

Practice Paper-XI

MATHEMATICS

Q 1.

In a triangle ABC, $\operatorname{cosec} A (\sin B \cos C + \cos B \sin C)$ equals

- (a) $\frac{c}{2}$
- (b) $\frac{a}{c}$
- (c) 1
- (d) 0

Q 2.

If $y = \frac{1}{x-2}$, $x \neq 2$ for what value, if any, of x is $y^2 = -2y^3$?

- (a) -4
- (b) $\frac{1}{2}$
- (c) 0
- (d) no value

Q 3.

The principle value of $\sin^{-1} \sin \frac{2\pi}{3}$ is

- (a) $-\frac{3\pi}{3}$
- (b) $\frac{2\pi}{3}$
- (c) $\frac{\pi}{3}$
- (d) $\frac{4\pi}{3}$

Q 4.

If the angles of a triangles are in the raito 1 : 2 3:, then the sides are in the ratio

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

Q 5.

The equation $2 \sin x + \cos x = 3$ has

- (a) only one solution
- (b) no solution
- (c) infinitely many solution
- (d) finitely many solution

Q 6.

If $f(x) = 3x + 2/5x - 3$, then

- (a) $F^{-1}(x) = f(x)$
- (b) $F^{-1}(x) = -f(x)$
- (c) $F(f(x)) = -x$
- (d) $F^{-1}(x) = -1/19$

Q 7.

The function $f(x) = x^3$ is increasing in

- (a) $(0, \infty)$
- (b) $(-\infty, 0)$
- (c) $(-\infty, \infty)$
- (d) $(-\infty, 1) \cup (1, \infty)$

Q 8.

If $\sin x + \cos x = a$, then $|\sin x - \cos x|$ equals

- (a) $\sqrt{2 - a^2}$
- (b) $\sqrt{2 + a^2}$
- (c) $\sqrt{a^2 - 2}$
- (d) none of these

Q 9.

In $(0, \pi/2)$, the function $f(x) = x/\sin x$ is

- (a) An increasing function
- (b) A decreasing function
- (c) A constant function
- (d) None of these

Q 10.

Let $f(x) = x^3 + 3/2x^2 + 3x + 3$, then $f(x)$ is

- (a) An even function
- (b) An odd function
- (c) An increasing function
- (d) A decreasing function

Q 11.

If $\tan\theta = m/n$, $0 < \theta < \pi$, then $\sin\theta$ is equal to

- (a) $m/\sqrt{m^2 + n^2}$
- (b) $-m/\sqrt{m^2 + n^2}$
- (c) $|m|/\sqrt{m^2 + n^2}$
- (d) None of these

Q 12.

The values of $\cos 52^\circ + \cos 68^\circ + \cos 172^\circ$ is equal to

- (a) 0
- (b) 2
- (c) 1/2
- (d) None of these

Q 13.

If $y = a \sin mx + b \cos mx$, then d^2y/dx^2 is equal to

- (a) M^2y
- (b) $-m^2y$
- (c) My
- (d) None of these

Q 14.

If $f(x) = e^x g(x)$, $g(0) = 2$, $g'(0) = 1$, then $f'(0)$ is

- (a) 1
- (b) 3
- (c) 2
- (d) 0

Q 15.

The value of $\int_1^3 \frac{\cos(\log x)}{x} dx$ is equal to

- (a) $\sin(\log 3)$
- (b) $\cos(\log 3)$
- (c) $\frac{\pi}{4}$
- (d) 1

Q 16.

$\int \sqrt{x^2 + a^2} dx$ is equal to

- (a) $\frac{x}{2} \sqrt{x^2 + a^2} - \frac{a^2}{2} \log(x + \sqrt{x^2 + a^2})$
- (b) $\frac{x}{2} \sqrt{x^2 + a^2} - \frac{a^2}{2} \sin^{-2}\left(\frac{x}{a}\right)$
- (c) $\frac{x}{2} \sqrt{x^2 + a^2} + \frac{a^2}{2} \log(x + \sqrt{x^2 + a^2})$
- (d) *none of these*

Q 17.

Differential coefficient of a function $f(g(x))$ with respect to the function $g(x)$ is

- (a) $F'(g(x))$
- (b) $F'(g(x)) g'(x)$
- (c) $F'(g(x))/g'(x)$
- (d) None of these

Q 18.

If $\lim_{x \rightarrow 0} \phi(x) = a^3$, $a \neq 0$, then $\lim_{x \rightarrow 0} \phi\left(\frac{x}{a}\right)$ is

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

Q 19.

The degree of the differential equation $(d^2y/dx^2) + (dy/dx)^2 - xy = 0$ is

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

Q 20.

The unit vector perpendicular to each of vectors $\hat{i} + 2\hat{j} + 3\hat{k}$ and $-3\hat{i} - 2\hat{j} - \hat{k}$ is

- (a) $\frac{1}{6\sqrt{5}}(8\hat{i} - 10\hat{j} + 4\hat{k})$
- (b) $8\hat{i} - 10\hat{j} + 4\hat{k}$
- (c) $8\hat{i} + 10\hat{j} + 4\hat{k}$
- (d) None of these

Q 21.

If G is the centroid of a triangle ABC and O is any point, then $\overline{OA} + \overline{OB} + \overline{OC}$ is equals to

- (a) \overline{OG}
- (b) $3\overline{OG}$
- (c) \overline{O}
- (d) none of these

Q 22.

The order and degree of the differential equation $d^2y/dx^2 = y + (dy/dx)^4$ are respectively

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

Q 23.

$$\int_0^x l \cos x \, dx =$$

- (a) 1
- (b) 2
- (c) 0
- (d) 3

Q 24.

The length of projection of the vector $3\hat{i} - \hat{j} - 2\hat{k}$ on the $\hat{i} - 2\hat{j} - 3\hat{k}$ is

- (a) $\frac{1}{16}$
- (b) $\sqrt{14}$
- (c) $\frac{14}{\sqrt{2}}$
- (d) None of these

Q 25.

If $\int_0^{\pi/2} \frac{d\theta}{9 \sin^2 \theta + 4 \cos^2 \theta} = k\pi$, then $k =$

- (a) $\frac{1}{16}$
- (b) $\frac{1}{12}$
- (c) $\frac{1}{8}$
- (d) $\frac{1}{3}$

Q 26.

The area bounded by the curve $x = at^2$, $y = 2at$ and x- axis is ($1 \leq t \leq 3$)

- (a) $26 a^2$
- (b) $8 a^2$
- (c) $26 a^2/3$
- (d) $104 a^2/3$

Q 27.

Vector projection of a vector \vec{a} on another vector \vec{b} is

- (a) $\vec{a} \cdot \vec{b}$
- (b) $(\vec{a} \cdot \vec{b}) \hat{b}$
- (c) $(\vec{a} \cdot \vec{b}) \vec{b}$
- (d) $\frac{(\vec{a} \cdot \vec{b})}{|\vec{b}|} \hat{b}$

Q 28.

If \vec{a} and \vec{b} are any two vectors, then $(\vec{a} \times \vec{b})^2 + (\vec{a} \cdot \vec{b})^2$ is equal to

- (a) $|\vec{a}|^2 |\vec{b}|^2$
- (b) $\lambda |\vec{a}|^2 |\vec{b}|^2$, where $|\lambda| < 1$
- (c) $|\vec{a}|^2 + |\vec{b}|^2$
- (d) none of these

Q 29.

The parabola $y^2 = 4ax$ and the circle $x^2 + y^2 - 2ax = 0$ touch each other at the point

- (a) (0, 0)
- (b) (a, 0)
- (c) (0, a)
- (d) None of these

Q 30.

Length of the common chord of the parabolas $y^2 = x$ and $x^2 = y$ is

- (a) 1
- (b) $\sqrt{2}$
- (c) $4\sqrt{2}$
- (d) None of these

Q 31.

The points $(0, 2, 0)$, $(\sqrt{3}, 1, 0)$ and $(1/\sqrt{3}, 1, 2\sqrt{2}/\sqrt{3})$ are the vertices of

- (a) A scalene triangle
- (b) An equilateral triangle
- (c) An isosceles triangle
- (d) None of these

Q 32.

The locus of a first degree equation in x , y and z is a

- (a) Straight line
- (b) Plane
- (c) Sphere
- (d) None of these

Q 33.

The point of contact of $3x + 4y + 7 = 0$ and $x^2 + y^2 - 4x - 6y - 12 = 0$ is

- (a) $(1, 1)$
- (b) $(-1, 1)$
- (c) $(1, -1)$
- (d) $(-1, -1)$

Q 34.

Three points A, B and C are collinear if the area of triangle ABC is

- (a) Greater than zero
- (b) Less than zero
- (c) Zero
- (d) None of these

Q 35.

Area of ΔABC whose vertices are $A(-1, 2, 3)$, $B(1, 1, 1)$ and $C(2, -1, 3)$ is

- (a) 9
- (b) 0
- (c) $9/2$
- (d) None of these

Q 36.

If the four points $(3, -2, 1)$, $(2, -3, -4)$, $(-1, 1, 2)$ and $(4, 5, \lambda)$ are coplanar, then λ is equal to

- (a) 0
- (b) $-17/146$
- (c) $-146/17$
- (d) None of these

Q 37.

The locus of a point, whose abscissa and ordinate are always equal is

- (a) $X + y = 0$
- (b) $X - y = 0$
- (c) $X + y = 1$
- (d) $X + y + 1 = 0$

Q 38.

The equation $|\vec{a}|^2 - \vec{r} \cdot (2\vec{i} + 4\vec{j} + 2\vec{k}) - 10 = 0$ represents a

- (a) plane
- (b) sphere of radius 4
- (c) sphere of radius 3
- (d) none of these

Q 39.

The number of sphere of a given radius which touch the coordinate planes is

- (a) 8
- (b) 4
- (c) 2
- (d) 1

Q 40.

Area of a triangle is 5 units, its two vertices are (2, 1) and (3, -2). Third vertex is on the line $y = x + 3$.
The coordinates of that vertex are

- (a) $(7/2, 13/2)$
- (b) (8, 14)
- (c) $(8/3, 5/3)$
- (d) $(7/3, 9/7)$

Q 41.

The projection of a line segment on the coordinates are 1, 2, 4 and 3 respectively.

The length of the line segment is

- (a) 19
- (b) 16
- (c) 13
- (d) 15

Q 42.

The co-ordinates of the point of intersection of the line $x - 6/-1 = y - 1/0 = z + 3/4$ and the plane $x + y - z = 3$ are

- (a) (2, 1, 0)
- (b) (7, -1, -7)
- (c) (1, 2, -6)
- (d) (5, -1, -1)

Q 43.

If $\text{cov}(x, y) = 0$, then the two lines of the regression are

- (a) Parallel
- (b) Coincident
- (c) At right angles
- (d) None of these

Q 44.

If the two lines of regression are at right angles, then $p(x, y)$ is equal to

- (a) 1
- (b) -1
- (c) $10r - 1$
- (d) 0

Q 45.

Two unlike parallel forces P and Q ($P \neq Q$) act at distinct points of a rigid body. The magnitude of their resultant is

- (a) $P - Q$
- (b) $Q - P$
- (c) $IP - Ql$
- (d) None of these

PHYSICS

Q 46.

The angle for which maximum height and horizontal range are same for a projectile is

- (a) 84°
- (b) 76°
- (c) 48°
- (d) 32°

Q 47.

A particle is moving with a constant speed along a straight line path. A force is not required to

- (a) Increase its speed
- (b) Decrease the momentum
- (c) Change the direction
- (d) Keep it moving with uniform velocity

Q 48.

an aeroplane moving horizontally with a speed of 720 km/h drops a food pocket, while flying at a height of 396.9 m. the time taken by a food pocket to reach the ground and its horizontal range is (Take $g = 9.8 \text{ m/sec}^2$)

- (a) 3 sec and 2000 m
- (b) 5 sec and 500 m
- (c) 8 sec and 1500 m
- (d) 9 sec and 1800 m

Q 49.

Two particles of equal mass are revolving in circular paths of radii r_1 and r_2 respectively with the same angular velocity. The ratio of their centripetal forces will be

- (a) r_1/r_2
- (b) r_2/r_1
- (c) $\sqrt{r_2/r_1}$
- (d) $(r_2/r_1)^2$

Q 50.

A particle is constrained to move on a straight line path. It returns to the starting point after 10 sec. the total distance covered by the particle during this time is 30 m. Which of the following statements about the motion of the particle is false?

- (a) displacement of the particle is zero
- (b) average speed of the particle is 3 m/s
- (c) displacement of the particle is 30 m
- (d) both (a) and (b)

Q 51.

The change of momentum in each ball of mass 60 g, moving in opposite directions with speeds 4 m/s collide and rebound with the same speed, is

- (a) 0.98 kg-m/s
- (b) 0.73 kg-m/s
- (c) 0.48 kg-m/s
- (d) 0.22 kg-m/s

Q 52

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 53.

Ratio of rotational and translational kinetic energies of a sphere is

- (a) 2/9
- (b) 2/7
- (c) 2/5
- (d) 2/3

Q 54.

The distance of a geostationary satellite from the centre of the earth (Radius, $R = 6400$ km) is nearest to

- (a) 5 R
- (b) 7 R
- (c) 10 R
- (d) 18 R

Q 55.

Which of the following law is related with pressure head, velocity head, and gravity head?

- (a) Stoke's law
- (b) Pascal's principle
- (c) Bernoulli's principle
- (d) Archimedes principle

Q 56.

weight of a body is maximum at

- (a) moon
- (b) poles of earth
- (c) equator of earth
- (d) centre of earth

Q 57.

Pick out the wrong pair

- (a) charge – coulomb
- (b) temperature – thermometer
- (c) pressure – barometer
- (d) specific gravity – hygrometer

Q 58.

A drop of liquid assumes spherical shape because of

- (a) density
- (b) viscosity
- (c) gravitation
- (d) surface tension

Q 59.

Which law states that – “If the pressure in a liquid is changed at particular point, the change is transmitted to the entire liquid without being diminished in magnitude.”

- (a) Stoke’s law
- (b) Pascal’s principle
- (c) Bernoulli’s principle
- (d) Archimedes principle

Q 60.

Which of the following cannot determine the state of a thermodynamic system ?

- (a) pressure and volume
- (b) volume and temperature
- (c) c)temperature and pressure
- (d) any one of pressure, volume or temperature

Q 61.

A Centigrade and a Fahrenheit thermometer are dipped in boiling water. The Water temperature is lowered until the Fahrenheit thermometer registers 140° . The fall in temperature as registered by the Centigrade thermometer will be

- (a) 30°
- (b) 40°
- (c) 60°
- (d) 80°

Q 62.

A particle executing S.H.M. has amplitude 0.01 and frequency 60 Hz. The maximum acceleration of the particle is

- (a) $144 \pi^2 \text{ m/s}^2$
- (b) $120 \pi^2 \text{ m/s}^2$
- (c) $80 \pi^2 \text{ m/s}^2$
- (d) $60 \pi^2 \text{ m/s}^2$

Q 63.

An organ pipe closed at one end vibrating in its first overtone and another pipe p_2 , open at both ends vibrating in its third overtone are in resonance with a given tuning fork. The ratio of lengths of p_1 and p_2 is

- (a) 1 : 2
- (b) 1: 3
- (c) 3 : 8
- (d) 3: 4

Q 64.

If the length of a closed organ pipe is 1 m and velocity of sound is 330 m/s, then the frequency for the second note is

- (a) $4 \times 330/4$ Hz
- (b) $3 \times 330/4$ Hz
- (c) $2 \times 330/4$ Hz
- (d) $2 \times 330/4$ Hz

Q 65.

A simple pendulum is executing simple harmonic motion with a time period T . If the length of the pendulum is increased by 21%, the increase in the time period of the pendulum of increased length is

- (a) 10%
- (b) 21%
- (c) 30%
- (d) 50%

Q 66.

A lightly damped oscillator with a frequency (ω) is set in motion by harmonic driving force of frequency (n). When $n < \omega$, then response of the oscillator is controlled by

- (a) spring constant
- (b) inertia of the mass
- (c) oscillator frequency
- (d) damping coefficient

Q 67.

Sound travels as

- (a) longitudinal waves
- (b) transverse waves
- (c) electromagnetic waves
- (d) none of these

Q 68.

Two concentric spheres of radii R and r have similar charges with equal surface densities (σ). What is the electric potential at their common centre?

- (a) σ/ϵ_0
- (b) $R\sigma/r\epsilon_0$
- (c) $\sigma/\epsilon_0 (R + r)$
- (d) $\sigma/\epsilon_0 (R - r)$

Q 69.

A potentiometer consists of a wire of length 4 m and resistance 10Ω . It is connected to a cell of e.m.f. 2V. The potential difference per unit length of the wire will be

- (a) 0.5 V/m
- (b) 2 V/m
- (c) 5 V/m
- (d) 10 V/m

Q 70.

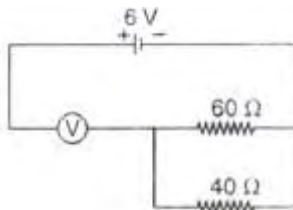
Which of the following does not obey Ohm's law?

- (a) copper
- (b) aluminium
- (c) diode-valve
- (d) none of these

Q 71.

The measurement of voltmeter in the following circuit is

- (a) 2.4 v
- (b) 3.4 v
- (c) 4.0 v
- (d) 6.0 v



Q 72.

The electric field required to keep q water drop of mass ' m ' just to remain suspended, when charged with one electron is

- (a) mg
- (b) emg
- (c) mg/g
- (d) em/g

Q73.

From a point charge. There is a fixed point A. At A, there is an electric field of 500 V/m and potential difference of 3000 V. Distance between point charge and A is

- (a) 6 m
- (b) 12 m
- (c) 16 m
- (d) 24 m

Q 74.

Three bulbs of 40 W, 60 W and 100 W are arranged in series with 220 V. Which bulb has minimum resistance?

- (a) 40 W
- (b) 60 W
- (c) 100 W
- (d) equal in all bulbs

Q 75.

A proton is passing from a fixed place with constant velocity. If E and B are electric and magnetic fields respectively, then which of the following statement is true?

- (a) $E \neq 0$ and $B = 0$
- (b) $B \neq 0$ and $E = 0$
- (c) $E \neq 0$ and $B \neq 0$
- (d) $E = 0$ and $B = 0$

Q 76.

If the velocity of radio waves is 3×10^5 km/s, then frequency corresponding to wavelength of 300 m is

- (a) 10 kHz
- (b) 1 MHz
- (c) 1 kHz
- (d) 10 MHz

Q 77.

In the given nuclear reaction, how many α and particles are emitted ${}_{92}\text{X}^{235} \rightarrow {}_{82}\text{Y}^{207}$?

- (a) 3 α particles and 2 β particle
- (b) 4 α particles and 3 β particle
- (c) 6 α particles and 4 β particle
- (d) 7 α particles and 4 β particle

Q 78.

Which radiation in sunlight causes heating affect?

- (a) ultraviolet
- (b) infra-red
- (c) visible light
- (d) all of these

Q 79.

Which of the following phenomenon shows the transverse nature of light?

- (a) diffraction
- (b) polarization
- (c) interference
- (d) photoelectric affect

Q 80.

The refractive angles of two prisms made of crown glass are 10° and 20° respectively. The ratio of their color deviation powers will be

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

Q 81.

Betatron is used for accelerating

- (a) protons
- (b) photons
- (c) neutrons
- (d) electrons

Q 82.

Which of the following color has the maximum speed in glass?

- (a) red
- (b) black
- (c) white
- (d) violet

Q 83.

Rutherford's α -particle experiment shows that the atoms have

- (a) proton
- (b) nucleus
- (c) neutron
- (d) electrons

Q 84.

The energy of the ground electronic state of hydrogen atom is -13.6 eV. The energy of the first excited state will be

- (a) -3.4 eV
- (b) -6.8 eV
- (c) -27.2 eV
- (d) -52.4 eV

Q 85.

Moderator used in nuclear reactor is

- (a) ice
- (b) boron rods
- (c) cadmium rods
- (d) heavy water

CHEMISTRY

Q 86.

An element having high first ionization energy is

- (a) inert gas
- (b) transition element
- (c) representative element
- (d) inner transition element

Q 87.

Isotopes are those substances which have

- (a) same number of protons
- (b) same number of neutrons
- (c) same number of nucleons
- (d) same number of positrons

Q 88.

Rutherford's atomic model suggests the existence of

- (a) atom
- (b) nucleus
- (c) α - particles
- (d) mesons

Q 89.

In which of following there exists a $p\pi - d\pi$ bonding?

- (a) diamond
- (b) graphite
- (c) dimethylamine
- (d) trisilylamine

Q 90.

Which of the following is used as a moderator in nuclear reactor?

- (a) H_2O
- (b) D_2O
- (c) Alum
- (d) any of these

Q 91.

At $80^\circ C$, distilled water has $[H_3O^+]$ concentration equal to 1×10^6 mole/litre. The value of K_w at this temperature will be

- (a) 1×10^{-6}
- (b) 1×10^{-9}
- (c) 1×10^{-12}
- (d) 1×10^{-15}

Q 92.

When 0.5 g of sulphur is burnt to SO_2 , 4.6 kJ of heat is liberated. The enthalpy of formation of sulphur dioxide is (Molecular weight of S = 32 O = 16)

- (a) + 147.2 kJ
- (b) - 147.2 kJ
- (c) + 294.4 kJ
- (d) - 294.4 kJ

Q 93.

The internal energy of a substance

- (a) decreases with increase in temperature
- (b) increases with increase in temperature
- (c) calculated by the relation $E = mc^2$
- (d) remains same with change in temperature

Q 94.

At 700 K, the equilibrium constant K_p for the reaction $2SO_3(g) = 2SO_2(g) + O_2(g)$ and K_p is 14, ($R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$). The numerical value in moles per litre of K_c for this reaction at the same temperature will be

- (a) $3.09 \times 10^{-7} \text{ mol-litre}$
- (b) $5.07 \times 10^{-8} \text{ mol-litre}$
- (c) $8.18 \times 10^{-9} \text{ mol-litre}$
- (d) $9.24 \times 10^{-10} \text{ mol-litre}$

Q 95.

In the reaction: $H_2S \rightleftharpoons 2H^+ + S^{2-}$, when NH_4OH is added, then

- (a) S^{2-} is precipitated
- (b) no action takes place
- (c) concentration of S^{2-} decreases
- (d) concentration of S^{2-} increases

Q 96.

At 25°C the pH value of a solution is 6. The solution is

- (a) basic
- (b) acidic
- (c) neutral
- (d) alkaline

Q 97.

The oxidation number of nitrogen in HNO_3 is

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

Q 98.

The e.m.f. of a galvanic cell with electrode potentials of $Zn^{+2}/Zn = + 0.76$ V and that of $Cu^{+2}/Cu = - 0.34$ V is

- (a) $- 1.1$ V
- (b) $+ 1.1$ V
- (c) $+ 0.34$ V
- (d) $+ 0.76$ V

Q 99.

Effect of temperature on the reaction rate is given by

- (a) Claisen-Clapeyron equation
- (b) Arrhenius equation
- (c) Gibbs-Helmholtz equation
- (d) kirchhoff's equation

Q 100.

In preparation of sulphuric acid, vanadium pentoxide is used in which of the following reaction?

- (a) $S + O_2 \rightarrow SO_2$
- (b) $2SO_2 + O_2 \rightarrow 2SO_3$
- (c) $SO_2 + H_2O \rightarrow H_2SO_4$
- (d) $N_2 + 3H_2 \rightarrow 2NH_3$

Q 101.

Which of the following is baking soda ?

- (a) sodium carbonate
- (b) sodium bicarbonate
- (c) ammonia carbonate
- (d) potassium bicarbonate

Q 102.

Nessler's reagent is

- (a) $KHgI_4$
- (b) K_2HgI_4
- (c) $KHgI_4 + NH_4OH$
- (d) $HgH^+ NH_4OH$

Q 103.

In which of the following process, fused sodium hydroxide is electrolyzed for the extraction of sodium?

- (a) Castner's process
- (b) Down's process
- (c) cyanide process
- (d) both (b) and (c)

Q 104.

When isomers have the same structural formula but differ in the relative arrangement of their atoms or group then they are called

- (a) mesomers.
- (b) stereoisomers
- (c) optical isomers
- (d) geometricalmesomers

Q 105.

Toluene reacts with chromyl chloride and forms

- (a) chlorotoluene
- (b) benzaldehyde
- (c) benzyl chloride
- (d) benzoic acid

Q 106.

Propane is obtained from propene, by which of the following methods ?

- (a) Wurtz reaction
- (b) Dehydrogenation
- (c) Frakland reaction
- (d) Catalytic hydrogenation

Q 107.

In Kjeldahl's method, CuSO_4 acts as

- (a) oxidizing agent
- (b) reducing agent
- (c) hydrolyzing agent
- (d) catalytic' agent

Q 108.

The percentage of sulphur in the organic compound, when 0.2595 g of a sulphur containing organic compound in a quantitative analysis by Carius method yielded 0.35 g of barium sulphate is

- (a) 14.52%
- (b) 16.52%
- (c) 18.52%
- (d) 19.52%

Q 109.

The second order Bragg's diffraction of X-rays with wavelength 1 \AA form a set of parallel planes in a metal occurs at an angle of 60° . The distance between the scattering planes in the crystal is

- (a) 1.00 \AA
- (b) 1.15 \AA
- (c) 2.00 \AA
- (d) 2.575 \AA

Q 110.

Solutions having same osmotic concentration are called

- (a) hypotonic
- (b) hypertonic
- (c) isotonic
- (d) normal

Q 111.

if 5.85 g of NaCl (Mol. Wt. 58.5) is dissolved in water and the solution is made up to 0.5 litre, then molarity of the solution will be

- (a) 0.1
- (b) 0.2
- (c) 0.4
- (d) 1.0

Q 112.

In a face centered cubic cell, an atom at the face contributes to the unit cell

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

Q 113.

If 0.5 amp current is passed through acidified silver nitrate solution for 10 minutes. The mass of silver deposited on cathode, is (eq. wt. of silver nitrate = 108)

- (a) 0.235 g
- (b) 0.336 g
- (c) 0.536 g
- (d) 0.636 g

Q 114.

A solution of a salt of a metal was electrolyzed for 150 minutes with a current of 0.15 amperes. The weight of metal deposited was 0.783 gm. The equivalent weight of the metal is

- (a) 55.97
- (b) 65.97 gm
- (c) 75.97 gm
- (d) 85.97 gm

Q 115.

A gaseous hypothetical chemical equation $2A \rightleftharpoons 4B + C$ is carried out in a closed vessel. The concentration of B is found to increase by $5 \times 10^{-3} \text{ mol L}^{-1}$ in 10 second.

The rate of appearance of B is

- (a) $5 \times 10^{-4} \text{ mol}^{-1} \text{ sec}^{-1}$
- (b) $5 \times 10^{-5} \text{ mol}^{-1} \text{ sec}^{-1}$
- (c) $6 \times 10^{-5} \text{ mol}^{-1} \text{ sec}^{-1}$
- (d) $4 \times 10^{-4} \text{ mol}^{-1} \text{ sec}^{-1}$

Q 116.

The alcohol, that is used as a beverage, is

- (a) propanol
- (b) butanol
- (c) ethanol
- (d) methanol

Q 117.

The boiling point of alcohol is higher than that of ether because of

- (a) higher molecular weight
- (b) association of molecule
- (c) presence of hydroxyl group
- (d) hydrogen bonding between the molecules

Q 118.

Which of the following compounds is resistant to nucleophilic attack by hydroxyl ions ?

- (a) acetamide
- (b) acetonitrile
- (c) dimethyl ether
- (d) methyl acetate

Q 119.

An aldehyde can undergo the aldol condensation having

- (a) an aromatic ring
- (b) no alpha H atom
- (c) at least one alpha H atom
- (d) at least one beta H atom

Q 120.

When phenol reacts with ammonia in presence of ZnCl_2 at 300°C , it gives

- (a) primary amine
- (b) secondary amine
- (c) tertiary amine
- (d) both (b) and (c)

Q 121.

Nitrobenzene on further excessive nitration gives

- (a) trinitrobenzene
- (b) m-dinitrobenzene
- (c) p-dinitrobenzene
- (d) all of these

Q 122.

Which of the following statements is correct regarding the preparation of ethers ?

- (a) ethers can be prepared by the action of Grignard reagent
- (b) ethers can be prepared by action of diazomethane with acetic acid
- (c) ethers may be prepared by heating allyl halides with dry ferrous sulphide
- (d) both (b) and (c)

Q 123.

Which of the following is formed when n-butyllithium reacts with tin (II) chloride ?

- (a) UBr
- (b) EtIb
- (c) $(C_4H_9)_4Sn$
- (d) $(C_2H_5)_4Pb$

Q 124.

Which of the following compounds is brown colored ?

- (a) $Fe[Fe(CN)_4]$
- (b) $Fe[Fe(CN)_6]$
- (c) $Fe_4[Fe(CN)_6]$
- (d) $K_2Fe[Fe(CN)_6]$

Q 125.

The number of β and β^- -particles emitted in nuclear reaction ${}_{90}Th^{228} \rightarrow {}_{83}Bi^{212}$ are respectively

- (a) 4, 1
- (b) 3, 7
- (c) 8, 1
- (d) 4, 7

INTELLIGENCE, LOGIC & REASONING

Q 126.

TIME: Clock: : Pressure : ?

- (a) Hydrometer
- (b) Voltmeter
- (c) Ammeter
- (d) Barometer

Q 127.

The colour of the paint isfrom the walls

- (a) corroding
- (b) sticking
- (c) eroding
- (d) falling

Q 128.

If in a certain code STUDENT is coded as TSDUNET, then how TEACHER will be coded ?

- (a) ATEACHER
- (b) REHACTA
- (c) ETCAEHR
- (d) ETCHAER

Q 129.

Hoof : Horse : : ? : Man

- (a) Foot
- (b) Leg
- (c) Arm
- (d) hand

Q 130.

If 35246 is coded as 63458; than how 24321 will be coded ?

- (a) 12234
- (b) 14223
- (c) 12423
- (d) 12243

Directions (Q. 131 – 133): find the number which will come next in the series.

Q 131.

2, 5, 11, 23, __

- (a) 34
- (b) 42
- (c) 36
- (d) 47

Q 132.

3, 14, 47, __, 443, 1334

- (a) 89
- (b) 119
- (c) 137
- (d) 146

Q 133.

26, 23, 20, 17, 14, 11, _.

- (a) 5
- (b) 6
- (c) 8
- (d) 7

Q 134.

If $a + b + c = 0$, then $a^3 + b^3 + c^3 =$

- (a) 0
- (b) 1
- (c) $a^3b^3c^3$
- (d) $3abc$

Q 135.

All the prime factors of 182 are

- (a) 2 and 13
- (b) 2 and 7
- (c) 7 and 13
- (d) 2, 7 and 13

ENGLISH LANGUAGE & COMPREHENSION

Directions (Q. 136 – 138): In the following questions, the first and the last parts of the sentence are numbered 1 and 6. The rest part of the sentence is split into four parts and named P, Q, R and S. These four parts are not given in their proper order. Read the sentence and find out which of the four combinations is correct.

Q 136.

1. If Socrates

P :innocent St. Joan was at

Q :the age of seventy

R :it may be imagined how

S :was innocent at

6. the age of seventeen

The correct sequence should be

- (a) QUSP
- (b) RPSQ
- (c) PRSQ
- (d) SQRP

Q 137.

1. It was all

P :that seemed

Q :and glamorous here

R :very wonderful

S :in the old places

6. so ordinary

The correct sequence should be

- (a) QSPR
- (b) SPRQ
- (c) RQSP
- (d) PRSQ

Q 138.

1. If you feed a dog or tame a bear by hand,

P :or until they succeed in getting it

Q :and tear and pull at it.

R :they get their teeth into the meat

S :until they bite a piece off,

6. all out of your hand.

The correct sequence should be

- (a) PSRQ
- (b) SQRP
- (c) RPSQ
- (d) RQSP

Directions (Q. 139 – 141): In the following questions, fill in the blanks with the correct word from the given options.

Q 139.

the earth.....round the Sun.

- (a) move
- (b) moves
- (c) moved
- (d) moving

Q 140.

I..... him only one letter up to now.

- (a) sent
- (b) have sent
- (c) have been sending
- (d) shall send

Q 141.

I shall telephone you when he.....back.

- (a) comes
- (b) coming
- (c) shall come
- (d) came

Directions (Q. 142 – 144): In the following questions, choose the correct synonym of the given word.

Q 142.

Amenties

- (a) pageantries
- (b) privileges
- (c) facilities
- (d) courtesies

Q 143.

Deflect

- (a) cheat
- (b) frustrate
- (c) pervert
- (d) depress

Q 144.

Exorbitant

- (a) odd
- (b) ridiculous
- (c) excessive
- (d) threatening

Directions (Q: 145 – 147): In the following sentences, choose the. Most appropriate preposition.

Q 145.

He is not in the office.....the moment.

- (a) from
- (b) with
- (c) for
- (d) at

Q 146.

She is very affectionate.....her children.

- (a) upon
- (b) with
- (c) towards
- (d) over

Q 147.

People were alarmed.....the tiger.

- (a) at
- (b) in
- (c) on
- (d) for

Directions (Q. 148 – 150): Read the following passage carefully and answer the questions given below the passage. Certain words/phrases in the passage are given in hold to locate them while answering some of the questions.

Our world has a heritage of culture and beauty, but unfortunately we have been handing oOn this heritage only to the less active and !.mportant members of each generation. The government of the world, by which I do not mean its ministerial posts but its key positions of power, has been allowed to fall into the hands of men ignorant of the past, without tenderness towards what is traditional, without understanding what they are destroying. There is no essential reason why this should be the case. To prevent it is an educational problem, and not a very difficult one.

Q 148.

Our world has heritage of culture means

- a) a richness of tradition
- b) an inherited cultural tradition
- c) too many cultural
- d) cultures which are now extinct

Q 149.

'The less active and important people' are the

- a) lazy people
- b) uncommitted people
- c) common people
- d) people who are in position of power

Q 150.

"Men ignorant of the past" means' the persons who

- a) do not learn from experience
- b) ignore the lessons of history
- c) are not aware of history.
- d) have no respect for the past