Sample Paper

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Engineering

Q.No. 1

Two capacitors each having a capacitance 2 x 10^{-6} F and a breakdown voltage 5000 V, are joined in series, What will be the resultant capacitance and the breakdown voltage of the combination?

(A)

$4x10^{-6}$ F & 1,000V

(B)

10^{-6} F & 10,000V

(C)

$2X10^{-6}$F & 5,000V

(D)

10^{-6}F & 2,500V

Q.No. 2

A set of 10 parallel lines is intersected by another set of m parallel lines. If the total number of parallelograms formed by these two sets of lines is 675. Then m =

(A)

15

(B)

10

(C)

12

(D)

6

Q.No. 3 Identify the correct statements from the following. [1] Sulphur sol is an example of a multimolecular colloid. [2] Tyndall effect is observed when the diameter of the dispersed particles is not much smaller than the wavelength of the light used. [3] The process of removing a dissolved substance from a colloidal solution by means of diffusion through a suitable membrane is called peptization. [4] Eosin. gelatin are examples of negatively charged sols.

(A) 1,2,3

(B) 1,2,4

(C) 1,3,4

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(D) 2,3,4

Q.No. 4

The set of all points where the function f(x)=2x|x| is differentiable is.....

(A)

$(-\infty, \infty)$

(B)

$(-\infty, 0) \cup (0, \infty)$

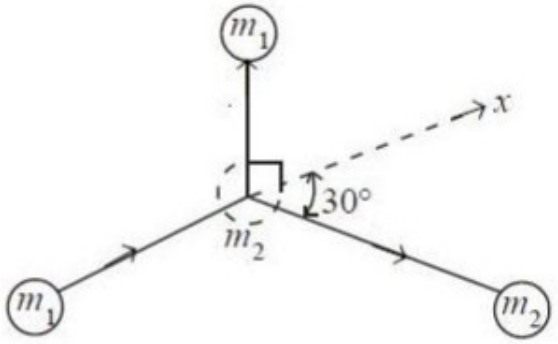
(C)

$(0, \infty)$

(D)

$[0, \infty)$

Q.No. 5 A particle of mass 'm_1 ' moving along the X-axis collides with a stationary particle of mass m_2 and deviates by an angle 30° to the X-axis as shown in the figure. If the percentage change in kinetic energy of the combined system of these two particles reduces by 50%. the ratio of the masses $\frac{m_2}{m_1}$ is



(A) 8

(B) 6

(C) 8/7

(D) 1/6

Q.No. 6 If $y = 2x$ is a tangent to the curve $y^2 = ax^3 + b$ at $(1, 2),$ then $(a, b) =$

(A) (8 , 4)

(B) $\left(\frac{2}{3}, 1\right)$

(C) $\left(\frac{8}{3}, \frac{4}{3}\right)$

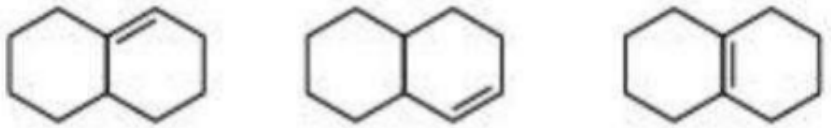
(D) $\left(\frac{8}{3}, \frac{2}{3}\right)$

Q.No. 7

The stability order of the given alkenes is

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(I) (II) (III)

(A)

(I)>(II)>(III)

(B)

(I)>(III)>(II)

(C)

(III)>(II)>(I)

(D)

(III)>(I)>(II)

Q.No. 8

$\Delta W = 0$ for the process _____

(A)

Isobaric

(B)

Isochoric

(C)

Isothermal

(D)

Adiabatic

Q.No. 9

Match the following?

Material	Application
(a) Silicones	(i) As a catalyst
	(ii) Greases
(b) Zeolites	(iii) In surgical implants
	(iv) As ion exchangers

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(A)

(a-ii),(a—iii),(b—i),(b—iv)

(B)

(a-i),(a~ iii), (b ii), (b -iv)

(C)

(a-ii),(a~ iv), (b i), (b -iii)

(D)

(a—i),Ca—iv),(b—ii), (b — iii)

Q.No. 10 All electrons ejected from a metallic surface by incident light of wavelength 400 nm travelled 1 m in the direction of a uniform electric field of 2 NC^{-1} and came to rest. The work function of the surface is

(A) 1.1 eV

(B) 2.2 eV

(C) 3.1 eV

(D) 5.1 eV

Q.No. 11

If $y= 5x^2 + 6x +6$, $x = 2$ and $\Delta x = 0.001$. then the values of Δy and dy respectively are:

(A)

0.026 & 0.026005

(B)

0.026005 & 0.026

(C)

0.026005 & 0.26

(D)

0.0026 & 0.026

Q.No. 12

A mixture of Dichloromethane and Aniline can be separated by

(A)

Distillation

(B)

Sublimation

(C)

Crystallization

(D)

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Fractional distillation

Q.No. 13 A straight line meets the X and Y axes at the points A. B respectively. If AB = 6 units. then the locus of the point P which divides the line segment AB such that AP : PB = 2:1 is

(A) $3x^2+ y^2 = 36$

(B) $4x^2 + y^2 = 36$

(C) $3x^2 + y^2 = 16$

(D) $4x^2 + y^2 = 16$

Q.No. 14

The probability of a man hitting a target is 2/3, the minimum number of times he must fire so that the probability of hitting the target at least once is more then 90 %

(A)

6

(B)

3

(C)

5

(D)

4

Q.No. 15

7 relatives of a man comprises 4 ladies and 3 gentlemen. His wife also has 7 relatives - 3 of them are ladies and 4 are gentlemen. In how many ways can they invite a dinner party of 3 ladies and 3 gentlemen so that there are 3 of man's relative and 3 of wife's relative?

(A)

485

(B)

500

(C)

486

(D)

102

Q.No. 16

The flow rate of water from a tap of diameter 1.25 cm is 3 litres per minute. If coefficient of viscosity of water is 10^{-3} Pa. s, the nature of flow is

(A)

Unsteady

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(B)

Turbulent

(C)

Streamlined

(D)

Laminar

Q.No. 17

A simple pendulum, suspended from the ceiling of a lift. has a period of oscillation T, when the lift is at rest. If the lift starts moving upwards with an acceleration a = 3g, then the new period will be

(A)

2T

(B)

4T

(C)

T/3

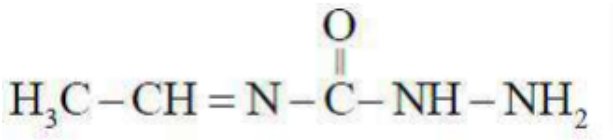
(D)

T/2

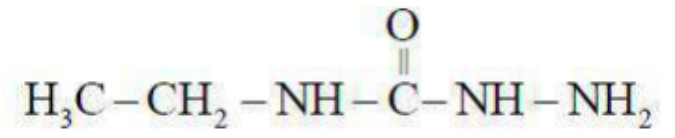
Q.No. 18

Which among the following 1s correct structure of the semi carbazone formed when ethanal reacts with semi carbazide?

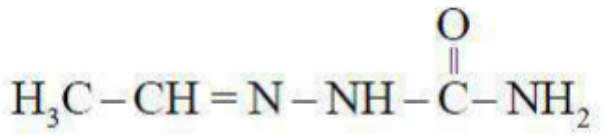
(A)



(B)



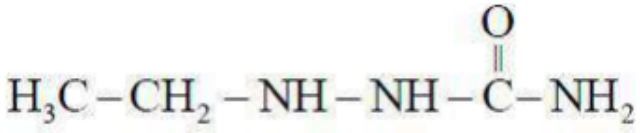
(C)



(D)

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Q.No. 19 The abscissae of two points P, Q are the roots of the equation $2x^2 + 4x - 7 = 0$ and their ordinates are the roots of the equation $3x^2 - 12x - 1 = 0$. Then the centre of the circle With PQ as a diameter is

(A) (-1, 2)

(B) (-2, 6)

(C) (1, -2)

(D) (2, -6)

Q.No. 20

If the roots of the equation $x^3 — ax^2 + by — c = 0$ are in HP. then the mean of the roots is

(A)

a/3c

(B)

b/3c

(C)

a

(D)

3c/b

Q.No. 21

Which of the following is not an electrophile?

(A)

CN^-

(B)

BF^3

(C)

NO^+_2

(D)

$AICI_3$

Q.No. 22

The equation of a circle with center at (—2 ,3) and circumference of 4π units is

(A)

$x^2+y^2+4x-6y-9=0$

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(B)

$x^2+y^2+4x-6y+9=0$

(C)

$x^2+y^2+4x-6y-3=0$

(D)

$x^2+y^2-4x+6y-9=0$

Q.No. 23

In Kjeldahl's method. organic 'N' is estimated as

(A)

Nitrogen

(B)

Ammonia

(C)

Nitric-acid

(D)

Nitrogen dioxide

Q.No. 24 The average translational kinetic energy of a molecule in a gas becomes equal to 0.69 eV at a temperature about [Boltzmann constant = 1 .38 x 10^{-23} J K^{-1}]

(A) 3370 °C

(B) 3388 °C

(C) 5333 °C

(D) 5060 °C

Q.No. 25

The equation of polar of (1, 1) with respect to the circle $x^2 + y^2 + 4y + 6y - 3 = O$ is

(A)

2x +3y—1=0

(B)

3x+4y+8=0

(C)

4x +3y+2=0

(D)

3x+4y+2=0

Q.No. 26

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A metal ‘M’ readily gives MSO_4 which is soluble in water. It forms its oxide MO Which is amphoteric. It forms an insoluble hydroxide $M(OH)_2$ which is soluble in NaOH solution. The M is

(A)

Be

(B)

Ba

(C)

Ca

(D)

Mg

Q.No. 27

A coil having 500 square loops each of side 10 cm is placed normal to a magnetic flux which increases at a rate of $1Ts^{-1}$. The induced emf is

(A)

0.1 V

(B)

0.5 V

(C)

1 V

(D)

5 V

Q.No. 28 The common roots of the equations $z^3 + 2z^2 + 2z + 1 = 0$ and $z^{2018} + z^{2017} + 1 = 0$ satisfy the equation

(A) -1, ω

(B) ω ,ω^2

(C) 1,ω

(D) -1 , ω^2

Q.No. 29

What is the nature of the graph between momentum of a body and its kinetic energy?

(A)

Straight line

(B)

Parabola

(C)

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Circle

(D)

Ellipse

Q.No. 30

An ideal gas expanded irreversibly against 10 bar pressure from 20 L to 30 L. Calculate Q if the process is Isoenthalpic. 1 L. bar = 100J

(A)

0J

(B)

100J

(C)

-100J

(D)

10KJ

Q.No. 31 An electromagnetic wave of frequency 1 x 10^{14} Hz is propagating along the Z-axis. The amplitude of electric field is 4 Vm^{-1} , then energy density of electric field will be (Permittivity of force space = 8.8 x 10^{-12} C^2 N^{-1} m^{-2})

(A) 2 x 10^{-13} Jm^{-3}

(B) 70.4 x 10^{-13} Jm^{-3}

(C) 70.4 x 10^{-12} Jm^{-3}

(D) 2 x 10^{-12} Jm^{-3}

Q.No. 32 If a circle C_1 : $x^2 + y^2 = 16$ intersects another circle C_2 With radius 5 such that the common chord is of maximum length and has a slope equal to ¾ then the centre of the circle C_2 is

(A) $\left(-\frac{9}{5}, \frac{12}{5}\right)$

(B) $\left(\frac{9}{5}, \frac{12}{5}\right)$

(C) $\left(-\frac{5}{9}, \frac{6}{5}\right)$

(D) $\left(\frac{7}{5}, -\frac{12}{5}\right)$

Q.No. 33 The $\sqrt{1-x^6} + \sqrt{1-y^6} = a\left(x^3 - y^3\right)$ then $y^2\frac{dy}{dx} =$

(A) $\sqrt{\frac{1-y^6}{1-x^6}}$

(B) $\sqrt{\frac{1-y^6}{1-x^7}}$

(C) $x^2\sqrt{\frac{1-y^6}{1-x^6}}$

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(D) $\frac{1}{x^2}\sqrt{\frac{1-y^6}{1-x^6}}$

Q.No. 34

Which of the following gives the maximum number of ions in aqueous solution?

(A)

$Ni(CO)_4$

(B)

$CoCl_3*5.H_20$

(C)

$PtCl_4 * 6\ NH_3$

(D)

$[Cr(NH_3)_3(NO_2)_3]$

Q.No. 35

A 25% solution of cane-sugar (mol mass= 342 g mol^{-1}) is isotonic with 5% solution of a substance A. Then find the molecular weight of A?

(A)

6.84 g mol^{-1}

(B)

68.4 g mol^{-1}

(C)

25 g mol^{-1}

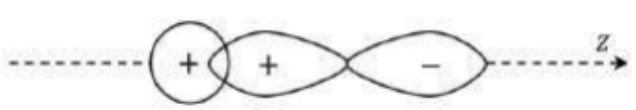
(D)

684 g mol^{-1}

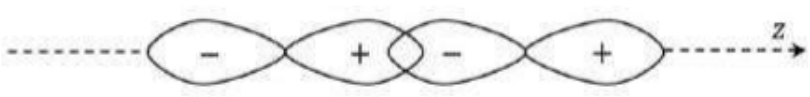
Q.No. 36

Which among the following represents zero overlap?

(A)



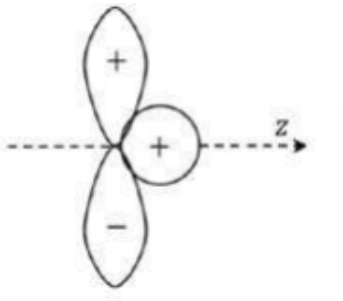
(B)



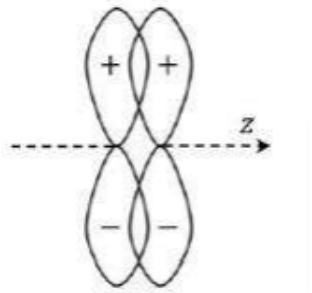
(C)

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(D)



Q.No. 37

$$\int_{-\pi/4}^{\pi/4} x \tan\left(1+x^2\right) dx =$$

(A)

0

(B)

$$\frac{\pi}{4}$$

(C)

$$\frac{-\pi}{4}$$

(D)

1

Q.No. 38

The slope of velocity — time graph for motion with uniform velocity is equal to:

(A)

Initial velocity

(B)

Final velocity

(C)

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Zero

(D)

Constant velocity

Q.No. 39

If 5 mg of ^{235}U is completely destroyed in an atom bomb, then approximate total energy released is: (given that the energy released per fission is 200 MeV)

(A)

$4x10^{8}J$

(B)

$6x10^{9}J$

(C)

$5x10^{7}J$

(D)

$3x10^{10}J$

Q.No. 40 The point of intersection of the common tangents drawn to the circles $x^2 + y^2 + 4x - 2y + 1 = 0$

(A) $\left(\frac{5}{2}, \frac{3}{2}\right)$

(B) $\left(\frac{6}{5}, \frac{1}{5}\right)$

(C) 0,-1

(D) $\left(\frac{12}{5}, \frac{7}{5}\right)$

Q.No. 41

The possible values of x if S.D of the numbers 2,3, 2x and 11 is 3.5 is equal to

(A)

4, 5/3

(B)

7/3

(C)

3, 7/3

(D)

2, 5/3

Q.No. 42 X^2 is used in the refining of Ti metal by van-Arkel method. Y, does not liberate O^2 from water and does not form HY and HOY with water. X_1 and Y_2 are respectively

(A) I_2,Cl_2

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(B) Cl_2,I_2

(C) I_2,I_2

(D) Cl_2,Cl_2

Q.No. 43 A motor engine pumps 1800 litre of water per minute from a well of depth 30 m and allows to pass through a pipe of cross sectional area 30 cm^2 . Then the power of the engine is (Acceleration due to gravity = 10 ms^{-2})

(A) 20.5 kW

(B) 15.5 kW

(C) 10.5 kW

(D) 9.5 kW

Q.No. 44

If the mean of a Poisson distribution is 7 then the ration P(Y = 1) : P(X = 2) is

(A)

1:2

(B)

3:1

(C)

1:6

(D)

6:1

Q.No. 45 If $\frac{(1-px)^{-1}}{(1-qx)} = a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots\ldots\ldots$ then a_n =

(A) $\frac{p^{n+1}-q^{n+1}}{q-p}$

(B) $\frac{p^{n+1}-q^{n+1}}{p-q}$

(C) $\frac{p^n-q^n}{q-p}$

(D) $\frac{p^n-q^n}{p-q}$

Q.No. 46

The fringe widths are found to be ω_1 and ω_2 , respectively if a Young's double shit experiment 18 performed m medium of refractive index n_1 and n_2 respectively. The correct statement is:

(A)

$\omega_1 > \omega_2$ if $n_1 > n_2$

(B)

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$\omega_1 > \omega_2$ if $n_1 < n_2$

(C)

$\omega_1 = \omega_2$ if $n_1 < n_2$

(D)

$$\frac{\omega_1}{\omega_2} = \frac{n_1}{n_2}$$

Q.No. 47 In the first order thermal decomposition of $C_2H_5I_{2(g)} \rightarrow C_2H_{4(g)} + HI_{(g)}$ the reactant in the beginning exerts a pressure of 2 bar in a closed vessel at 600 K. If the partial pressure of the reactant is 0.1 bar after 1000 minutes at the same temperature the rate constant in min^{-1} is (log 2 = 0.30)

(A) 6×10^{-4}

(B) 6×10^{3}

(C) 6×10^{-3}

(D) 6×10^{4}

Q.No. 48 When an inductor L and a resistor R in series are connected across a 12 V. 50 Hz supply. a current of 0.5 A flows in the circuit. The current differs in the phase from applied voltage by π/3 radian. Then the value of R is

(A) 10Ω

(B) 3Ω

(C) 12Ω

(D) 15Ω

Q.No. 49

If the point (λ ,1+ λ) lies inside the circle $x^2 + y^2 = 1$, then

(A)

$\lambda > 0$

(B)

$\lambda < 0$

(C)

$-1 < \lambda < 0$

(D)

$0 < \lambda < 1$

Q.No. 50

When a vehicle of mass m is moving with a velocity v over a concave over-bridge, of radius of curvature r, the thrust on the road at the lowest point on the bridge will be

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(A)

$mg + mv^2/ r$

(B)

$mg - mv^2/ r$

(C)

m^2v^2g/ r

(D)

v^2g/ r

Q.No. 51

Consider a fluid in a container. Let the density of the fluid at the surface and at depth H be ρ_0 and ρ respectively. The bulk modulus of the fluid is B_0. If $\rho = \frac{\rho_0}{1+\alpha\rho_0 gH}$ then the constant α is:

$\left(\text{Assume } \frac{\rho-\rho_0}{\rho_0} \ll 1\right)$

(A)

B_0

(B)

$1/B_0$

(C)

$-B_0$

(D)

$-1/B_0$

Q.No. 52 The length of the latus rectum of the parabola $20(x^2 + y^2 -6x -2y + 10) = (4x -2y -5)^2$ is

(A) $\sqrt{5}/2$

(B) $2\sqrt{5}$

(C) $\sqrt{5}$

(D) $4\sqrt{5}$

Q.No. 53 A body travelling along a straight line path travels first half of the distance with a velocity 7 ms^{-1}. During the travel time of the second half of the distance. first half time is travelled with a velocity 14 ms^{-1} and the second half time is travelled with a velocity 21 ms^{-1}. Then the average velocity of the body during the journey is

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(A) 14 ms^{-1}

(B) 10 ms^{-1}

(C) 9 ms^{-1}

(D) 12 ms^{-1}

Q.No. 54

A galvanometer may be converted into ammeter or a voltmeter. In which of the following cases the resistance of the devices so obtained will be largest?

(A)

Ammeter of range 1A

(B)

Ammeter of range 10 A

(C)

Voltmeter of range 1 V

(D)

Voltmeter of range 10 V

Q.No. 55

Match the following ions with the corresponding hybridization of their central atoms?

Ions	Hybridization
(i) NO_3^-	(a) sp^3
(ii) NH_2^-	(b) sp
(iii) SCN^-	(c) sp^3d
(iv) ICl_2^-	(d) sp^2

(A)

i-d, ii—a, iii—b, iv—c

(B)

i-c, ii—b, iii-a, iv—d

(C)

i-a, ii-d, iii—e, iv—b

(D)

i b, ii-c, ii d, iv—a

Q.No. 56

Molar specific heat at constant pressure C_p is related to internal energy U and absolute temperature T as C_p =

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(A)

U/T

(B)

dU/dT

(C)

dU/dT + R

(D)

U x T

Q.No. 57

If

$$\int \frac{x^2+1}{x^4+1}dx = f(x) + c$$

, then f(x)=.....

(A)

$$\frac{1}{\sqrt{2}}\mathrm{Tan}^{-1}\left(\frac{x^2+1}{\sqrt{2}x}\right)$$

(B)

$$\frac{1}{\sqrt{2}}\mathrm{Tan}^{-1}\left(\frac{x^2-1}{\sqrt{2}x}\right)$$

(C)

$$\frac{1}{\sqrt{2}}\mathrm{Tan}^{-1}\left(\frac{1-x^2}{\sqrt{2}x}\right)$$

(D)

$$\frac{1}{\sqrt{2}}\mathrm{Tan}^{-2}\left(\frac{1-x^2}{\sqrt{2}x}\right)$$

Q.No. 58

One mole of a gas at a pressure 2 Pa and temperature 27 °C is heated till both pressure and volume are doubled, What is the temperature of the gas?

(A)

300K

(B)

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600K

(C)

900K

(D)

1200K

Q.No. 59

The reaction used for the synthesis of ether is

(A)

Williamson’s synthesis

(B)

Reimer- Tiemann reaction

(C)

Sandmeyer reaction

(D)

Finkelstein reaction

Q.No. 60 Under standard conditions the density of a gas is $\frac{1400}{1089}\,\mathrm{kg\,m^{-3}}$ and the speed of sound propagation in it is 330 ms^{-1}, then the number of degrees of freedom of the gas molecules is

(A) 2

(B) 7

(C) 5

(D) 3

Q.No. 61

Two balls are released from the same position at a height of 500 m above ground, one after the other, with an interval of 1s. What is the distance between the two balls when the first hits ground? (Acceleration due to gravity g = 10 m/s^2)

(A)

95 m

(B)

65 m

(C)

130 m

(D)

175 m

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Q.No. 62 The variance of the following continuous frequency distribution is

Class Interval	0-10	10-20	20-30	30-40
Frequency	2	3	4	1

(A) 201

(B) 62

(C) 19

(D) 84

Q.No. 63 At T(K), if the ionization constant of ammonia in solution is 2.5×10^{-5}, the pH of 0.01 M ammonia solution and the ionization constant of its conjugate acid respectively at that temperature are (log 2 = 0.30)

(A) 7, 4.0×10^{-8}

(B) 7, 4.0×10^{-10}

(C) 3.3, 4.0×10^{-8}

(D) 3.3, 4.0×10^{-4}

Q.No. 64

If the density of a 5 M solution of KCl is 1.26 **g/ml**. then find the molality of the solution. (Molecular mass of KCl = 74.55 g mol)

(A)

0.74 m

(B) 1.26 m

(C)

7.45 m

(D)

3.38 m

Q.No. 65

Among the following options, identify the one which exhibits the greatest number of oxidation states.

(A)

Fe

(B)

Mn

(C)

Cr

(D)

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V

Q.No. 66 In a test. a student either guesses or copies or knows the answer to a multiple choice question with four choices having one correct answer. The probability that he guesses the answer is ⅓ and the probability that he copies it is 1/12. The probability that his answer is correct given that he copied it is ⅙ . The probability that he knew the answer, given that he has correctly answered it. is

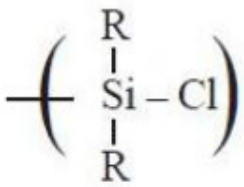
(A) 6/7

(B) 15/49

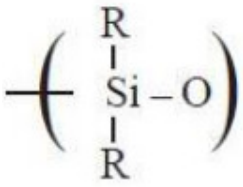
(C) 7/12

(D) 10/13

Q.No. 67 Which of the following is known as silicone?



(A) Polymer of



(B)

(C) Polymer SiO_2

(D) Polymer of $[SiO_4]^{4-}$

Q.No. 68 A gas expands with temperature according to the relation $V = kT^{2/3}$, where k is a constant. Work done when the temperature changes by 60 K is (R-Universal gas constant)

(A) 10 R

(B) 20 R

(C) 50 R

(D) 40 R

Q.No. 69 If f: A→ B is an onto function such that $f(x) = \sqrt{|x| - x} + \frac{1}{\sqrt{|x|-x}}$ then A and B are respectively

(A) (-∞, ∞), (0,∞)

(B) (-∞, 0), (2,∞)

(C) (0,∞), (2,∞)

(D) (-∞, 0], (0,∞)

Q.No. 70

$$\text{If } y = \text{Tan}^{-1}\sqrt{\frac{1-\cos x}{1+\cos x}}, \text{ then the values of } \frac{dy}{dx} \text{ and } \frac{d^2y}{dx^2} \text{ respectively are}$$

(A)

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1, 0

(B)

x/2, 1/2

(C)

1/2, 0

(D)

-1/2, 0

Q.No. 71

If

$$y = \text{Sin}^{-1}\left[x\sqrt{1-x} - \sqrt{x}\cdot\sqrt{1-x^2}\right]$$

and 0 <x <1 then dy/dx is equal to

(A)

$$\frac{1}{2\sqrt{1-x^2}} - \frac{1}{x\sqrt{1-x^2}}$$

(B)

$$\frac{1}{\sqrt{1-x^2}} - \frac{1}{2\sqrt{x-x^2}}$$

(C)

$$\$\frac{1}{2\sqrt{x-x^2}} + \frac{1}{\sqrt{1-x^2}}$$

(D)

$$\frac{-1}{\sqrt{1-x^2}} - \frac{1}{x\sqrt{1-x^2}}$$

Q.No. 72

Which of the following practices will not come under green chemistry?

(i) Using soaps made of vegetable oils instead synthetic detergents, whenever possible,

(ii) Using H_2O_2, for bleaching purposes instead chlorine based bleaching agents.

(iii) Using liquefied $C0_2$ for dry cleaning clothes and laundry.

(iv) Using plastic cans for neatly storing substances

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(A)

(i) only

(B)

(ii) only

(C)

(iii) only

(D)

(iv) only

Q.No. 73

Thermopile Bolometer is used to detect

(A)

ultraviolet radiation

(B)

X — rays

(C)

gamma radiation

(D)

infrared radiation

Q.No. 74

At high concentration of soap in water soap behaves as a

(A)

Multi molecular colloid

(B)

Associated colloid

(C)

Macromolecular colloid

(D)

Lyophilic colloid

Q.No. 75

If

$$\alpha, \beta, \gamma, \delta$$

are zeroes of the polynomial equation

$$x^4 - 3x^2 + 6x - 12 = 0$$

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then the value of

$$\frac{\alpha+\beta+\gamma}{\delta^2}+\frac{\alpha+\delta+\gamma}{\beta^2}+\frac{\alpha+\beta+\delta}{\gamma^2}+\frac{\delta+\beta+\gamma}{\alpha^2}=$$

(A)

1/2

(B)

-1/2

(C)

1/3

(D)

-1/3

Q.No. 76 A solid sphere rolls down without slipping on a smooth inclined plane of inclination $Sin^{-1}(0.42)$. If the acceleration due to gravity is 10 ms^{-2}, the acceleration of the rolling sphere is

(A) 1 ms^{-2}

(B) 2 ms^{-2}

(C) 3 ms^{-2}

(D) 4 ms^{-2}

Q.No. 77 To measure a magnetic field between the magnetic poles of a loudspeaker, a small coil having 30 turns and 2.5 cm^2 area is placed perpendicular to the field and removed immediately. If the total charge flown through the coil is 7.5 10^{-3} C. and the Total resistance of wire and galvanometer is 0.3Ω. then the magnitude of the magnetic field is

(A) 0.03 T

(B) 0.3 T

(C) 3 T

(D) 3 x 10^2 T

Q.No. 78

The angle between any two diagonals of a cube is

(A)

Cos^{-1} (1/3)

(B)

Cos^{-1} (1/√3)

(C)

Cos^{-1} (1/2)

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(D)

Cos^{-1} (2/3)

Q.No. 79

For a binomial distribution B(n, p) mean = 200, standard deviation = 10, then $n^2 + 1/p^2 + 1/q^2$ =

(A)

1,60,004

(B)

1,60,006

(C)

1,60,008

(D)

1,60,002

Q.No. 80 A solid copper cube of 7 cm edge is subjected to a hydraulic pressure of 8000 KPa. Tile volume contraction of the copper cube is (Bulk modulus of copper = 140 GPa)

(A) 196 x $10^{-3}cm^{-3}$

(B) 19.6 x $10^{-6}cm^{-3}$

(C) 19.6 x $10^{-3}cm^{-3}$

(D) 196 x $10^{-3}cm^{-3}$

Q.No. 81

Which reaction(s) among the following produce Dinitrogen?

i) $NH_4Clt_{(aq)} + NaNO_{2(aq)}$ —>

(ii) $NH_2CONH_2 + 2\ H_20$ —>

(iii) $Ba(N_3)_2$—>

(iv) $NH_4Cl + Ca(OH)_2$ —>

(A)

(i) & (iii) only

(B)

(ii) & (iii) only

(C)

(iii) & (iv) only

(D)

(ii) & (iv) only

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Q.No. 82

A hydrogen atom emits a photon corresponding to an electron transition from n=5 to n= 1, If R is the Rydberg constant, then the wavelength of emitted photon is:

(A)

25/24R

(B)

24R/25

(C)

4/5R

(D)

5R/4

Q.No. 83

The mean of the numbers a,b, 8,5,10 is 6 and the variance is 6.80, then the possible values of a and b are

(A)

a=2,b=3

(B)

a=4,b=5

(C)

a=1,b=3

(D)

a=3,b=4

Q.No. 84

The equation of a curve passing through the point (0 , 1). given that the slope of the tangent to the curve at any point (x , y) is equal to the sum of the x-coordinate, and the product of x and y coordinates at that point, is

(A)

$$y = 1 - 2\,e^{(x^2/2)}$$

(B)

$$y = -1 + 2\,e^{(x^2/2)}$$

(C)

$$y = -1 - 2\,e^{(x^2/2)}$$

(D)

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$y = 1 + 2\,e^{(x^2/2)}$

Q.No. 85

The geometries of $[Ni(CO)_4]$, $[PtCl_4]^{2-}$ and $[Co\ (NH_3)_6]^{3+}$ respectively are:

(A)

Tetrahedral, Tetrahedral and Octahedral

(B)

Tetrahedral, Square planar and Square pyramidal

(C)

Square planar, Square planar and Octahedral

(D)

Tetrahedral, Square planar and Octahedral

Q.No. 86 Which one of the following statements is not correct regarding phosphine?

(A) It is a weak base

(B) It reacts with $CuSO_4$ solution to form $CuHPO_4$

(C) It is formed by the reaction of Ca_3P_2 with HCl

(D) It is used in smoke screens.

Q.No. 87

Two bolts, two nuts and three needles are in a box. Two parts are chosen at random from the box, What is the probability that one is a bolt and one is a needle?

(A)

2/21

(B)

4/21

(C)

6/21

(D)

12/21

Q.No. 88 Given $\sin x = \sum_{n=1}^{\infty}(-1)^{n-1}\frac{x^{2n-1}}{(2n-1)!}$. If the function f(x) given by $f(x) = \frac{\cos(\sin x)-\cos x}{x^4}(x \neq 0)$ and f(0) = k is continuous at x = 0 then k =

(A) 1/6

(B) 1/3

(C) 1/2

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(D) 0

Q.No. 89 Under which of the following conditions E value of the cell for the cell reaction given is maximum ?

(A) C_1 = 0.1 M, C_2 = 0.01 M

(B) C_1 = 0.1 M, C_2 = 0.001 M

(C) C_1 = 0.1 M, C_2 = 0.02 M

(D) C_1 = 0.2 M, C_2 = 0.01 M

Q.No. 90

When a spiral spring is stretched by suspending a load with it. the strain produced is called _____ strain.

(A)

Volume

(B)

Shearing

(C)

Transverse

(D)

Longitudinal

Q.No. 91

If the vectors

$$\vec{a} = \hat{i} - \hat{j} + 2\hat{k}, \vec{b} = 2\hat{i} + 4\hat{j} + \hat{k}$$

and

$$\vec{c} = \lambda\hat{i} + \hat{j} + \mu\hat{k}$$

are mutually orthogonal then

$$(\lambda, \mu)$$

is equal to

(A)

(-3, 2)

(B)

(2, -3)

(C)

(-2, 3)

(D)

(3, -2)

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Q.No. 92

$$\int \frac{dx}{\sqrt{7-6x-x^2}} =$$

(A)

$$\text{Sinh}^{-1}\left(\frac{x+3}{4}\right)+c$$

(B)

$$\log\left|\frac{x+3}{4}\right|+c$$

(C)

$$\text{Sin}^{-1}\left(\frac{x+3}{4}\right)+c$$

(D)

$$\frac{1}{2}\text{Sin}^{-1}\left(\frac{x+3}{4}\right)+c$$

Q.No. 93

The angle between the lines $ab(x^2 - y^2) + (a^2 — b^2)xy = O$ is

(A)

π/2

(B)

π/3

(C)

π/4

(D)

π/6

Q.No. 94

The product(s) of the reaction $NaBH_4 + I_2$ ——> 'Products' is/are

(A)

$B_2H_4I_2 + 2NaI$

(B)

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B_2H_6 + NaH + HI

(C)

B_2H_6 + 2 NaI+ HI

(D)

$2NaBH_4I$

Q.No. 95 The standard enthalpy of formation of $CO_{(g)}, CO_{2(g)}, N_2O_{(g)},$ and $N_2O_{4(g)}$ are respectively $-10, -393, 81,$ and $-10 kJmol^{-1}$. Enthalpy change (in kJ) of the following reaction is
$N_2O_{4(g)} + 3CO_{(g)} \longrightarrow N_2O_{(g)} + 3CO_{2(g)}$

(A) -1058

(B) +1058

(C) -957

(D) +957

Q.No. 96 If the equation of the plane passing through the point (2, - 1. 3) and perpendicular to the planes $3x - 2y + z = 9$ and $x + y + z = 9$ is $x + by + cz + d = 0$ then $d =$

(A) 11/3

(B) 0

(C) 3

(D) ⅓

Q.No. 97

The number of real roots of the equation $\frac{(x^2+1)^3}{x^3} + \frac{x^2+1}{3x} = 0\ (x \neq 0)$ is

(A)

1

(B)

0

(C)

2

(D)

3

Q.No. 98 The length of a potentiometer wire is '/', A cell of emf 'E' is balanced at a length (l/3) from positive end of the wire. If the length of the wire is increased by (l/2) the distance at which the same cell gives the balancing point is (cell in the primary is ideal and no series resistance is present in the primary circuit)

(A) 2l/3

(B) l/2

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(C) l/6

(D) 4l/3

Q.No. 99 $\int \frac{x^5 dx}{(x^2+x+1)(x^6+1)(x^4-x^3+x-1)} =$

(A) $\log_e \left| \frac{x^6-1}{x^6+1} \right| + c$

(B) $\frac{1}{12}\log_e \left| \frac{x^6-1}{|x^6+1|} \right| + c$

(C) $\frac{1}{12}\log_e \left| \frac{x^4+1}{x^4-1} \right| + c$

(D) $\log_e \left| \frac{x^8+4}{x^6-1} \right| + c$

Q.No. 100 In Dumas method one gram of carbon compound gives 50 mL of N_2 at 300 K and 740 mm Hg pressure, If the aqueous tension at 300 K is 15 mm Hg, what is the percentage of nitrogen in it?

(A) 5.42

(B) 10.84

(C) 21.68

(D) 2.71

Q.No. 101

The heat liberated when 1.89 g of benzoic acid is burnt in a bomb calorimeter at 25 °C increases the temperature of 18.94 kg of water by 0.632 °C. If the specific heat of water at 25 °C is 0.998 cal / (g — °C). then find the heat of combustion of benzoic acid.

(A)

2540 kJ mol^{-1}

(B)

1975 kJ mol^{-1}

(C)

3240 kJ mol^{-1}

(D)

2825 kJ mol^{-1}

Q.No. 102

In a mixed oxide of 'A' and 'B', 'A' occupies all the octahedral voids while 'B' occupies $(2/3)^{rd}$ the tetrahedral voids. The molecular formula of this oxide is.....

(A)

$A_3B_4O_3$

(B)

$A_3B_2O_3$

(C)

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A_3BO_3

(D)

AB_2O_3

Q.No. 103 If the radical axis of the circles x touches the circle $x^2 + y^2 +2gx+ 3fy +c = 0$ and $2x^2 + 2y^2 +3x +8y+2c =0$ touches the circles $x^2 + y^2 +2x +2y+1 = 0$, then (4g-3) (f-2)=

(A) 0

(B) -1

(C) 1

(D) 2

Q.No. 104

(1 — tan 348°)(1 + cot 417°) =

(A)

$3\sqrt{3}$

(B)

2

(C)

$2/\sqrt{3}$

(D)

1

Q.No. 105 How many prime numbers lie between 115 and 122.

(A) 0

(B) 4

(C) 8

(D) 2

Q.No. 106

The reaction of 'tert-butyl methyl ether' with one equivalent of HI gives.....

(A)

tert-butyl iodide & methyl iodide

(B)

iso-butene & methyl iodide

(C)

iso-butene & methanol

(D)

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tert-butyl iodide & methanol

Q.No. 107 Assertion (A) : $\overline{a}, \overline{b}, \overline{c}, \overline{d}$ are position vectors of 4 points such that $2\overline{a} - 3\overline{b} + 7\overline{c} - 6\overline{d} = \overline{0}$ $\Rightarrow \overline{a}, \overline{b}, \overline{c}, \overline{d}$ are coplanar.

Reason (R): Vector equation of the plane passing through three points whose position vectors are $\overline{a}, \overline{b}, \overline{c}$ is $\overline{r} = (1 - x - y)\overline{a} + x\overline{b} + y\overline{c}$ Which of the following is true?

(A) Both (A) and (R) are uue and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A)

(C) (A) is true, but (R) is false

(D) (A) is false. but (R) is true

Q.No. 108 A solid sphere of mass 100 kg and radius 10 m moving in a space becomes a circular disc of radius 20 m in one hour. Then the rate of change of moment of inertia in the process is

(A) $\frac{40}{9}\mathrm{kgm^2s^{-1}}$

(B) $\frac{10}{9}\mathrm{kgm^2s^{-1}}$

(C) $\frac{50}{9}\mathrm{kgm^2s^{-1}}$

(D) $\frac{25}{9}\mathrm{kgm^2s^{-1}}$

Q.No. 109

Which of the following metals produces Hydrogen gas on reacting with cold dilute Nitric acid

(A)

Al

(B)

Fe

(C)

Mg

(D)

Cu

Q.No. 110

If the origin is the centroid of the triangle for which (—2 3, 4) and (3 ,-1, 5) are two vertices, then the third vertex is .....

(A)

(1,2,9)

(B)

(-1,-2,9)

(C)

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(1,-2,-9)

(D)

(-1,-2,-9)

Q.No. 111 Match for each functions in List -I to its derivative given in List- II

List - I జాబితా - I		List - II జాబితా - II	
A)	$\text{Sin}^{-1}\left(\frac{2x}{1+x^2}\right)$	I)	$\cos x - \sin x$
B)	$\text{Tan}^{-1}\left(\frac{1-x}{1+x}\right)$	II)	$\frac{-1}{1+x^2}$
C)	$e^{\log(\sin x+\cos x)}$	III)	$\frac{2}{1+x^2}$
D)	$\sqrt{1-\sin 2x}\left(0<x<\frac{\pi}{4}\right)$	IV)	$\cos x + \sin x$
		V)	$-\sin x - \cos x$

(A) A-III B-II C-I D-V

(B) A-II B-III C-V D-IV

(C) A-II B-III C-V D-I

(D) A-III B-II C-I D-IV

Q.No. 112

If one of the roots of the equation $x^2 + p\,x + c = 0$ is equal to the square of the other then .....

(A)

$p(q^2 - 3p) = q(p - 1)$

(B)

$p(3p - q^2) = p(p + 1)$

(C)

$p(3q - p^2) = q(q - 1)$

(D)

$p(3q - p^2) = q(q + 1)$

Q.No. 113 Define $f(x) = \begin{cases} \frac{\sqrt{1+px}-\sqrt{1-px}}{x}, \text{ if } -1 \le x < 0 \\ \frac{2x+1}{x-2}, \text{ if } 0 \le x \le 1 \end{cases}$ If $\lim_{x\to 0} f(x)$ exists then p =

(A) -1

(B) -1/2

(C) 1/2

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(D) 1

Q.No. 114

The three lines given by the combined equation $y^3 - 4x^2 y = 0$ represents

(A)

the sides of an isosceles triangle

(B)

the sides of a right-angled triangle

(C)

the sides of an equilateral triangle

(D)

concurrent lines

Q.No. 115 The correct option for the first ionization enthalpy $\left(\text{in kJmol}^{-1}\right)$ of Li, Na, K and Cs respectively is

(A) 496, 520, 419, 374

(B) 374, 419, 496, 520

(C) 520, 496, 419, 374

(D) 374, 419, 520, 496

Q.No. 116

Calculate the amount of hydrogen gas required in order to produce 100 g of ammonia by the reaction of $N_2(g)$ and $H_2(g)$ gases

(A)

35.29 g

(B)

17.65 g

(C)

28.11 g

(D)

34 g

Q.No. 117

The alkaline earth metal sulphate, which has its hydration enthalpy greater than its

(A)

$BeSO_4$

(B)

$BaSO_4$

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(C)

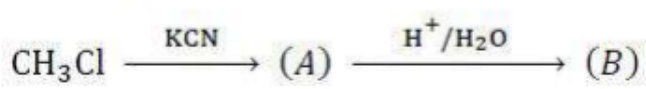
$CaSO_4$

(D)

$SrSO_4$

Q.No. 118

Identify the compound (B) in given reaction.



(A)

CH_3NH_2

(B)

HCOOH

(C)

CH_3COOH

(D)

CH_3COCH_3

Q.No. 119

If the lines 4x + 3y -1=0, x-y +5 =O and kx + 5y—3 = 0 are concurrent then k =

(A)

4

(B)

5

(C)

6

(D)

7

Q.No. 120

Newton's law of cooling holds good provided the temperature difference between body and surrounding is .....

(A)

very large

(B)

large

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(C)

small

(D)

very small

Q.No. 121

If θ is the angle between the lines $x^2 + 2hxy + by^2 = 0$ then the angle between $x^2+2xy\sec\theta +y^2 =0$ is

(A)

θ

(B)

2θ

(C)

θ/2

(D)

3θ

Q.No. 122

$$\int \frac{x+\sin x}{1+\cos x}dx =$$

Options :

$$x\cot\left(\frac{x}{2}\right)+c$$

$2 .$

$$\cot\left(\frac{x}{2}\right)+c$$

3.

$$\tan\left(\frac{x}{2}\right)+c$$

(A)

$$x\cot\left(\frac{x}{2}\right)+c$$

(B)

$$\cot\left(\frac{x}{2}\right)+c$$

(C)

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$$\tan\left(\frac{x}{2}\right)+c$$

(D)

$$xtan\left(\frac{x}{2}\right)+c$$

Q.No. 123 Let [x] denote the greatest integer less than or equal to x. Then the number of points where the function y = [x] +|1-x|, is not differentiable. is

(A) 1

(B) 2

(C) 3

(D) 4

Q.No. 124

If the line joining the points (k, 2,3) and (1,1,2) is parallel to the line joining the points (5,4,-1) and (3,2,—3), then the value of k =

(A)

1

(B)

2

(C)

-2

(D)

3

Q.No. 125

If refractive index of water is 4/3 and that of a given slab immersed in it is 5/3. The value of critical angle for a zray of light tending to go from glass to water is:

(A)

$Sin^{-1}(4/5)$

(B)

$Sin^{-1}(3/4)$

(C)

$Sin^{-1}(5/3)$

(D)

$Sin^{-1}(4/3)$

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Q.No. 126

The length of the chord intercepted by the circle $x^2 + y^2 - 8x — 2y — 8 = 0$ on the line $x + y + 1=0$ is units.

(A)

14

(B)

7

(C)

$2\sqrt{7}$

(D)

$\sqrt{7}$

Q.No. 127 The non-biodegradable waste fonned in fertilizer industries is

(A) fly ash

(B) carbon monoxide

(C) gypsum

(D) lead

Q.No. 128

If a=x/y-z, b=y/z-x & c= z/x-y where x,y,z are not all zero, then what is the value of ab+bc+ca=?

(A)

0

(B)

-1

(C)

+1

(D)

2

Q.No. 129 The major product obtained in the reaction of bromobenzene with Mg in dry ether followed by the reaction with benzonitrile and hydrolysis is

(A) Acetophenone

(B) Benzophenone

(C) Phenyl benzoate

(D) Benzoic acid

Q.No. 130

If

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$$\int_a^b x^3 dx = 0 \text{ and } \int_a^b x^2 dx = \frac{2}{3}$$

then

(A)

a = -1 & b = 1

(B)

a = 1 & b = -1

(C)

a = 2 & b = -2

(D)

a = -2 & b = 2

Q.No. 131

R divides the line joining two points P and Q whose position vectors are

$$P(\hat{i} + 2\hat{j} - \hat{k}), Q(-\hat{i} + \hat{j} + \hat{k})$$

respectively in the ratio 2 + 1 externally, S divides PQ internally in the ratio 2: 1, Then the position vector of the midpoint of the line joining R and S is.....

(A)

$$\frac{-5}{3}\hat{i} - \frac{2}{3}\hat{j} - \frac{5}{3}\widehat{k}$$

(B)

$$\frac{-5}{3}\hat{i} + \frac{2}{3}\hat{j} + \frac{5}{3}\hat{k}$$

(C)

$$\frac{5}{3}\hat{i} - \frac{2}{3}\hat{j} - \frac{5}{3}\hat{k}$$

(D)

$$\frac{5}{3}\hat{i} + \frac{2}{3}\hat{j} + \frac{5}{3}\hat{k}$$

Q.No. 132

A body of mass 3 kg is moving with a velocity of 8m.s^{-1} collides head on with another body of mass 1 kg, moving in the opposite direction with a velocity of 4m.s^{-1}. After the collision, if the two bodies stick together and move, they move with a common velocity.....

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(A)

$5ms^{-1}$

(B)

$7ms^{-1}$

(C)

$10ms^{-1}$

(D)

$14ms^{-1}$

Q.No. 133

Photo cells convert .....

(A)

light energy into mechanical energy

(B)

heat energy into electrical energy

(C)

light energy into electrical energy

(D)

electrical energy into light energy

Q.No. 134 $\int \frac{x-1}{(x+1)\sqrt{x^3+x^2+x}}dx =$

(A) $2\tan^{-1}\left(\sqrt{\frac{1+x+x^2}{x}}\right) + \mathrm{c}$

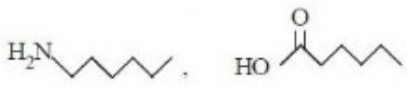
(B) $\tan^{-1}\left(\sqrt{\frac{1+x+x^2}{x}}\right) + c$

(C) $\tan^{-1}\left(\sqrt{\frac{x}{1+x+x^2}}\right) + c$

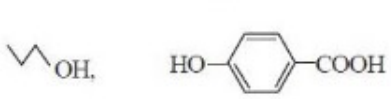
(D) $\tan^{-1}\left(\sqrt{\frac{1+x^2}{x}}\right) + c$

Q.No. 135 The monomers of nylon 6. 6 (X) and terylene (Y) are

X



Y

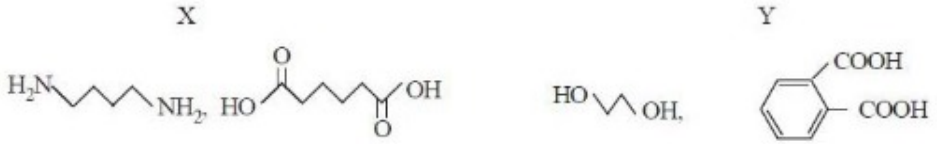


(A)

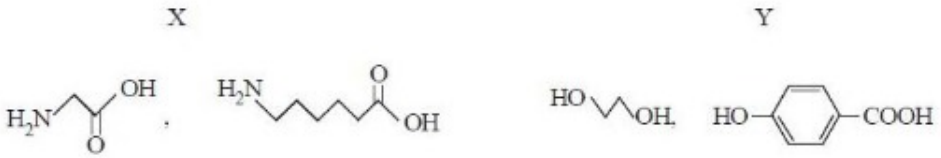
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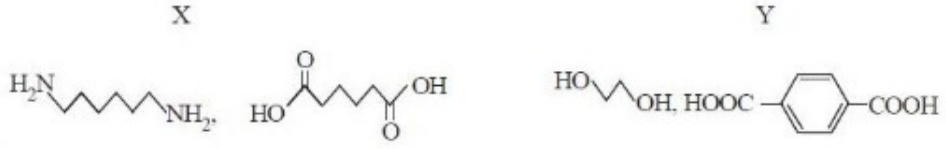
(B)



(C)



(D)



Q.No. 136

The perpendicular distance from origin to the plane x + 2y — 22 + 5 = 0 equals ..... units.

(A)

3/4

(B)

5/3

(C)

5/9

(D)

5

Q.No. 137

A solid float such that its $(1/3)^{rd}$ part is above water surface, Then, the density of solid is

(A)

744 $kg.m^{-3}$

(B)

1000/3 $kg.m^{-3}$

(C)

2000/3 $kg.m^{-3}$

(D)

910 $kg.m^{-3}$

Q.No. 138

Thermopile Bolometer is used to detect ..

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(A)

ultraviolet radiation

(B)

X-rays

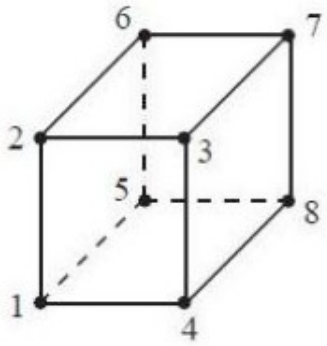
(C)

gamma radiation

(D)

infrared radiation

Q.No. 139 If the resistance of each edge of a cube shaped wire frame shown in figure below is R, the resistance



between points 1 and 7 is

(A) 5R/6

(B) R/6

(C) 5R

(D) 6R/5

Q.No. 140

The current gain for a transistor working as common-base amplifier is 0.96. If the emitter current is 7.2 mA, then the base current is

(A)

0.29 mA

(B)

0.35 mA

(C)

0.39 mA

(D)

10 mA

Q.No. 141

The radius of earth is about 6400 km and that of mars is 3200 km, And mass of the earth is about 10 times mass of mars. An object weighs 200 N on the surface of earth. Then its weight on the surface of mars will be

(A)

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80N

(B)

40N

(C)

20N

(D)

8N

Q.No. 142

$$\lim_{x \to \infty} \left(\frac{2 + \sin x}{x^2 + 3} \right) =$$

(A)

0

(B)

1

(C)

-1

(D)

Infinite

Q.No. 143

The flow rate of water from a tap of diameter 1.25 cm is 3 litres per minute. If coefficient of viscosity of water is 10^{-3}Pa.s, the nature of flow is _____

(A)

Unsteady

(B)

Turbulent

(C)

Streamlined

(D)

Laminar

Q.No. 144

ABCDEF is a regular hexagon. The sum of the vectors

$$\overrightarrow{BE}, \overrightarrow{BC}, \overrightarrow{EF}, \overrightarrow{BA}, \overrightarrow{CF}, \overrightarrow{AF}$$

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(A)

$$\overrightarrow{BF}$$

(B)

$$\overrightarrow{2BF}$$

(C)

$$\overrightarrow{FB}$$

(D)

$$\overrightarrow{3BF}$$

Q.No. 145

When two resistors of resistances R, = (200 + 2) Q and Ry = (400 + 4) Q are connected in series, the equivalent resistance of the combination is

(A)

(800 ± 7) Ω

(B)

(600 ± 2) Ω

(C)

(600 ± 6) Ω

(D)

(200 ± 2) Ω

Q.No. 146 The green colour seen in firework displays is due to the chloride salt of

(A) barium

(B) sodium

(C) strontium

(D) copper

Q.No. 147 Mixed aldol products obtained from aldol condensation of ethanal and propanone are

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(A) 

(B) 

(C) 

(D) 

Q.No. 148 Assertion [A]: S_N1 hydrolysis of optically active 2-bromooctane results in the formation of (+)-octan-2-ol Reason [R]: The reaction proceeds through a planar carbocation which can be attacked by the nucleophile from either side The correct answer is

(A) [A] and [R] are correct, [R] is the correct explanation of [A]

(B) [A] and [R] are correct but [R] is not the correct explanation of [A]

(C) [A] is correct but [R] is not correct

(D) [A] is not correct but [R] is correct

Q.No. 149 $\cos^2 5^\circ - \cos^2 15^\circ - \sin^2 15^\circ + \sin^2 35^\circ + \cos 15^\circ \sin 15^\circ - \cos 5^\circ \sin 35^\circ =$

(A) 0

(B) 1

(C) 3/2

(D) 2

Q.No. 150

Pressure of 1 g ideal gas X at 300K is 2. atm. When 2 g of another gas Y 1s introduced in the same vessel at same temperature, the pressure become 1 atm. The correct relationship between molar mass of X and Y is .....

(A)

$M_Y = 2M_X$

(B)

$M_Y = 4M_X$

(C)

$M_X = 4M_Y$

(D)

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$M_X = 5M_Y$

Q.No. 151 Identify the correct statements from the following i. The ionic radius of Pr^{3+}, Dy^{3+} and Sm^{3+} follow the order, $Sm^{3+} > Pr^{3+} > Dy^{3+}$ ii. Eu^{2-} acts as strong reducing reagent iii. Pu exhibits +7 oxidation state

(A) i, ii only

(B) i, iii only

(C) i ii, iii

(D) ii, iii only

Q.No. 152 The equation of the circle whose radius is 3 and which touches internally the circle at $x^2 + y^2 - 4x - 6y - 12 = 0$ at the point (-1,-1) is

(A) $5x^2 + 5y^2 + 9x - 6y - 7 = 0$

(B) $5x^2 + 5y^2 - 8x - 14y - 32 = 0$

(C) $5x^2 + 5y^2 - 6x + 8y - 8 = 0$

(D) $5x^2 + 5y^2 + 6x - 8y - 12 = 0$

Q.No. 153 If $\sinh x = \frac{3}{4}$ and $\cosh y = \frac{5}{3}$ then $x + y =$

(A) log 2

(B) log 6

(C) log 3

(D) log 5

Q.No. 154

The tendency of forming chloride hydrates of alkaline earth metals is in the order of.....

(A)

Ba > Sr, Ca > Mg

(B)

Sr >Ba, Mg > Ca

(C)

Ma > Ca, Sr > Ba

(D)

Mg > Sr > Ca> Ba

Q.No. 155 If the position vectors of the vertices A, B and C of Δ ABC are $\bar{i} + 2\bar{j} - 5\bar{k}$, $-2\bar{i} + 2\bar{j} + \bar{k}$ and $2\bar{t} + \bar{j} - \bar{k}$ respectively then ∠B =

(A) $\cos^{-1}\left(\frac{7}{3\sqrt{10}}\right)$

(B) $\cos^{-1}\left(\frac{8}{\sqrt{105}}\right)$

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(C) $\cos^{-1}\left(\frac{1}{\sqrt{42}}\right)$

(D) $\cos^{-1}\left(\frac{-}{7}3\sqrt{10}\right)$

Q.No. 156

If $4x^2 - 5xy + y^2 = 0$ represents a pair of lines with slopes m, and my. then the value of $|m_1 — m_2]$ equals

(A)

1

(B)

2

(C)

3

(D)

4

Q.No. 157 In an examination hall there are 'mn' chairs in m rows and n columns. The number of ways in which m students can be seated such that no row is vacant is

(A) $m^n n!$

(B) $n^m m!$

(C) $m^n n!$

(D) $n^n m!$

Q.No. 158 For $A \neq 0, x < 0, \lim_{n\to\infty} \frac{\sin x - e^n}{1+Ae^{nx}} =$

(A) 1/A

(B) sin x

(C) -1/A

(D) -sin x

Q.No. 159 What is the slag formed during the extraction of iron?

(A) MgO

(B) $FeSiO_3$

(C) $CaSiO_3$

(D) $MgSiO_3$

Q.No. 160

For strong acid and strong base neutralization net chemical change is $H^+ + 0H^-$ ----> H_20 (l) ΔH_r^0 =-55.84kJ mol^{-1}, If enthalpy of neutralization of CH,CQOH by NaOH is 49.86 kJ mol^{-1} then enthalpy of ionization of CH,COOH is .....

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(A)

5.98 kJ mol^{-1}

(B)

-5.98 kJ mol^{-1}

(C)

105.7 kJ mol^{-1}

(D)

-59.8 kJ mol^{-1}

Answer Sheet

Q.No	Answer
Q.No. 1	(B)
Q.No. 2	(D)
Q.No. 3	(B)
Q.No. 4	(A)
Q.No. 5	(A)
Q.No. 6	(C)
Q.No. 7	(D)
Q.No. 8	(B)
Q.No. 9	(A)
Q.No. 10	(A)
Q.No. 11	(B)
Q.No. 12	(A)
Q.No. 13	(D)
Q.No. 14	(B)
Q.No. 15	(A)
Q.No. 16	(B)
Q.No. 17	(D)
Q.No. 18	(C)
Q.No. 19	(A)
Q.No. 20	(D)
Q.No. 21	(A)
Q.No. 22	(B)
Q.No. 23	(B)
Q.No. 24	(D)
Q.No. 25	(D)
Q.No. 26	(A)
Q.No. 27	(D)

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Q.No. 28	(B)
Q.No. 29	(B)
Q.No. 30	(D)
Q.No. 31	(D)
Q.No. 32	(A)
Q.No. 33	(C)
Q.No. 34	(C)
Q.No. 35	(B)
Q.No. 36	(C)
Q.No. 37	(A)
Q.No. 38	(C)
Q.No. 39	(A)
Q.No. 40	(C)
Q.No. 41	(C)
Q.No. 42	(C)
Q.No. 43	(C)
Q.No. 44	(D)
Q.No. 45	(B)
Q.No. 46	(B)
Q.No. 47	(C)
Q.No. 48	(C)
Q.No. 49	(C)
Q.No. 50	(A)
Q.No. 51	(D)
Q.No. 52	(C)
Q.No. 53	(B)
Q.No. 54	(D)
Q.No. 55	(A)
Q.No. 56	(C)
Q.No. 57	(B)
Q.No. 58	(D)
Q.No. 59	(A)
Q.No. 60	(C)
Q.No. 61	(A)
Q.No. 62	(D)
Q.No. 63	(B)
Q.No. 64	(D)
Q.No. 65	(B)
Q.No. 66	(A)
Q.No. 67	(B)
Q.No. 68	(D)

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Q.No. 69	(B)
Q.No. 70	(C)
Q.No. 71	(B)
Q.No. 72	(D)
Q.No. 73	(D)
Q.No. 74	(B)
Q.No. 75	(A)
Q.No. 76	(C)
Q.No. 77	(B)
Q.No. 78	(A)
Q.No. 79	(C)
Q.No. 80	(C)
Q.No. 81	(A)
Q.No. 82	(A)
Q.No. 83	(D)
Q.No. 84	(B)
Q.No. 85	(D)
Q.No. 86	(B)
Q.No. 87	(C)
Q.No. 88	(A)
Q.No. 89	(A)
Q.No. 90	(B)
Q.No. 91	(A)
Q.No. 92	(C)
Q.No. 93	(A)
Q.No. 94	(C)
Q.No. 95	(A)
Q.No. 96	(A)
Q.No. 97	(B)
Q.No. 98	(B)
Q.No. 99	(B)
Q.No. 100	(A)
Q.No. 101	(C)
Q.No. 102	(A)
Q.No. 103	(A)
Q.No. 104	(B)
Q.No. 105	(A)
Q.No. 106	(D)
Q.No. 107	(A)
Q.No. 108	(A)
Q.No. 109	(C)

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Q.No. 110	(D)
Q.No. 111	(A)
Q.No. 112	(D)
Q.No. 113	(B)
Q.No. 114	(D)
Q.No. 115	(C)
Q.No. 116	(B)
Q.No. 117	(A)
Q.No. 118	(C)
Q.No. 119	(C)
Q.No. 120	(C)
Q.No. 121	(A)
Q.No. 122	(D)
Q.No. 123	(D)
Q.No. 124	(B)
Q.No. 125	(A)
Q.No. 126	(C)
Q.No. 127	(C)
Q.No. 128	(B)
Q.No. 129	(B)
Q.No. 130	(A)
Q.No. 131	(B)
Q.No. 132	(A)
Q.No. 133	(C)
Q.No. 134	(A)
Q.No. 135	(D)
Q.No. 136	(B)
Q.No. 137	(C)
Q.No. 138	(D)
Q.No. 139	(A)
Q.No. 140	(A)
Q.No. 141	(A)
Q.No. 142	(A)
Q.No. 143	(B)
Q.No. 144	(D)
Q.No. 145	(C)
Q.No. 146	(A)
Q.No. 147	(D)
Q.No. 148	(A)
Q.No. 149	(A)
Q.No. 150	(B)

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Q.No. 151	(D)
Q.No. 152	(B)
Q.No. 153	(B)
Q.No. 154	(C)
Q.No. 155	(B)
Q.No. 156	(D)
Q.No. 157	(B)
Q.No. 158	(B)
Q.No. 159	(C)
Q.No. 160	(A)

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