GUJCET 2024 Solved Paper

Mathematics

Question1

The Integrating Factor of the differential equation $(\tan^{-1}y - x)dy = (1+y^2)dx$ is ____ .

Options:

A. $\frac{1}{1+y^2}$

B. $\tan^{-1}y$

C. $e^{\frac{1}{1+y^2}}$

D. $e^{\tan^{-1}y}$

Answer: D

Question2

The angle ' θ ' between the vectors $\vec{a} = \hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + \hat{j} - \hat{k}$ is ____

Options:

A. $\cos^{-1}\left(-\frac{1}{3}\right)$

B. $\cos^{-1}\frac{1}{3}$

C. $\sin^{-1}\frac{1}{3}$

D. $\sin^{-1}\ -\frac{1}{3}$

Answer: A

Question3

The area of a parallelogram, whose adjacent sides are given by the $\vec{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{b} = -\hat{j} - 2\hat{k}$, is ____ .

Options:

A. $\sqrt{6}$

B. $2\sqrt{6}$

C. 24

D. $2\sqrt{3}$

Answer: B

Question4

The value of $\hat{j} \cdot \hat{i} \times \hat{k} + \hat{i} \cdot \hat{j} \times \hat{j} + \hat{k} \cdot \hat{j} \times \hat{i} + \hat{i} \cdot \hat{k} \times \hat{j}$ is ____

Options:

A. -2

B. -1

C. -3

D. -4

Answer: C

Question5

The angle, between the pair of lines, given by $\frac{x-3}{1} = \frac{y-2}{2} = \frac{z+4}{2}$. and $\frac{x-5}{3} = \frac{y+2}{2} = \frac{z}{6}$ is _____ .

Options:

A. $\cos^{-1} \frac{19}{21}$

B. $\cos^{-1} \frac{\sqrt{19}}{21}$

C. $\sin^{-1} \frac{19}{21}$

D. $\cos^{-1} -\frac{19}{21}$

Answer: A

Question6

If the lines $\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$ and $\frac{x-1}{3k} = \frac{y-1}{1} = \frac{6-z}{5}$ are perpendicular, then the value of k is ____ .

Options:

A. $-\frac{7}{10}$

B. $\frac{7}{10}$

C. $\frac{10}{7}$

D. $-\frac{10}{7}$

Answer: D

Question7

The Cartesian equation of the line which passes through the point (1, −3, 5) and parallel to the line given by $\frac{x+3}{3} = \frac{y-4}{5} = \frac{z+8}{6}$ is :

Options:

A. $\frac{x-1}{3} = \frac{y+3}{5} = \frac{z-5}{6}$

B. $\frac{x+3}{1} = \frac{y-4}{-3} = \frac{z+8}{5}$

C. $\frac{x+3}{-3} = \frac{y-4}{4} = \frac{z+8}{-8}$

D. $\frac{x-1}{-3} = \frac{y+3}{4} = \frac{z-5}{-8}$

Answer: A

Question8

The coordinates of the corner points of the bounded feasible region are (0, 6), (3, 3), (9, 9), (0, 12). The maximum of the objective function $z = 6x + 12y$ is :

Options:

A. 152

B. 162

C. 144

D. 166

Answer: B

Question9

Minimise objective function $z = 7x + 3y$ subject to the constraints : $x + y \leq 5$, $x + y \geq 10$, $x \geq 0$, $y \geq 0$ is :

Options:

A. 15

B. 35

C. 70

D. No feasible region and hence no feasible solution

Answer: D

Question10

If, for independent events A and B, P(A) = p, P(B) = $\frac{1}{2}$ and P(A ∪ B) = $\frac{3}{5}$ are given then, the value of p is _____ .

Options:

A. $\frac{1}{10}$

B. $\frac{1}{5}$

C. $\frac{3}{5}$

D. $\frac{1}{3}$

Answer: B

Question11

The probability of obtaining an even prime number on each die, when a pair of dice is rolled is :

Options:

A. $\frac{1}{3}$

B. 0

C. $\frac{1}{12}$

D. $\frac{1}{36}$

Answer: D

Question12

If A and B are two events such that P(B) ≠ 0 and P(A | B) = 1, then ____.

Options:

A. B ⊂ A

B. A ⊂ B

C. A ≠ φ

D. B ≠ φ

Answer: A

Question13

The relation R = {(a, a), (b, b), (c, c), (a, c)}, is defined on the set {a, b, c}, is ____ .

Options:

A. Reflexive and transitive but not symmetric

B. Reflexive and symmetric but not transitive

C. Transitive and symmetric but not reflexive

D. An equivalence relation

Answer: A

Question14

$f : Z \longrightarrow Z$, $f(x) = x^3 + 2$ is defined then function f is ____

Options:

A. One - one but not onto

B. One - one and onto

C. Not one - one but onto

D. Neither one - one nor onto

Answer: A

Question15

If $y = \tan^{-1}x$ then ____ .

Options:

A. $0 \leq y \leq \pi$

B. $0 < y < \pi$

C. $-\pi/2 < y < \pi/2$

D. $-\pi/2 \leq y \leq \pi/2$

Answer: C

Question16

The value of $\tan^{-1}(-1) + \sec^{-1}(-2) + \sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$ is ____ .

Options:

A. $-\pi/6$

B. $-\pi/3$

C. π

D. $2\pi/3$

Answer: D

Question17

$\sin^{-1}\left(\sin\frac{23\pi}{6}\right) =$ ____

Options:

A. $-\pi/6$

B. $\pi/6$

C. $23\pi/6$

D. $-5\pi/6$

Answer: A

Question18

If A is square matrix such that $A^2 = A$, then $(I - A)^3 - (I + A)^2 =$

Options:

A. $2(I - A)$

B. I-A

C. I

D. 0

E. None of above

Answer: E

Question19

If $A = \begin{bmatrix} \sin\alpha & -\cos\alpha \\ \cos\alpha & \sin\alpha \end{bmatrix}$ and $A + A' = I$, then the value of $\cos\alpha$ is ____

Options:

A. $1/2$

B. $\sqrt{3}/2$

C. -1

D. 0

Answer: B

Question20

If A = $\begin{bmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$ **then** $I + A^2 =$ ____ .

Options:

A. 0

B. $I + A$

C. A

D. $2I$

Answer: D

Question21

If area of △PQR is 3 sq. units with vertices P(k, 1), Q(2, 4) and R(1, 1). Then value of k is ____ .

Options:

A. −3, 1

B. 0,2

C. −1, 3

D. 1,3

Answer: C

Question22

If $\begin{matrix} 2017 & 2018 \\ 2019 & 2020 \end{matrix} + \begin{matrix} 2021 & 2022 \\ 2023 & 2024 \end{matrix} = 2k$, **then** $k^3 =$

Options:

A. -8

B. 8

C. 0

D. -64

Answer: A

Question23

If A = $\begin{matrix} 2 & -4 \\ -3 & 6 \end{matrix}$ **then** $A^{-1} =$ ____.

Options:

A. $\frac{1}{24}\begin{matrix} -2 & 4 \\ 3 & -6 \end{matrix}$

B. $\frac{1}{24}\begin{matrix}6 & 4\\ 3 & 2\end{matrix}$

C. $\frac{1}{24}\begin{matrix}-6 & 4\\ 3 & -2\end{matrix}$

D. Does not exist

Answer: D

Question24

If function f is continuous at point $x = \pi/2$ and $f(x) = \begin{cases}\frac{2k\cos x}{\pi - 2x} & , x \neq \pi/2\\ 2024 & , x = \pi/2\end{cases}$;

then the value of k is ____ .

Options:

A. 1012

B. 506

C. 2024

D. 4048

Answer: C

Question25

$\frac{d}{dx}(e^{x \log x} + e^3) =$ ____ .

Options:

A. $(1 + \log x)$

B. $x^x(1 + \log x)$

C. $x^x \log x$

D. $x^x(1 + \log x) + e^3$

Answer: B

Question26

If $x = a(1 - \cos \theta)$, $y = a(\theta + \sin \theta)$ then $\frac{dy}{dx} =$ ____ .

Options:

A. $\cot \theta/2$

B. $\tan \theta/2$

C. $-\cot \theta/2$

D. $-\tan \theta/2$

Answer: A

Question27

If $\frac{d^2y}{dx^2} - my = 0$ satisfies for $y = 7\sin x + 5\cos x$ then the value of m is ____

Options:

A. 1

B. 0

C. -1

D. -2

Answer: C

Question28

The rate of change of the surface area of a sphere with respect to its radius r, when r = 6cm, is ____ cm^2/s.

Options:

A. 24π

B. 12π

C. 48π

D. 144π

Answer: C

Question29

For function f (x) = sin 3x; x ∈ $0, \frac{\pi}{2}$, f is ____ .

Options:

A. Increasing in $0, \frac{\pi}{2}$

B. Decreasing in $0, \frac{\pi}{2}$

C. Decreasing in [0, π/6) and increasing in (π/6, π/2)

D. Increasing in [0, π/6) and decreasing in (π/6, π/2)

Answer: D

Question30

The absolute maximum value of the function f (x) = sin x + cos x, x ∈ [0, π] is ____ .

Options:

A. 0

B. $\frac{1}{\sqrt{2}}$

C. 1

D. $\sqrt{2}$

Answer: D

Question31

$\int \frac{e^{2x}-1}{e^{2x}+1} dx = +C$

Options:

A. $\log(e^{2x}-1)+x$

B. $\log(e^{2x}+1)-x$

C. $\log(e^{2x}+1)+x$

D. $\log(e^{2x}-1)-x$

Answer: B

Question32

$\int \frac{1}{\sqrt{4x-x^2}} dx = C$

Options:

A. $\sin^{-1} \frac{x-2}{2}$

B. $\frac{1}{2}\tan^{-1} \frac{x-2}{2}$

C. $\log(x-2)+\sqrt{4x-x^2}$

D. $\frac{1}{4}\log \frac{x}{x-4}$

Answer: A

Question33

$\int e^x \left(\frac{1+\sin x}{1+\cos x} \right) dx = \_\_\_\_ + C$

Options:

A. $e^x \tan \frac{x}{2}$

B. $e^x \tan x$

C. $e^x \cot \frac{x}{2}$

D. $e^x \cot x$

Answer: A

Question34

$\int_{-\pi/2}^{\pi/2} (x^5 - x^3 \cos x + \sin^3 x - 3)\, dx =$

Options:

A. 3π

B. $-\pi$

C. -3π

D. 0

Answer: C

Question35

$\int_0^1 xe^x\,dx =$ ____

Options:

A. 1

B. 0

C. e

D. -1

Answer: A

Question36

Area lying in the first quadrant and bounded by ellipse $9x^2 + 16y^2 = 1$ is ____

Options:

A. $\frac{\pi}{12}$

B. $\frac{\pi}{48}$

C. 12π

D. 3π

Answer: B

Question37

Area of the region bounded by the curve $x^2 = 4y$, X -axis and the line $x = 3$ is ____ .

Options:

A. $\frac{9}{4}$

B. 2

C. $\frac{9}{3}$

D. $\frac{9}{2}$

Answer: A

Question38

The area bounded by the curve $y = \cos x$ between $x = -\pi/2$ and $x = \pi/2$ is ____

Options:

A. 1

B. 4

C. 0

D. 2

Answer: D

Question39

The order and the degree of the differential equation $\sqrt{\frac{d^2y}{dx^2}} = \sqrt[3]{\left(\frac{dy}{dx}\right)^4 + 2}$ is respectively ____ and ____ .

Options:

A. 3,2

B. 2,3

C. 2,8

D. 1,8

Answer: B

Question40

The general solution of the differential equation $\frac{x\,dy - y\,dx}{y} = 0$ is ____ .

Options:

A. $x = cy^2$

B. $xy = c$

C. $y = cx$

D. $y = cx^2$

Answer: C

Physics

Question1

A short bar magnet placed with its axis at 30° with a uniform external magnetic field of 0.5 T experiences a torque of magnitude equal to 4.5×10^{-2} J . Then the magnitude of magnetic moment of the magnet will be ____

Options:

A. $18 \times 10^{-2} \mathrm{J\,T^{-1}}$

B. $36 \times 10^{-2} \mathrm{J\,T^{-1}}$

C. $1.8 \times 10^{2} \mathrm{J\,T^{-1}}$

D. $3.6 \times 10^{2} \mathrm{J\,T^{-1}}$

Answer: A

Question2

A square loop of side 10 cm and resistance 0.5Ω is placed vertically in the east-west plane. A uniform magnetic field of 0.10 T is setup across the plane in the north-east direction. The magnetic field is decreased to zero in 0.70 S at a steady rate. Then the magnitude of induced current during this time interval will be ____

Options:

A. 8.0×10^{-3}A

B. 4.0×10^{-3}A

C. 6.0×10^{-3}A

D. 2.0×10^{-3}A

Answer: D

Question3

A coil has N turns and current passes through it is I ampere then we obtain L Henry of self inductance. Now if current charge to 5 I then new self inductance will be ____ H.

Options:

A. L

B. 1/5L

C. 25 L

D. 5 L

Answer: A

Question4

A pure inductor of 50.0 mH is connected to a source of 220 V . Then rms current in the circuit will be ____ . The frequency of the source is 50 Hz .

Options:

A. 21 A

B. 7 A

C. 14 A

D. 28 A

Answer: C

Question5

In LCR series a.c. circuit at resonance the value of power factor will be ____

Options:

A. ∞

B. 1

C. -1

D. 0

Answer: B

Question6

If the primary coil of a transformer has 100 turns and the secondary has 200 turns. Then for a input of 220 V at 10 A find output current, in step up transformer.

Options:

A. 5.0 A

B. 50.0 A

C. 0.5 A

D. 0.05 A

Answer: A

Question7

For obtaining wattless current ____ is connected with a.c. supply.

Options:

A. Only R

B. R − L in series

C. Only L

D. R − C in series

Answer: C

Question8

As indicated below which one is the equation of Ampere-Maxwell law?

Options:

A. $\oint \vec{E} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\varphi_E}{dt}$

B. $\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\varphi_E}{dt}$

C. $\oint \vec{B} \cdot d\vec{A} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\varphi_E}{dt}$

D. $\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\varphi_B}{dt}$

Answer: B

Question9

Cellular phones use radio waves to transmit voice communication in the ____ band.

Options:

A. LF

B. HF

C. VHF

D. UHF

Answer: D

Question10

For plane mirror focal length is ____ m.

Options:

A. -1

B. ∞

C. 1

D. 0

Answer: A

Question11

A rays coming from an object which is situated at ∞ spherical glass surface (n = 1.5). Then the distance of image will be ____ R is the radius of curvature of a spherical glass.

Options:

A. 1.5R

B. R

C. 3R

D. 2R

Answer: A

Question12

For a thin prism, the angle of prism is 4° having refractive index 1.6 , then the angle of minimum deviation will be ____

Options:

A. 0.4°

B. 2.0°

C. 2.4°

D. 1.6°

Answer: C

Question13

Consider a refracting telescope whose objective has a focal length of 1 m and the eyepiece a focal length of 1 cm , then magnifying power of this telescope will be ____ .

Options:

A. 100

B. 50

C. 200

D. 1

Answer: A

Question14

The phase difference between any two particle of a given wave front is ____ rad.

Options:

A. π/4

B. 0

C. π/2

D. π

Answer: B

Question15

In a Young's double-slit experiment, the slits are separated by 0.28 mm and the screen is placed 1.4 m away. The distance between the central bright fringe and the fourth bright fringe is measured to be 1.2 cm . Then the wavelength of light used in the experiment is ____ .

Options:

A. 500 nm

B. 660 nm

C. 600 nm

D. 550 nm

Answer: C

Question16

The refractive index of glass is 1.6 then the speed of light in glass will be ____ speed of light in vacuum is $3.0 \times 10^8 ms^{-1}$.

Options:

A. $1.48 \times 10^8 ms^{-1}$

B. $1.66 \times 10^8 ms^{-1}$

C. $1.22 \times 10^8 ms^{-1}$

D. $1.88 \times 10^8 ms^{-1}$

Answer: D

Question17

Js is the unit of ____ physical quantity.

Options:

A. Angular momentum

B. Work function

C. Moment of Inertia

D. Rydberg constant

Answer: A

Question18

To emit an electron from the metal, minimum electric field required is ____ .

Options:

A. 10^4V m^{-1}

B. 10^6V m^{-1}

C. 10^5V m^{-1}

D. 10^8V m^{-1}

Answer: D

Question19

A ball of mass 0.12 kg moving with a speed of 20ms^{-1} has de-Broglie wavelength-
____ ($h = 6.63 \times 10^{-34} \text{J s}$)

Options:

A. $4.76 \times 10^{-34} \text{m}$

B. $2.76 \times 10^{-34} \text{m}$

C. $3.76 \times 10^{-34} \text{m}$

D. $1.76 \times 10^{-34} \text{m}$

Answer: B

Question20

The ratio of radius for second and third orbit of hydrogen atom is ____ .

Options:

A. 4 : 9

B. 3 : 2

C. 9 : 4

D. 2 : 3

Answer: A

Question21

In Geiger-Marsden seattering experiment the thickness of a thin foil of gold is ____ m.

Options:

A. 6.2×10^{-7}

B. 5.5×10^{-7}

C. 2.1×10^{-7}

D. 4.2×10^{-7}

Answer: C

Question22

The ground state energy of hydrogen atom is -13.6 eV , then the potential energy of the electron in this state will be ____ .

Options:

A. -6.8 eV

B. -27.2 eV

C. 13.6 eV

D. 27.2 eV

Answer: B

Question23

Some atomic species of the same element differing in mass are called ____

Options:

A. Isotope

B. Isotone

C. Isomar

D. Isobar

Answer: A

Question24

Find the value of x and y from below given nuclear reaction

$$_{92}^{235}U + {}_{0}^{1}n \longrightarrow {}_{x}^{133}Sb + {}_{41}^{y}Nb + 4\,{}_{0}^{1}n$$

Options:

A. (133, 41)

B. (51, 95)

C. (92, 1)

D. (51, 99)

Answer: D

Question25

The ratio of the nuclear radii of the $_{1}^{1}H$ and $_{13}^{27}Al$ is ____

Options:

A. 3 : 5

B. 1 : 2

C. 2 : 1

D. 1 : 3

Answer: D

Question26

Which impurity is used to convert pure semiconductor into p-type semiconductor?

Options:

A. Phosphorous

B. Antimony

C. Indium

D. Arsenic

Answer: C

Question27

The energy required for electron to jump the forbidden band for germanium at room temperature in the intrinsic semiconductor is ____ eV .

Options:

A. 0.05

B. 0.72

C. 5.4

D. 1.1

Answer: B

Question28

The Dimensional formula for Electric Flux is ____ .

Options:

A. $M^{1}L^{3}T^{-3}A^{1}$

B. $M^{1}L^{1}T^{-3}A^{-1}$

C. $M^{-1}L^{-3}T^{3}A^{1}$

D. $M^{1}L^{3}T^{-3}A^{-1}$

Answer: D

Question29

For an electric dipole an angle between $\vec{E}$ and $\vec{P}$ at a point on the equatorial plane is ____ .

Options:

A. 45°

B. 180°

C. 0°

D. 90°

Answer: B

Question30

An infinite line charge produces an electric field of $9 \times 10^4 N/C$ at a distance of 2 cm . Then the linear charge density will be ($K = 9 \times 10^9 N\,m^2/C^2$)

Options:

A. $0.1\mu C/m$

B. $10\mu C/m$

C. $0.01\mu C/m$

D. $1\mu C/m$

Answer: B

Question31

If an electron is accelerated by a potential difference of 2.5 V it would gain energy of ____ .
(Take charge of electron $1 \times 10^{-19} C$)

Options:

A. 2.5 erg

B. 2.5 MeV

C. 2.5 eV

D. 2.5 J

Answer: C

Question32

A radius of spherical charged shell is 10 cm and electric potential on its surface is 100 V , then the potential at 2 cm from the centre of the shell will be ____

Options:

A. 0 V

B. 1 V

C. 200 V

D. 100 V

Answer: D

Question33

A parallel plate capacitor with air between the plates has a capacitance of 4 pF . If the distance between the plates is reduced by half and the space between them is filled with a substance of dielectric constant 6 then the value of capacitance will be ____ .

Options:

A. 48 pF

B. 24 pF

C. 12 pF

D. 98 pF

Answer: A

Question34

The SI units of the current density is ____

Options:

A. Am^{-2}

B. Am^{-1}

C. Am^{-3}

D. Am^{2}

Answer: A

Question35

The magnitude of the drift velocity per unit electric field is known as ____ .

Options:

A. Charge density

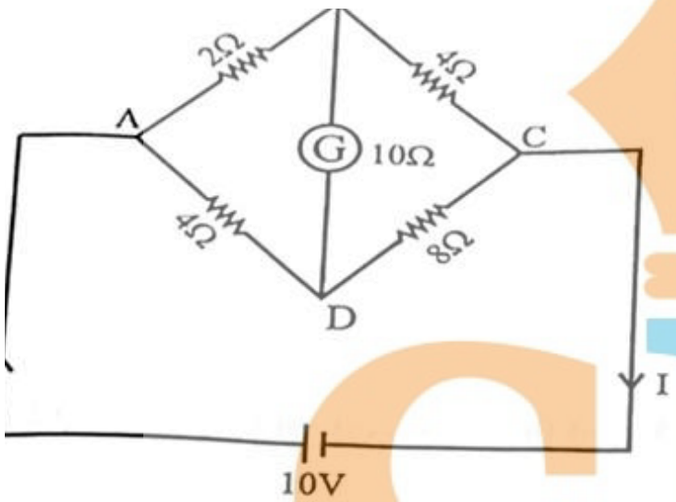
B. Conductivity

C. Mobility

D. Resistivity

Answer: C

Question36



As shown in the circuit diagram find the value of I ____

Options:

A.

2.8 A

B.

0.4 A

C.

1.8 A

D.

2.5 A

Answer: D

Question37

A silver wire has a resistance of 2.1Ω at 27.5°C and a resistance of 2.7Ω at 100°C. Then the temperature coefficient of resistivity of silver will be ____ .

Options:

A. $3.9 \times 10^{3°}C$

B. $3.9 \times 10^{3°}C^{-1}$

C. $3.9 \times 10^{-3°}C$

D. $3.9 \times 10^{-3°}C^{-1}$

Answer: D

Question38

$\frac{Vs}{Am}$ is the unit of which physical quantity?

Options:

A. χ_m

B. μ_0

C. χ_c

D. ε_0

Answer: B

Question39

An ideal ammeter and an ideal voltmeter has resistance ____ Ω and ____ Ω respectively.

Options:

A. (0, ∞)

B. (∞, 0)

C. (∞, ∞)

D. (0, 0)

Answer: A

Question40

A solenoid has a core of a material with relative permeability 400. The windings of the solenoid are insulated from the core and carry a current of 2 A . If the number turns is 1000 per meter then the value of magnetic intensity will be ____

Options:

A. $8 \times 10^{-5} Am^{-1}$

B. $2 \times 10^{3} Am^{-1}$

C. $2 \times 10^{-3} Am^{-1}$

D. $8 \times 10^{5} Am^{-1}$

Answer: B

Chemistry

Question1

Reaction $2A \longrightarrow B + 3C$ is zero order reaction. If $K = 3.5 \times 10^{-4} mol\, L^{-1} S^{-1}$; What will be the rate of production of ' C '?

Options:

A. $3.5 \times 10^{-4} mol\, L^{-1} S^{-1}$

B. $10.5 \times 10^{-4} mol\, L^{-1} S^{-1}$

C. $7.0 \times 10^{-4} mol\, L^{-1} S^{-1}$

D. $1.167 \times 10^{-4} mol\, L^{-1} S^{-1}$

Answer: B

Question2

$KMnO_4$ acts as on oxidising agent in acidic medium. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphide ion in acidic solution is ____ .

Options:

A. 4/5

B. 3/5

C. 2/5

D. 1/5

Answer: C

Question3

Which one of the following is amphoteric oxide?

Options:

A. Cr_2O_3

B. CrO

C. CrO_3

D. V_2O_3

Answer: A

Question4

Which of the following ion show highest spin only magnetic moment value?

Options:

A. Ti^{2+}

B. Mn^{2+}

C. Fe^{2+}

D. Co^{2+}

Answer: B

Question5

Name the member of lanthanide series which is well known to exhibit +4 oxidation state?

Options:

A. Gadolinium

B. Thulium

C. Samarium

D. Cerium

Answer: D

Question6

Which one is the correct formula for coordination compound tris [ethane-1,2-diamine] cobalt (III) sulphate

Options:

A. $[Co(en)_3](SO_4)_2$

B. $[Co(en)_3]_2(SO_4)_3$

C. $[Co(en)_3]SO_4$

D. $[Co(en)_3]_3(SO_4)_2$

Answer: B

Question7

Hybridizations in $[Ni(CO)_4]$ and $[Ni(CN)_4]^{-2}$ are respectively

Options:

A. dsp^2 and sp^3

B. sp^3 and sp^3

C. dsp^2 and dsp^2

D. sp^3 and dsp^2

Answer: D

Question8

Identify the optically active compound from the following.

Options:

A. $[Co(en)_3]Cl_3$

B. $[Co(NH_3)_6]Cl_2$

C. $[Co(NH_3)_5Cl]Cl$

D. $[Pt(NH_3)_2Cl_2]$

Answer: A

Question9

In the complex $K[Cr(H_2O)_2(C_2O_4)_2] \cdot 3H_2O$, oxidation state and co-ordination number of the central metal ion is ____ and ____

Options:

A. +4, 6.

B. +3, 4.

C. +3, 6

D. +4, 4

Answer: C

Question10

Which reagent will be used for the following reaction?

$$CH_3CH_2CH_2CH_3 \xrightarrow{?} CH_3-CH_2-CH_2CH_2Cl + CH_3-CH_2-\underset{Cl}{CH}-CH_3$$

Options:

A. Cl_2 /UV light

B. $NaCl + H_2SO_4$

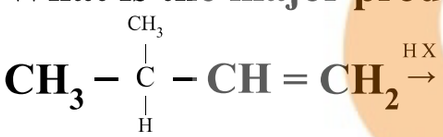
C. Cl_2, air/dark

D. Cl_2, air, Fe/dark

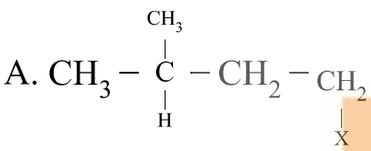
Answer: A

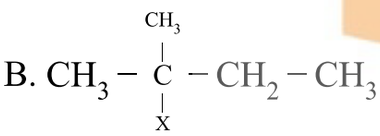
Question11

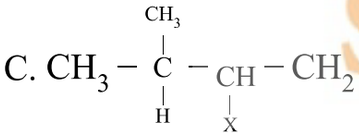
What is the major product in the following reaction?

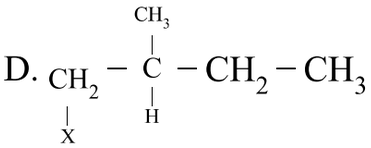


Options:

A. 

B. 

C. 

D. 

Answer: B

Question12

Predict the order of reactivity of the following compounds in S_N1 reaction

(i) $C_6H_5 \cdot CH_2Br$

(ii) $C_6H_5 \cdot CH \cdot (C_6H_5)Br$

(iii) $C_6H_5 \cdot CH(CH_3)Br$

(iv) $C_6H_5 \cdot C \cdot (CH_3)(C_6H_5)Br$

Options:

A. (iv) > (iii) > (ii) > (i)

B. (ii) > (iv) > (iii) > (i)

C. (iv) > (ii) > (iii) > (i)

D. (ii) > (iii) > (iv) > (i)

Answer: C

Question13

Match the reactions given in column - I with the names given in column - II.

Column 1	Column II
i) $R-Cl+NaI \xrightarrow[\text{accetone}]{\text{dry}} R-I+NaCl$	a) Swarts reaction
ii) $CH_3-Br+AgF \xrightarrow{\Delta} CH_3-F+AgBr$	b) Wurtz reaction
iii) $R-X+Mg \xrightarrow[\text{ether}]{\text{dry}} R-\underset{\downarrow H_2O \\ RH+Mg(OH)X}{Mg}-X$	c) Finkelstein reaction

d) Grignard reaction

Options:

A. (i) → (a); (ii) → (c); (iii) → (d)

B. (i) → (d); (ii) → (c); (iii) → (b)

C. (i) → (b); (ii) → (a); (iii) → (d)

D. (i) → (c); (ii) → (a); (iii) → (d)

Answer: D

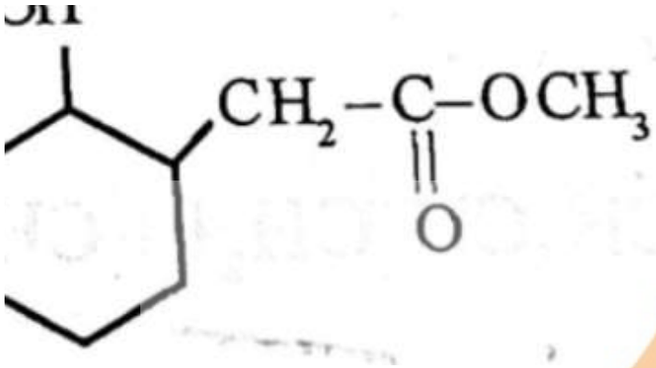
Question14

Which product will be obtained in the following reaction

Options:

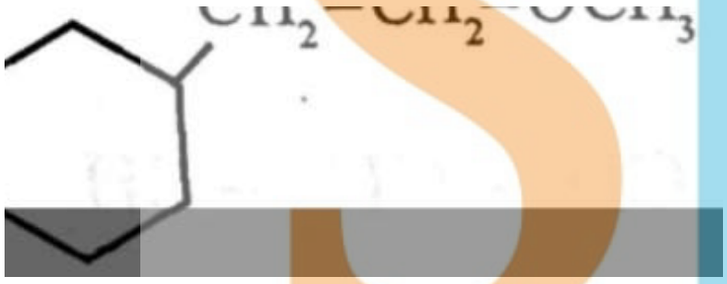
A.

B.



C.

D.



Answer: B

Question15

Predict the major product of acid catalysed dehydration of butan- I − ol.

Options:

A. $CH_3 - CH = CH - CH_3$

B. $CH_2 - \overset{CH_3}{\underset{|}{C}} = CH_2$

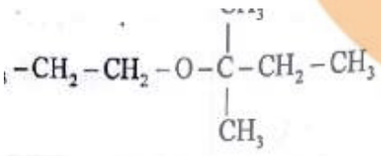
C. $CH_3 - CH_2 - CH = CH,$

D. $2CH_2 = CH_2$

Answer: A

Question16

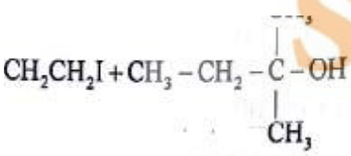
Give the major product formed by heating



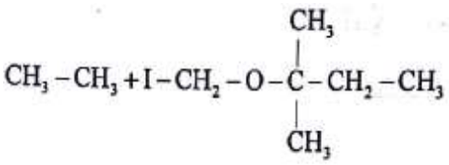
With HI

Options:

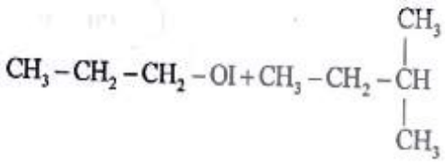
A.



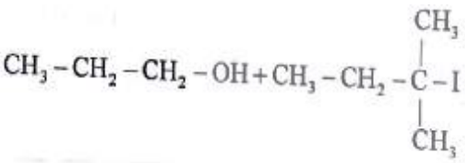
B.



C.



D.



Answer: D

Question17

Arrange the following compounds in decreasing order of their acidic strength

i) 

ii) 

iii) 

Options:

A.

(i) > (ii). > (iii)

B.

(iii) > (i) > (ii)

C.

(ii) > (i) > (iii)

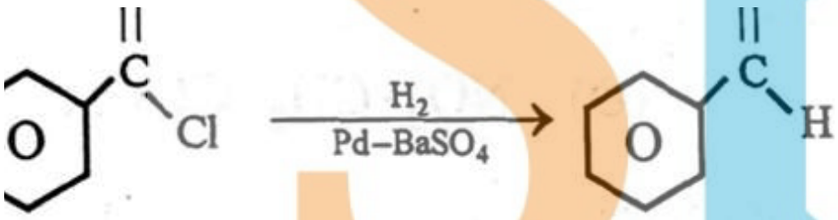
D.

(ii) > (iii) > (i)

Answer: C

Question18

Name the following reaction.



Options:

A.

Etard reaction

B.

Stephen reaction

C.

Rosenmund reduction

D.

Clemmensen reduction

Answer: C

Question19

$'R' + CH_3 - CO - CH_3 \xrightarrow{H^+}$ **Schiff's base what is ' R ' in this reaction?**

Options:

A. $CH_3 - NH_2$

B. $NH_2 - NH_2$

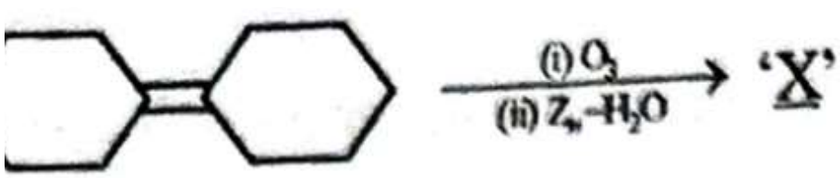
C. NH_2OH

D. $C_6H_5 - NH - NH_2$

Answer: A

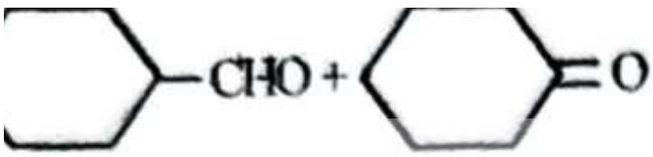
Question20

What is X in this reaction?

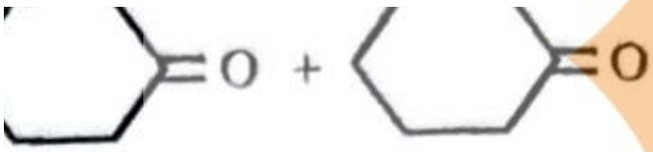


Options:

A.

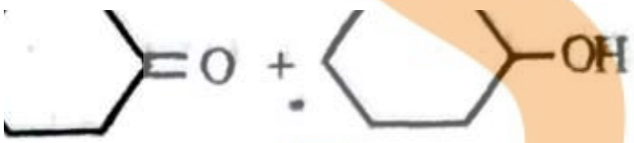


B.



C.

D.



Answer: B

Question21

Which of the following carboxylic acid has least pKa value among all?

Options:

A. HCOOH

B. $CH_3 \cdot COOH$

C. $C_6H_5 \cdot COOH$

D. $NO_2 \cdot CH_2 \cdot COOH$

Answer: D

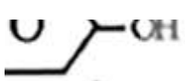
Question22

Identify ' C ' in the following reaction.

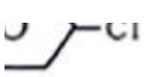
Options:

A.

B.



C.



D.

Answer: A

Question23

Which amine is prepared by Gabriel phthalimide synthesis?

Options:

A. $R-\overset{\overset{R}{|}}{\underset{\underset{R}{|}}{N}}$

B. $R-NH-R$

C. $R-NH_2$

D. $Ar-NH_2$

Answer: C

Question24

Which is the correct order of the basic strength of given amines?

Options:

A. $NH_3 > C_6H_5NH_2 > (C_2H_5)_2NH > C_2H_5NH_2$

B. $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3 > C_6H_5NH_2$

C. $C_6H_5NH_2 > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$

D. $(C_2H_5)_2NH > C_2H_5NH_2 > C_6H_5NH_2 > NH_3$

Answer: B

Question25

Which diazonium salt is water insoluble and stable at room temperature?

Options:

A. $C_6H_5N_2^+HSO_4^-$

B. $C_6H_5N_2^+Br^-$

C. $C_6H_5N_2^+Cl^-$

D. $C_6H_5 \cdot N_2^+BF_4^-$

Answer: D

Question26

Lactose is composed of which units?

Options:

A. β-D-Galactose and β-D-Glucose

B. α-D-Glucose and β-D-Fructose

C. α-D-Glucose and β-D-Galactose

D. α-D-Glucose and α-D-Glucose

Answer: A

Question27

Which of the following gives Zwitter ion in its aqueous solution?

Options:

A. $NH_2 - CH_2 - CH_2 - NH_2$

B. $NH_2 - CH_2 - COOH$

C. $CH_3CH_2NH_2$

D. $COOH - CH_2 - COOH$

Answer: B

Question28

Deficiency of which vitamin is responsible for RBC deficient in haemoglobin?

Options:

A. Vitamin B_2

B. Vitamin B_6

C. Vitamin B_1

D. Vitamin B_{12}

Answer: D

Question29

Which of the following statement is incorrect for the structure of Nucleic acids?

Options:

A. A unit formed by the attachment of a base 1′ position of sugar is known as nucleoside

B. In DNA molecule, the sugar moiety is β-D-2-deoxyribose

C. RNA contains four bases adenine, guanine, cytosine and thymine

D. Nucleotides are joined together by phosphodiester linkage

Answer: C

Question30

Calculate the mass of Glucose ($C_6H_{12}O_6$) required in making 2.5 kg of 0.25 molal aqueous solution.
[Atomic wt : H = 1, O = 16, C = 12amu]

Options:

A. 90.0 g

B. 107.65 g

C. 112.5 g

D. 135.0 g

Answer: B

Question31

The vapour pressure of pure liquids ' P ' and ' Q ' are 450 and 750 mm of Hg respectively at 350 K . If total vapour pressure is 600 mm of Hg , the mole fractions of ' P ' and ' Q ' respectively will be ____ and ____

Options:

A. 0.6 and 0.4 .

B. 0.4 and 0.6

C. 0.5 and 0.5

D. 0.7 and 0.3

Answer: C

Question32

The freezing point depression of 645 g of aqueous solution of ethylene glycol ($C_2H_6O_2$) is 2.25 K . Find weight of ethylene glycol in the solution.

[K_f = 1.86K kgmol $^{-1}$; H = 1, C = 12, O = 16amu]

Options:

A. 48.375 g

B. 50 g

C. 42.50 g

D. 45.0 g

Answer: A

Question33

Van't Hoff factor (i) for dilute aqueous solution of $K_4[Fe(CN)_6]$, $Fe[Fe(CN)_6]_3$ and $[CoCl_2(en)_2]Cl_2$ are respectively ____ , ____ , ____ ?

Options:

A. 5, 7, 3

B. 2, 5, 7

C. 7, 5, 2

D. 2, 7, 5

Answer: A

Question34

Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10 .

Options:

A. +0.59 V

B. -0.059 V

C. -0.59 V

D. +0.059 V

Answer: C

Question35

Which of the statements for solution of electrolyte is not correct?

Options:

A. Conductivity of solution does not depend upon temperature

B. Conductivity of solution depends on the nature of electrolyte

C. Conductivity of solution depends on the nature of solvent and its viscosity

D. Conductivity of solution depends on the concentration of electrolyte

Answer: A

Question36

During the electrolysis of higher concentration of H_2SO_4, the product obtained at anode is ____ .

Options:

A. $SO_{2(g)}$

B. $S_2O^{2-}_{8(aq)}$

C. $SO^{2-}_{3(aq)}$

D. $O_{2(g)}$

Answer: B

Question37

How much Faraday of electricity is required to reduce 1.5 mole $KMnO_4$ into Mn in basic medium?

Options:

A. 6.0 F

B. 7.5 F

C. 3.0 F

D. 4.5 F

Answer: D

Question38

For any reaction the rate constant K $= 2.3 \times 10^{-5} mol^{-3/2} L^{3/2} S^{-1}$; then the order of reaction will be ____ .
07.49

Options:

A. 0.5

B. 1.5

C. 2.5

D. 0.0

Answer: C

Question39

Which of the following statements is incorrect for a reaction carried out in presenc of catalyst?

Options:

A. There is no change in Gibbs energy of the reaction

B. Equilibrium constant of the reaction does not change

C. The activation energy of the reaction decreases

D. Potential energy of reactants and products change

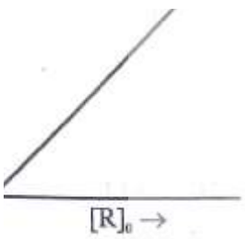
Answer: D

Question40

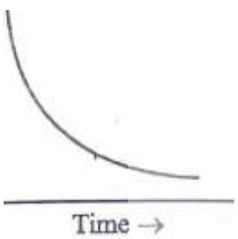
Which of the following graphs is correct for a first order reaction R ⟶ P ?

Options:

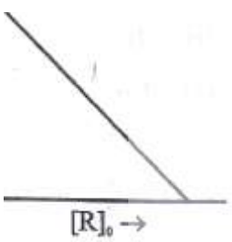
A.



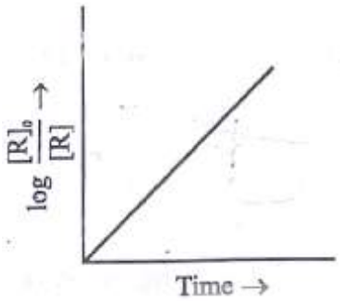
B.



C.



D.



Answer: D
