of the equation $x^2 - \cos \theta + 1 = 0$ are

- (a) real for all θ
- (b) real when $\theta = n\theta$, $n \in \mathbb{Z}$
- (c) none-real for all θ
- (d) real when $\theta = (2n + 1)\pi/2$, $n \in \mathbb{Z}$

Q 45.

The number $(1 + i)^n / (1 - i)^n - 2$ is equal to

- (a) $4i^{n-2}$
- (b) $2i^{n-4}$
- (c) $2i^{n-1}$
- (d) none of these

PHYSICS

Q 46.

Magnetic field is measured in

- (a) weber
- (b) henry
- (c) $\text{weber}(\text{metre})^2$
- (d) $\text{weber}/(\text{metre})^2$

Q 47.

the dimensions of Planck's constant are

- (a) $[\text{ML}^2\text{T}^{-1}]$
- (b) $[\text{ML}^3\text{T}^{-1}]$
- (c) $[\text{ML}^{-2}\text{T}^{-1}]$
- (d) $[\text{M}^{\circ}\text{L}^{-1}\text{T}^{-3}]$

Q 48.

The speed of boat is 5 km/hr in still water. It crosses a river of width 1 km along the shortest possible path in 15 minutes. Then velocity of river is

- (a) 4 km/hr
- (b) 3 km/hr
- (c) 2 km/hr
- (d) 1 km/hr

Q 49.

A bullet is dropped from the same height when another bullet is fired horizontally. They will hit the ground

- (a) simultaneously
- (b) one after the other
- (c) depends on the observer
- (d) depends upon mass of bullet

Q 50.

the displacement of a particle moving in a straight line depends on time (t) as: $x = \alpha t^3 + \beta t^2 + \gamma t + \delta$.

The ratio of its initial acceleration to its initial velocity depends

- (a) Only on α
- (b) Only on α and β
- (c) Only on β and γ
- (d) Only on α and γ

Q 51.

If a cyclist moving with a speed of 4.9 m/s on a level road can take a sharp circular turn of radius 4 m, then coefficient of friction between the cycle tyres and road is

- (a) 0.41
- (b) 0.51
- (c) 0.61
- (d) 0.71

Q 52.

a body of mass 5 kg is moving in a circle of radius 1 m with an angular velocity of 2 radian/sec. The centripetal force acting on the body is

- (a) 10 N
- (b) 20 N
- (c) 30 N
- (d) 40 N

Q 53.

A bullet of mass 25 g moving with a velocity of 200 m/s is stopped within 5 cm of the target. The average resistance offered by the target is

- (a) 10 kN
- (b) 20 kN
- (c) 30 kN
- (d) 40 kN

Q 54.

A machine delivering power moves a body along a straight line. The distance moved by the body in time is proportional to

- a) t
- b) \sqrt{t}
- c) $t^{3/2}$
- d) $t^{3/4}$

Q 55.

If the radius of earth is reduced by 1% without changing the mass, then change in the acceleration due to gravity will be

- (a) 1% decrease
- (b) 1% increase
- (c) 2% increase
- (d) 2% decrease

Q 56.

If the spinning speed of earth is increased, then weight of the body at the equator

- (a) increases
- (b) decreases
- (c) doubles
- (d) does not change

Q 57.

The ratio of energy required to raise a satellite to a height 'h' above the earth's surface to that required to put it into the orbit is

- (a) $h: R$
- (b) $R : h$
- (c) $2h: R$
- (d) $h: 2R$

Q 58.

A circular disc is rotating with angular velocity ω . If a man standing at the edge of the disc walks towards its centre, then angular velocity of the disc will

- (a) decrease
- (b) increase
- (c) be halved
- (d) not change

Q 59.

For a gas, if the ratio of specific heats at constant pressure and volume is γ , then the value of degree of freedom is

- (a) $2/\gamma - 1$
- (b) $1/2(\gamma - 1)$
- (c) $\gamma - 1/\gamma + 1$
- (d) $\gamma + 1/\gamma - 1$

Q 60.

A lift is ascending with an acceleration equal to $g/3$. What will be the time-period of a simple pendulum suspended from its ceiling if its time-period in stationary lift is T ?

- (a) $T/2$
- (b) $(\sqrt{3}/2) T$
- (c) $(\sqrt{3}/4) T$
- (d) $T/4$

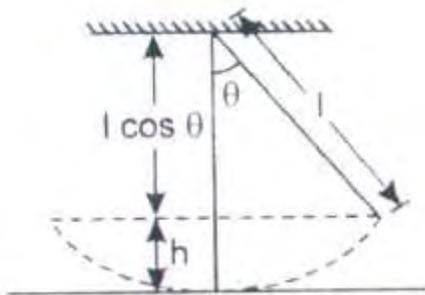
Q 61.

If the equation of a sound wave is given as: $y = 0.0015 \sin (62. \times + 316 t)$, then wavelength of this wave is

- (a) 0.4 unit
- (b) 0.3 unit
- (c) 0.2 unit
- (d) 0.1 unit

Q 62.

A simple pendulum of length ' l ' has a maximum angular displacement θ . The maximum kinetic energy of the bob of mass m is.



- (a) $mg l$
- (b) $0.5 mg l$
- (c) $mg l \sin \theta$
- (d) $mg l (1 - \cos \theta)$

Q 63.

A standing wave is represented by: $y = a \sin(100 t) \cdot \cos(0.01 x)$; where t in seconds and x in metres. The velocity of wave is

- (a) 10^4 m/s
- (b) 1 m/s
- (c) 10^{-4} m/s
- (d) 10^{-2} m/s

Q 64.

The amplitude of the vibrating particle due to superposition of two simple harmonic motions of $y_1 = \sin(\omega t + \pi/3)$ and $y_2 = \sin(\omega t)$ is

- (a) 1
- (b) $\sqrt{2}$
- (c) $\sqrt{3}$
- (d) 2

Q 65.

In a sinusoidal wave, the time required for a particular point to move from maximum displacement is 0.17 sec. The frequency of the wave is

- (a) 0.36 Hz
- (b) 0.73 hz
- (c) 1.47 Hz
- (d) 2.94 Hz

Q 66.

When a current flows in a wire, there exists an electric field in the direction of

- (a) flow of current
- (b) opposite to the flow of current
- (c) perpendicular to the flow of current
- (d) at an angle of 45° to the flow of current

Q 67.

Two identical mercury drops, each of radius r are charged to the same potential V . if the mercury drops coalesce to form a big drop of radius R , then potential of the combined drop will be

- (a) $(b)^{3/2}$
- (b) $(b)^{2/3}$
- (c) $(c)^{2/3}$
- (d) $(c)^{1/2}$

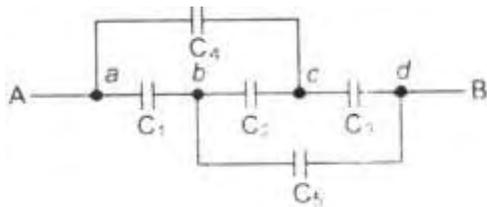
Q 68.

The energy stored in a capacitor is actually stored

- (a) between the plates
- (b) on the positive plate
- (c) on the negative plate
- (d) on the outer surfaces of the plates

Q 69.

In the given figure, the capacitors C_1 , C_3 , C_4 , C_5 have a capacitance of $4 \mu\text{F}$ each. If the capacitor C_2 has a capacitance between A and B is



- (a) $2 \mu\text{F}$
- (b) $4 \mu\text{F}$
- (c) $6 \mu\text{F}$
- (d) $8 \mu\text{F}$

Q 70.

A 100 W , 200 V bulb is connected to a 160 volts supply. The actual power consumption would be

- (a) 64 W
- (b) 80 W
- (c) 100 W
- (d) 125 W

Q 71.

To convert a galvanometer in a voltmeter. We must connect a

- (a) low resistance in series
- (b) high resistance in series
- (c) low resistance in parallel
- (d) high resistance in parallel

Q 72.

A galvanometer of $100\ \Omega$ resistance gives full scale deflection with $0.01\ \text{A}$ current. How much resistance should be connected to convert it into an ammeter of range $10\ \text{A}$?

- (a) $0.2\ \Omega$ in series
- (b) $0.2\ \Omega$ in parallel
- (c) $0.1\ \Omega$ in series
- (d) $0.1\ \Omega$ in parallel

Q 73.

The potential difference between two electrodes of a galvanic cell, in an open circuit, is known as

- (a) current
- (b) impedance
- (c) potential difference
- (d) electromotive force

Q 74.

The magnetic field B_0 due to a current carrying circular loop of radius $12\ \text{cm}$ at its centre is $0.50 \times 10^{-4}\ \text{T}$, The magnetic field due to this loop at a point on the axis at a distance of $5\ \text{cm}$ from the centre is

- (a) $3.5 \times 10^{-9}\ \text{T}$
- (b) $5.3 \times 10^{-9}\ \text{T}$
- (c) $9.3 \times 10^{-5}\ \text{T}$
- (d) $3.9 \times 10^{-5}\ \text{T}$

Q 75.

An e.m.f. of $15\ \text{volt}$ is applied in a circuit containing $5\ \text{H}$ inductance and $10\ \Omega$ resistance. The ratio of currents at $t = \infty$ and at $t = 1\ \text{sec}$ is

- (a) e^{-1}
- (b) $1 - e$
- (c) $e^{1/2}/e^{1/2} - 1$
- (d) $e^2/e^2 - 1$

Q 76.

Two magnets of magnetic moments M and $2M$ are placed in a vibration magnetometer, with identical poles in the same direction. The time-period of vibration of the combination is T_1 . If the same magnets are placed with opposite poles together and vibrate with timeperiod T_2 , then

- (a) $T_2 = T_1$
- (b) $T_2 > T_1$
- (c) $T_2 < T_1$
- (d) T_2 is infinite

Q 77.

Which of the following waves have the maximum wavelength ?

- (a) X-rays
- (b) radio waves
- (c) UV rays
- (d) IR rays

Q 78.

At what angle, a ray of light will be incident on one face of an equilateral prism, so that the emergent ray may graze the second surface of the ($\mu = 1.5$).

- (a) 18°
- (b) 28°
- (c) 32°
- (d) 38°

Q 79.

A paper, with two marks having separation d , is held normal to the line of sight of an observer at distance of 50 cm. The diameter of the eye-lens of the observer is 2 mm. Which of the following is the least value of d , so that the marks can be seen as separate? (mean wavelength of visible light may be taken 5000 Å)

- (a) 0.125 cm
- (b) 1.225 cm
- (c) 1.525 cm
- (d) 2.125 cm

Q 80.

How many images will be formed if two mirrors are fitted on adjacent wall and one mirror on roof?

- (a) 2
- (b) 5
- (c) 7
- (d) 10

Q 81.

An optician prescribes spectacles to a patient with a combination of a convex lens of focal length 40 cm and concave lens 25 cm. The power of spectacles is

- (a) -1.5 D
- (b) -6.5 D
- (c) 1.5 D
- (d) 6.5 D

Q 82.

The velocity of an electron in the inner-most orbit of an atom is

- (a) zero
- (b) mean
- (c) lowest
- (d) highest

Q 83.

The hydrogen atom can give spectral lines in the Lyman, Balmer and Paschen series. Which of the following statement is correct ?

- (a) Paschen series is in visible region
- (b) balmer series is in visible region
- (c) lyman series is in infra-red region
- (d) Balmer series is in ultra violet-region

Q 84.

A sample of a radioactive substance contains 2828 atoms. If its half-life is 2 days, how many atoms will be left intact in the sample after one day ?

- (a) 1414
- (b) 707
- (c) 2000
- (d) 1000

Q 85.

In a nuclear reactor, the fast moving neutrons are slowed down by passing them through

- (a) oil
- (b) vacuum
- (c) heavy water
- (d) kerosene

CHEMISTRY

Q 86.

The unit of rate constant for the first order reaction is

- (a) sec^{-1}
- (b) mol. Ltr^{-1}
- (c) $\text{mol}^{-1} \cdot \text{ltr. Sec}^{-1}$
- (d) all of these

Q 87.

the charge of an electron is -1.6×10^{-19} C. The value of free charge on Li^+ ion will be

- (a) 3.6×10^{-19} C
- (b) 2.6×10^{-19} C
- (c) 1.6×10^{-19} C
- (d) 1×10^{-19} C

Q 88.

The maximum valency of an element with atomic number 7 is

- (a) 2
- (b) 3
- (c) 4
- (d) 5

Q 89.

How many grams of CaCO_3 will give 56 g of CaO ?

- (a) 120 g
- (b) 112 g
- (c) 100 g
- (d) 56 g

Q 90.

Which of the following has the same mass as that of an electron ?

- (a) photon
- (b) proton
- (c) positron
- (d) neutron

Q 91.

What is the value of carbonate hardness of water sample if 100 ml of it took 5 ml of 0.09 N HCl solution? (Molecular weight of $\text{Na}_2\text{CO}_3 = 106$)

- (a) 4.50 mg-eq/ltr.
- (b) 477.00 mg-eq/ltr.
- (c) 0.042 mg-eq/ltr.
- (d) 1.80 mg-eq/ltr.

Q 92.

The shape of IF_7 molecule is

- (a) octahedral
- (b) tetrahedral
- (c) trigonalbipyramidal
- (d) pentagonalbipyramidal

Q 93.

If the rate of diffusion of CH_4 is twice of that of a gas X, then what is the molecular mass of the gas X ?

- (a) 32
- (b) 64
- (c) 80
- (d) 96

Q 94.

The extraction of IA and IIA group metals is done by

- (a) carbon reduction
- (b) electrolytic reduction
- (c) metal displacement
- (d) alumino, thermic process

Q 100.

The maximum number of hydrogen bonds formed by a water molecule in ice is

- (a) 4
- (b) 3
- (c) 2
- (d) 1

Q 101. Which of the following shows electrical conduction?

- (a) Sodium
- (b) graphite
- (c) diamond
- (d) potassium

Q 102.

The rate of a chemical reaction depends upon

- (a) time
- (b) pressure
- (c) concentration
- (d) all of these

Q 103.

The interatomic distances in H_2 and Cl_2 molecules are 74 and 198 pm respectively. The bond length of HCl is

- (a) 124 pm
- (b) 136 pm
- (c) 272 pm
- (d) 248 pm

Q 104.

The electronic configuration of Mn^{2+} ion in its ground state is

- (a) $3d^5 4s^0$
- (b) $3d^4 s^1$
- (c) $3d^3 4s^2$
- (d) $3d^2 4s^2 4p^2$

Q 105.

The shape of ethylene molecule is

- (a) square planar
- (b) tetrahedral
- (c) pyramidal
- (d) linear

Q 106.

An isomer of ethanol is

- (a) ethanol
- (b) methanol
- (c) diethyl ether
- (d) dimethyl ether

Q 107.

The hybridization of carbons of C—C single bond of $\text{HC}=\text{C}-\text{CH}=\text{CH}_2$ is

- (a) $\text{sp}^3 - \text{sp}^3$
- (b) $\text{sp}^2 - \text{sp}^3$
- (c) $\text{sp}^3 - \text{sp}$
- (d) $\text{sp} - \text{sp}^2$

Q 108.

The positive charge of an atom is

- (a) spread all over the atom
- (b) distributed around the nucleus
- (c) concentrated at the nucleus
- (d) all of these

Q 109.

During the electrolysis of an electrolyte, the number of ions produced, is directly proportional to the

- (a) time consumed
- (b) mass of electrons
- (c) quantity of electricity passed
- (d) electro chemical equivalent of electrolyte

Q 110.

In graphite, carbon atoms are joined together due to

- (a) ionic bonding
- (b) covalent bonding
- (c) metallic bonding
- (d) Van der waal's forces

Q 111.

Carborundum is

- (a) SiC
- (b) AlCl₃
- (c) Al₂(SO₄)₃
- (d) Al₂O₃. 2H₂O

Q 112.

Which of the following is called laughing gas ?

- (a) nitric oxide
- (b) nitrous oxide
- (c) dinitrogen trioxide
- (d) dinitrogenpentoxide

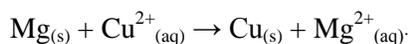
Q 113.

ZnO when heated with BaO at 1100°C gives a compound. Identify the compound

- (a) BaZnO₂
- (b) Ba + ZnO₂
- (c) BaCdO₂
- (d) BaO₂ + Zn

Q 114.

For a cell, the cell reaction is



If standard reduction potentials of Mg and Cu are -2.37 V and $+0.34 \text{ V}$, then e.m.f. of the cell of

- (a) 2.03 V
- (b) -2.03 V
- (c) 2.71 V
- (d) -2.71 V

Q 115.

In the metallurgy of zinc, the zinc dust obtained from roasting contains some zinc oxide. How is this removed ?

- (a) smelting is employed
- (b) X-ray method is used
- (c) absorbance of UV light
- (d) shock coding with a shower of lead

Q 116.

Excess of ethanol when heated with concentrated H_2SO_4 at $140^\circ C$, the compound obtained is

- (a) Ethane
- (b) Diethyl sulphate
- (c) Ethoxy ethane
- (d) Ethyl hydrogensulphate

Q 117.

when metallic copper comes in contact with moisture, a green powdery/pasty coating can be seen over it. This is chemically known as

- (a) Copper sulphide – Copper carbonate
- (b) Copper sulphate – Copper sulphide
- (c) Copper carbonate – Copper sulphate
- (d) Copper carbonate – Copper sulphate

Q 118.

Which of the following is the most stable carbonium ion among the following?

- (a) $C_6H_5CH_2^+$
- (b) $CH_3CH_2^+$
- (c) $C_6H_5-CH_2CH_2^+$
- (d) $C_6H_5CH^+-C_6H_5$

Q 119.

If Na is heated in presence of air, it forms

- (a) Na_2CO_3
- (b) Na_2O_2
- (c) Na_2O
- (d) both (b) and (c)

Q 120.

The indicator used in the titration of iodine against sodium thiosulphate is

- (a) starch
- (b) potassium
- (c) K_2CrO_4
- (d) $K_3Fe(CN)_6$

Q 123.

The reaction of an aldehyde with hydroxylamine gives a product which is called

- (a) aldoxime
- (b) hydrazine
- (c) semicarbazone
- (d) aminohydroxide

Q 124.

According to the nuclear reaction:

${}_4Be + {}_2He^4 \rightarrow {}_6C^{12} + {}_0n^1$, mass no. of (Be) atom is

- (a) 4
- (b) 6
- (c) 7
- (d) 9

Q 125. The bad smelling substance, formed by the action of alcoholic caustic potash on chloroform and aniline, is

- (a) nitrobenzene
- (b) phenyl cyanide
- (c) phenylisocyanide
- (d) phenylisocyanate

LOGICAL REASONING

Direction (Q. 126 – 127). Choose the correct relation.

Q 126.

pigeon: peace ::

- (a) crown: head
- (b) war: liberty
- (c) laurels: victory
- (d) white flag: surrender

Q 127.

tall: dwarf :: genius:

- (a) shot
- (b) long
- (c) idiot
- (d) intelligence

Direction (Q. 128 – 129). Solve the following problems.

Q 128.

The number which will come next in the series 2,6,12,20,....., is

- (a) 30
- (b) 32
- (c) 38
- (d) 40

Q 129.

0,....., 8,27,64,125

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Q 130.

Which one set of letters when sequentially placed in the gaps of the given letter series shall complete it?

bab_b_b_abb

- (a) abba
- (b) bbba
- (c) abab
- (d) babb

Q 131.

From the given alternatives, the word which cannot be formed from the letters used in the word SUPERIMPOSABLE is

- (a) POSSIBLE
- (b) REPOSURE
- (c) SPIRE
- (d) REPTILE

Q 132.

If the code of STEADY is 931785 and that of ENTRY is 12345, then what will be the code of SEDATE?

- (a) 814195
- (b) 954185
- (c) 614781
- (d) 918731

Q 133.

$$\sqrt{4/3} - \sqrt{3/4} =$$

- (a) 0
- (b) 1
- (c) $1/2\sqrt{3}$
- (d) $5\sqrt{3/7}$

Q 134.

If $5 + 2\sqrt{3/7} + 4\sqrt{3} = a + b\sqrt{3}$, then the values of a and b are

- (a) a = 11, b = 11
- (b) a = 11, b = 6
- (c) a = 11, b = - 6
- (d) a = -11, b = - 6

Q 135.

If the sum of three consecutive odd numbers is 57, then the middle number is

- (a) 17
- (b) 19
- (c) 21
- (d) 23

ENGLISH

Directions (Q. 136 – 138). Choose the correct word to complete the sentences from the given choices.

Q 136.

There is no rose.....has a thorn.

- (a) which
- (b) but
- (c) whom
- (d) as

Q 137

.....are your pencils.

- (a) this
- (b) their
- (c) those
- (d) that

Q 138

.....is doubtful whether he will come.

- (a) it
- (b) that
- (c) their
- (d) its

Directions (Q. 139 – 141). In each of the following questions, out of the given alternatives, choose the synonym of the given word.

Q 139.

Economic

- (a) save
- (b) reduce
- (c) minimize
- (d) accumulate

Q 140.

Ascend

- (a) leap
- (b) grow
- (c) deviate
- (d) mount

Q 141.

Stupid

- (a) silly
- (b) insane
- (c) disobedient
- (d) incapable

Directions (Q. 142 – 144). In each of the following questions, out of the given alternatives, choose the antonym of the given word.

Q 142.

Accuracy

- (a) faulty
- (b) true
- (c) correct
- (d) right

Q 143.

Amnesty

- (a) reward
- (b) gift
- (c) crowd
- (d) punishment

Q 144.

Density

- (a) thinness
- (b) thickness
- (c) toughness
- (d) kindness

Directions (Q. 145 -147). In each of the following questions, fill in the blanks with the correct word from the given options.

Q 145.

He.....to office daily.

- (a) go
- (b) goes
- (c) went
- (d) going

Q 146.

Distribute these sweets.....the poor students of this school.

- (a) between
- (b) among
- (c) by
- (d) from

Q 147.

Although he is lame.....he can walk fast.

- (a) but
- (b) as
- (c) yet
- (d) still

Directions (Q. 148 – 150). Read the following passage carefully and answer the questions given below it.

Though the US prides itself on being a leader in the world community, a recent report shows that it lags far behind other industrialised countries in meeting the needs of its youngest and most vulnerable citizens. The US has a higher infant mortality rate, a higher proportion of low birth weight babies, a smaller proportion of babies immunised against childhood diseases and a much higher rate of adolescent pregnancies. These findings, described as a ‘quiet crisis’ requiring immediate and far-reaching action, appeared in a report prepared by a task force of educators, doctors, politicians and business people. According to the report, a fourth of the nation’s 12 million infants and toddlers live in poverty. As many as half confront risk factors that could harm their ability to develop intellectually, physically and socially. Child immunisations are too low, more children are born into poverty, more are in substandard care while their parents work and more are being raised by single parents. When taken together, these and other risk factors can lead to educational and health problems that are much harder and more costly to reverse.

The crisis begins in the womb with unplanned parent-hood. Women with unplanned pregnancies 80% of teenage pregnancies and 56% of all pregnancies are unplanned. The problems continue after birth where unplanned pregnancies and unstable partnerships often go hand in hand. Since 1950, the number of single parent families has nearly tripled. More than 25 per cent of all births today are to unmarried mothers. As the number of single-parent families grows and more women enter the work force, infants and toddlers are increasingly in the care of people other than their parents. More disturbingly, recent statistics show that American parents are increasingly neglecting or abusing their children. In only four years from 1987-1991, the number of children in foster care increased by over 50 per cent. Babies under the age of one are the fastest growing category of children entering foster care. The crisis affects children under the age of three most severely, the report says. Yes, it is this period-from infancy through pre-school years – that sets the stage for a child’s future.

Q 148.

The number of children born to married mothers in the US is approximately how many times the number of children born to unwed mothers.?

- (a) 3.5 times
- (b) 3 times
- (c) 2 times
- (d) 1.5 times

Q 149.

Children born out of unplanned pregnancies are highly vulnerable because

- (a) their parents are mostly poor
- (b) they are raised by single parents
- (c) they are mostly mainourished
- (d) they are less likely to receive pre-nantal care

Q 150.

Read the following factors A, B and C and decide which one or two of them is/are responsible for the physical, intellectual and social under-development of infants in the US?

A. Illiteracy of parents

B. lack of parental care

C. Poverty

- (a) only A
- (b) only B
- (c) only C
- (d) both B and C