

# NTA JEE 2024\_27 29 30 31 Jan 1st Feb 2024

Test Date	29/01/2024
Test Time	3:00 PM - 6:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 If each term of a geometric progression  $a_1, a_2, a_3, \dots$  with  $a_1 = \frac{1}{8}$  and  $a_2 \neq a_1$ , is the arithmetic mean of the next two terms and  $S_n = a_1 + a_2 + \dots + a_n$ , then  $S_{20} - S_{18}$  is equal to

- Options
1.  $-2^{18}$
  2.  $2^{18}$
  3.  $-2^{15}$
  4.  $2^{15}$

Question Type : MCQ

Question ID : 405859750

Option 1 ID : 4058592441

Option 2 ID : 4058592442

Option 3 ID : 4058592443

Option 4 ID : 4058592444

Status : Answered

Chosen Option : 2

Q.2

Let  $\vec{OA} = \vec{a}$ ,  $\vec{OB} = 12\vec{a} + 4\vec{b}$  and  $\vec{OC} = \vec{b}$ , where O is the origin. If S is the parallelogram with adjacent sides OA and OC, then  $\frac{\text{area of the quadrilateral OABC}}{\text{area of S}}$

- Options
- is equal to \_\_\_\_\_
1. 7
  2. 8
  3. 10
  4. 6

Question Type : MCQ

Question ID : 405859760

Option 1 ID : 4058592482

Option 2 ID : 4058592483

Option 3 ID : 4058592484

Option 4 ID : 4058592481

Status : Answered

Chosen Option : 1

Q.3 If  $R$  is the smallest equivalence relation on the set  $\{1, 2, 3, 4\}$  such that  $\{(1,2), (1,3)\} \subset R$ , then the number of elements in  $R$  is \_\_\_\_\_

- Options
1. 8
  2. 10
  3. 15
  4. 12

Question Type : MCQ  
Question ID : 405859745  
Option 1 ID : 4058592421  
Option 2 ID : 4058592422  
Option 3 ID : 4058592424  
Option 4 ID : 4058592423  
Status : Answered  
Chosen Option : 1

Q.4 An integer is chosen at random from the integers  $1, 2, 3, \dots, 50$ . The probability that the chosen integer is a multiple of atleast one of 4, 6 and 7 is

- Options
1.  $\frac{21}{50}$
  2.  $\frac{14}{25}$
  3.  $\frac{8}{25}$
  4.  $\frac{9}{50}$

Question Type : MCQ  
Question ID : 405859761  
Option 1 ID : 4058592485  
Option 2 ID : 4058592486  
Option 3 ID : 4058592488  
Option 4 ID : 4058592487  
Status : Answered  
Chosen Option : 1

Q.5 If  $\log_e a, \log_e b, \log_e c$  are in an A.P. and  $\log_e a - \log_e 2b, \log_e 2b - \log_e 3c, \log_e 3c - \log_e a$  are also in an A.P. then  $a : b : c$  is equal to

- Options
1.  $16 : 4 : 1$
  2.  $25 : 10 : 4$
  3.  $6 : 3 : 2$
  4.  $9 : 6 : 4$

Question Type : MCQ  
Question ID : 405859749  
Option 1 ID : 4058592438  
Option 2 ID : 4058592437  
Option 3 ID : 4058592440  
Option 4 ID : 4058592439  
Status : Not Answered  
Chosen Option : --

Q.6

The function  $f(x) = 2x + 3(x)^{\frac{2}{3}}$ ,  $x \in \mathbb{R}$ , has

Options 1.

- exactly two points of local maxima and exactly one point of local minima
- exactly one point of local maxima and exactly one point of local minima
- exactly one point of local maxima and no point of local minima
- exactly one point of local minima and no point of local maxima

Question Type : MCQ

Question ID : 405859752

Option 1 ID : 4058592452

Option 2 ID : 4058592449

Option 3 ID : 4058592450

Option 4 ID : 4058592451

Status : Answered

Chosen Option : 2

Q.7

Let a unit vector  $\hat{u} = x\hat{i} + y\hat{j} + z\hat{k}$  make angles  $\frac{\pi}{2}$ ,  $\frac{\pi}{3}$  and  $\frac{2\pi}{3}$  with the vectors

$\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{k}$ ,  $\frac{1}{\sqrt{2}}\hat{j} + \frac{1}{\sqrt{2}}\hat{k}$  and  $\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j}$  respectively. If  $\vec{v} = \frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j} + \frac{1}{\sqrt{2}}\hat{k}$ ,

then  $|\hat{u} - \vec{v}|^2$  is equal to

- Options 1. 9  
2. 7  
3.  $\frac{11}{2}$   
4.  $\frac{5}{2}$

Question Type : MCQ

Question ID : 405859759

Option 1 ID : 4058592478

Option 2 ID : 4058592477

Option 3 ID : 4058592479

Option 4 ID : 4058592480

Status : Answered

Chosen Option : 3

Q.8 Number of ways of arranging 8 identical books into 4 identical shelves where any number of shelves may remain empty is equal to

- Options 1. 12  
2. 18  
3. 16  
4. 15

Question Type : MCQ

Question ID : 405859748

Option 1 ID : 4058592433

Option 2 ID : 4058592436

Option 3 ID : 4058592435

Option 4 ID : 4058592434

Status : Answered

Chosen Option : 3

Q.9 The distance of the point (2, 3) from the line  $2x - 3y + 28 = 0$ , measured parallel to the line  $\sqrt{3}x - y + 1 = 0$ , is equal to

- Options
1.  $6\sqrt{3}$
  2.  $4\sqrt{2}$
  3.  $3 + 4\sqrt{2}$
  4.  $4 + 6\sqrt{3}$

Question Type : MCQ

Question ID : 405859757

Option 1 ID : 4058592472

Option 2 ID : 4058592469

Option 3 ID : 4058592470

Option 4 ID : 4058592471

Status : Answered

Chosen Option : 3

Q.10 Let  $x = \frac{m}{n}$  ( $m, n$  are co-prime natural numbers) be a solution of the equation

$\cos(2\sin^{-1}x) = \frac{1}{9}$  and let  $\alpha, \beta$  ( $\alpha > \beta$ ) be the roots of the equation  $mx^2 - nx - m + n = 0$ . Then the point  $(\alpha, \beta)$  lies on the line

- Options
1.  $3x + 2y = 2$
  2.  $3x - 2y = -2$
  3.  $5x - 8y = -9$
  4.  $5x + 8y = 9$

Question Type : MCQ

Question ID : 405859763

Option 1 ID : 4058592496

Option 2 ID : 4058592495

Option 3 ID : 4058592493

Option 4 ID : 4058592494

Status : Not Answered

Chosen Option : --

Q.11 Let  $y = \log_e \left( \frac{1-x^2}{1+x^2} \right)$ ,  $-1 < x < 1$ . Then at  $x = \frac{1}{2}$ , the value of  $225(y' - y'')$  is equal to

- Options
1. 732
  2. 736
  3. 742
  4. 746

Question Type : MCQ

Question ID : 405859753

Option 1 ID : 4058592456

Option 2 ID : 4058592455

Option 3 ID : 4058592454

Option 4 ID : 4058592453

Status : Answered

Chosen Option : 4

Q.12 Let  $r$  and  $\theta$  respectively be the modulus and amplitude of the complex number

$$z = 2 - i \left( 2 \tan \frac{5\pi}{8} \right), \text{ then } (r, \theta) \text{ is equal to}$$

Options

1.  $\left( 2 \sec \frac{3\pi}{8}, \frac{5\pi}{8} \right)$
2.  $\left( 2 \sec \frac{11\pi}{8}, \frac{11\pi}{8} \right)$
3.  $\left( 2 \sec \frac{5\pi}{8}, \frac{3\pi}{8} \right)$
4.  $\left( 2 \sec \frac{3\pi}{8}, \frac{3\pi}{8} \right)$

Question Type : MCQ

Question ID : 405859746

Option 1 ID : 4058592428

Option 2 ID : 4058592426

Option 3 ID : 4058592427

Option 4 ID : 4058592425

Status : Not Answered

Chosen Option : --

Q.13

$$\text{If } \int \frac{\sin^{\frac{3}{2}} x + \cos^{\frac{3}{2}} x}{\sqrt{\sin^3 x \cos^3 x \sin(x-\theta)}} dx = A\sqrt{\cos\theta \tan x - \sin\theta} + B\sqrt{\cos\theta - \sin\theta \cot x} + C, \text{ where } C \text{ is}$$

the integration constant, then  $AB$  is equal to

- Options
1.  $4 \operatorname{cosec}(2\theta)$
  2.  $2 \sec\theta$
  3.  $8 \operatorname{cosec}(2\theta)$
  4.  $4 \sec\theta$

Question Type : MCQ

Question ID : 405859754

Option 1 ID : 4058592457

Option 2 ID : 4058592458

Option 3 ID : 4058592459

Option 4 ID : 4058592460

Status : Not Answered

Chosen Option : --

Q.14

$$\text{The function } f(x) = \frac{x}{x^2 - 6x - 16}, x \in \mathbb{R} - \{-2, 8\}$$

- Options
1. increases in  $(-\infty, -2) \cup (-2, 8) \cup (8, \infty)$
  2. decreases in  $(-\infty, -2)$  and increases in  $(8, \infty)$
  3. decreases in  $(-2, 8)$  and increases in  $(-\infty, -2) \cup (8, \infty)$
  4. decreases in  $(-\infty, -2) \cup (-2, 8) \cup (8, \infty)$

Question Type : MCQ

Question ID : 405859751

Option 1 ID : 4058592447

Option 2 ID : 4058592445

Option 3 ID : 4058592446

Option 4 ID : 4058592448

Status : Answered

Chosen Option : 1

Q.15 The sum of the solutions  $x \in \mathbb{R}$  of the equation  $\frac{3\cos 2x + \cos^3 2x}{\cos^6 x - \sin^6 x} = x^3 - x^2 + 6$  is

- Options
1. -1
  2. 1
  3. 3
  4. 0

Question Type : MCQ  
Question ID : 405859764  
Option 1 ID : 4058592498  
Option 2 ID : 4058592499  
Option 3 ID : 4058592500  
Option 4 ID : 4058592497  
Status : Not Answered  
Chosen Option : --

Q.16 Let P(3, 2, 3), Q(4, 6, 2) and R(7, 3, 2) be the vertices of  $\Delta PQR$ . Then, the angle  $\angle QPR$  is

- Options
1.  $\frac{\pi}{3}$
  2.  $\frac{\pi}{6}$
  3.  $\cos^{-1}\left(\frac{1}{18}\right)$
  4.  $\cos^{-1}\left(\frac{7}{18}\right)$

Question Type : MCQ  
Question ID : 405859758  
Option 1 ID : 4058592476  
Option 2 ID : 4058592475  
Option 3 ID : 4058592474  
Option 4 ID : 4058592473  
Status : Not Answered  
Chosen Option : --

Q.17 If  $\sin\left(\frac{y}{x}\right) = \log_e|x| + \frac{\alpha}{2}$  is the solution of the differential equation

$$x \cos\left(\frac{y}{x}\right) \frac{dy}{dx} = y \cos\left(\frac{y}{x}\right) + x \text{ and } y(1) = \frac{\pi}{3}, \text{ then } \alpha^2 \text{ is equal to}$$

- Options
1. 4
  2. 3
  3. 12
  4. 9

Question Type : MCQ  
Question ID : 405859755  
Option 1 ID : 4058592462  
Option 2 ID : 4058592461  
Option 3 ID : 4058592464  
Option 4 ID : 4058592463  
Status : Not Answered  
Chosen Option : --

Q.18 If the mean and variance of five observations are  $\frac{24}{5}$  and  $\frac{194}{25}$  respectively and the mean of the first four observations is  $\frac{7}{2}$ , then the variance of the first four observations is equal to

- Options
1.  $\frac{105}{4}$
  2.  $\frac{77}{12}$
  3.  $\frac{5}{4}$
  4.  $\frac{4}{5}$

Question Type : MCQ

Question ID : 405859762

Option 1 ID : 4058592491

Option 2 ID : 4058592492

Option 3 ID : 4058592490

Option 4 ID : 4058592489

Status : Answered

Chosen Option : 3

Q.19 Let A be the point of intersection of the lines  $3x + 2y = 14$ ,  $5x - y = 6$  and B be the point of intersection of the lines  $4x + 3y = 8$ ,  $6x + y = 5$ . The distance of the point  $P(5, -2)$  from the line AB is

- Options
1.  $\frac{5}{2}$
  2. 8
  3. 6
  4.  $\frac{13}{2}$

Question Type : MCQ

Question ID : 405859756

Option 1 ID : 4058592466

Option 2 ID : 4058592468

Option 3 ID : 4058592467

Option 4 ID : 4058592465

Status : Not Answered

Chosen Option : --

Q.20

Let  $A = \begin{bmatrix} 2 & 1 & 2 \\ 6 & 2 & 11 \\ 3 & 3 & 2 \end{bmatrix}$  and  $P = \begin{bmatrix} 1 & 2 & 0 \\ 5 & 0 & 2 \\ 7 & 1 & 5 \end{bmatrix}$ . The sum of the prime factors

of  $|P^{-1}AP - 2I|$  is equal to

- Options 1. 26  
2. 27  
3. 23  
4. 66

Question Type : MCQ

Question ID : 405859747

Option 1 ID : 4058592429

Option 2 ID : 4058592431

Option 3 ID : 4058592430

Option 4 ID : 4058592432

Status : Answered

Chosen Option : 2

Section : Mathematics Section B

Q.21

Remainder when  $64^{32^{32}}$  is divided by 9 is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA

Question ID : 405859768

Status : Not Answered

Q.22

Let  $f(x) = \lim_{r \rightarrow x} \left\{ \frac{2r^2 \left[ (f(r))^2 - f(x)f(r) \right] - r^3 e^{\frac{f(r)}{r}}}{r^2 - x^2} \right\}$  be differentiable in

$(-\infty, 0) \cup (0, \infty)$  and  $f(1) = 1$ . Then the value of  $ea$ , such that  $f(a) = 0$ , is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA

Question ID : 405859772

Status : Not Answered

Q.23

Let the slope of the line  $45x + 5y + 3 = 0$  be  $27r_1 + \frac{9r_2}{2}$  for some  $r_1, r_2 \in \mathbb{R}$ .

Then  $\lim_{x \rightarrow 3} \left( \int_3^x \frac{8t^2}{\frac{3r_2x}{2} - r_2x^2 - r_1x^3 - 3x} dt \right)$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA

Question ID : 405859769

Status : Not Answered



Q.24 Let  $P(\alpha, \beta)$  be a point on the parabola  $y^2 = 4x$ . If  $P$  also lies on the chord of the parabola  $x^2 = 8y$  whose mid point is  $\left(1, \frac{5}{4}\right)$ , then  $(\alpha - 28)(\beta - 8)$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859773  
Status : Not Answered

Q.25 Let  $O$  be the origin, and  $M$  and  $N$  be the points on the lines  $\frac{x-5}{4} = \frac{y-4}{1} = \frac{z-5}{3}$  and  $\frac{x+8}{12} = \frac{y+2}{5} = \frac{z+11}{9}$  respectively such that  $MN$  is the shortest distance between the given lines. Then  $\overline{OM} \cdot \overline{ON}$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859774  
Status : Not Answered

Q.26 Let the set  $C = \{(x, y) \mid x^2 - 2^y = 2023, x, y \in \mathbb{N}\}$ . Then  $\sum_{(x,y) \in C} (x+y)$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859765  
Status : Not Answered

Q.27 Let  $\alpha, \beta$  be the roots of the equation  $x^2 - \sqrt{6}x + 3 = 0$  such that  $\text{Im}(\alpha) > \text{Im}(\beta)$ .

Let  $a, b$  be integers not divisible by 3 and  $n$  be a natural number such that

$$\frac{\alpha^{99}}{\beta} + \alpha^{98} = 3^n(a + ib), \quad i = \sqrt{-1}$$

Then  $n + a + b$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859766  
Status : Not Answered

Q.28 If  $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sqrt{1 - \sin 2x} \, dx = \alpha + \beta\sqrt{2} + \gamma\sqrt{3}$ , where  $\alpha, \beta$  and  $\gamma$  are rational numbers, then  $3\alpha + 4\beta - \gamma$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859770  
Status : Not Answered

Q.29 Let the area of the region  $\{(x,y) : 0 \leq x \leq 3, 0 \leq y \leq \min\{x^2 + 2, 2x + 2\}\}$  be A.  
Then  $12A$  is equal to \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859771  
Status : Not Answered

Q.30 Let for any three distinct consecutive terms  $a, b, c$  of an A.P, the lines  $ax + by + c = 0$  be concurrent at the point P and  $Q(\alpha, \beta)$  be a point such that the system of equations

$$x + y + z = 6,$$

$$2x + 5y + \alpha z = \beta \text{ and}$$

$$x + 2y + 3z = 4, \text{ has infinitely many solutions. Then } (PQ)^2 \text{ is equal to } _____.$$

Given --  
Answer :

Question Type : SA  
Question ID : 405859767  
Status : Not Answered

Section : Physics Section A

Q.31 A small liquid drop of radius  $R$  is divided into 27 identical liquid drops. If the surface tension is  $T$ , then the work done in the process will be:

Options

1.  $\frac{1}{8}\pi R^2 T$

2.  $4\pi R^2 T$

3.  $3\pi R^2 T$

4.  $8\pi R^2 T$

Question Type : MCQ  
Question ID : 405859781  
Option 1 ID : 4058592538  
Option 2 ID : 4058592536  
Option 3 ID : 4058592537  
Option 4 ID : 4058592535  
Status : Answered  
Chosen Option : 3

Q.32 A plane electromagnetic wave of frequency 35 MHz travels in free space along the X-direction. At a particular point (in space and time)  $\vec{E} = 9.6 \hat{j} V/m$ . The value of magnetic field at this point is :

- Options
1.  $3.2 \times 10^{-8} \hat{i} T$
  2.  $9.6 \hat{j} T$
  3.  $3.2 \times 10^{-8} \hat{k} T$
  4.  $9.6 \times 10^{-8} \hat{k} T$

Question Type : MCQ  
Question ID : 405859788  
Option 1 ID : 4058592563  
Option 2 ID : 4058592566  
Option 3 ID : 4058592565  
Option 4 ID : 4058592564  
Status : Answered  
Chosen Option : 2

Q.33 An electric field is given by  $(6\hat{i} + 5\hat{j} + 3\hat{k}) N/C$ . The electric flux through a surface area  $30\hat{i} m^2$  lying in YZ-plane (in SI unit) is :

- Options
1. 180
  2. 60
  3. 90
  4. 150

Question Type : MCQ  
Question ID : 405859784  
Option 1 ID : 4058592547  
Option 2 ID : 4058592550  
Option 3 ID : 4058592549  
Option 4 ID : 4058592548  
Status : Answered  
Chosen Option : 1

Q.34 Two particles X and Y having equal charges are being accelerated through the same potential difference. Thereafter they enter normally in a region of uniform magnetic field and describes circular paths of radii  $R_1$  and  $R_2$  respectively. The mass ratio of X and Y is:

- Options
1.  $\left(\frac{R_2}{R_1}\right)$
  2.  $\left(\frac{R_2}{R_1}\right)^2$
  3.  $\left(\frac{R_1}{R_2}\right)^2$
  4.  $\left(\frac{R_1}{R_2}\right)$

Question Type : MCQ  
Question ID : 405859786  
Option 1 ID : 4058592557  
Option 2 ID : 4058592558  
Option 3 ID : 4058592556  
Option 4 ID : 4058592555  
Status : Answered  
Chosen Option : 4

Q.35 If the distance between object and its two times magnified virtual image produced by a curved mirror is 15 cm, the focal length of the mirror must be:

- Options
1. - 10 cm
  2. 10/3 cm
  3. 15 cm
  4. - 12 cm

Question Type : MCQ

Question ID : 405859794

Option 1 ID : 4058592589

Option 2 ID : 4058592587

Option 3 ID : 4058592588

Option 4 ID : 4058592590

Status : Not Answered

Chosen Option : --

Q.36 The bob of a pendulum was released from a horizontal position. The length of the pendulum is 10 m. If it dissipates 10% of its initial energy against air resistance, the speed with which the bob arrives at the lowest point is:

[Use,  $g : 10 \text{ ms}^{-2}$ ]

- Options
1.  $6\sqrt{5} \text{ ms}^{-1}$
  2.  $5\sqrt{5} \text{ ms}^{-1}$
  3.  $5\sqrt{6} \text{ ms}^{-1}$
  4.  $2\sqrt{5} \text{ ms}^{-1}$

Question Type : MCQ

Question ID : 405859779

Option 1 ID : 4058592527

Option 2 ID : 4058592528

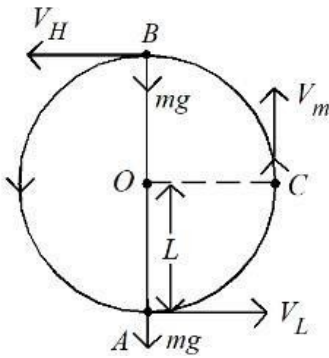
Option 3 ID : 4058592529

Option 4 ID : 4058592530

Status : Answered

Chosen Option : 1

Q.37 A bob of mass ' $m$ ' is suspended by a light string of length ' $L$ '. It is imparted a minimum horizontal velocity at the lowest point  $A$  such that it just completes half circle reaching the top most position  $B$ . The ratio of kinetic energies  $\frac{(K.E)_A}{(K.E)_B}$  is :



- Options
1. 3:2
  2. 2:5
  3. 1:5
  4. 5:1

Question Type : MCQ

Question ID : 405859777

Option 1 ID : 4058592522

Option 2 ID : 4058592521

Option 3 ID : 4058592519

Option 4 ID : 4058592520

Status : Answered

Chosen Option : 1

Q.38 A particle is moving in a straight line. The variation of position ' $x$ ' as a function of time ' $t$ ' is given as  $x = (t^3 - 6t^2 + 20t + 15) \text{ m}$ . The velocity of the body when its acceleration becomes zero is :

- Options
1. 6 m/s
  2. 8 m/s
  3. 4 m/s
  4. 10 m/s

Question Type : MCQ

Question ID : 405859776

Option 1 ID : 4058592516

Option 2 ID : 4058592515

Option 3 ID : 4058592517

Option 4 ID : 4058592518

Status : Answered

Chosen Option : 2

Q.39 The temperature of a gas having  $2.0 \times 10^{25}$  molecules per cubic meter at 1.38 atm (Given,  $k = 1.38 \times 10^{-23} \text{ JK}^{-1}$ ) is :

- Options
1. 200 K
  2. 300 K
  3. 100 K
  4. 500 K

Question Type : MCQ  
Question ID : 405859783  
Option 1 ID : 4058592545  
Option 2 ID : 4058592543  
Option 3 ID : 4058592546  
Option 4 ID : 4058592544  
Status : Answered  
Chosen Option : 2

Q.40 In Young's double slit experiment, light from two identical sources are superimposing on a screen. The path difference between the two lights reaching at a point on the screen is  $7\lambda/4$ . The ratio of intensity of fringe at this point with respect to the maximum intensity of the fringe is :

- Options
1.  $\frac{3}{4}$
  2.  $\frac{1}{4}$
  3.  $\frac{1}{3}$
  4.  $\frac{1}{2}$

Question Type : MCQ  
Question ID : 405859789  
Option 1 ID : 4058592567  
Option 2 ID : 4058592570  
Option 3 ID : 4058592569  
Option 4 ID : 4058592568  
Status : Answered  
Chosen Option : 2

Q.41 A stone of mass 900g is tied to a string and moved in a vertical circle of radius 1m making 10 rpm. The tension in the string, when the stone is at the lowest point is (if  $\pi^2=9.8$  and  $g=9.8 \text{ m/s}^2$ ) :

- Options
1. 9.8 N
  2. 8.82 N
  3. 17.8 N
  4. 97 N

Question Type : MCQ  
Question ID : 405859778  
Option 1 ID : 4058592526  
Option 2 ID : 4058592523  
Option 3 ID : 4058592525  
Option 4 ID : 4058592524  
Status : Answered  
Chosen Option : 1

Q.42 A physical quantity  $Q$  is found to depend on quantities  $a$ ,  $b$ ,  $c$  by the relation

$$Q = \frac{a^4 b^3}{c^2}. \text{ The percentage error in } a, b \text{ and } c \text{ are } 3\%, 4\% \text{ and } 5\% \text{ respectively.}$$

Then, the percentage error in  $Q$  is :

- Options
1. 66%
  2. 14%
  3. 34%
  4. 43%

Question Type : MCQ

Question ID : 405859775

Option 1 ID : 4058592512

Option 2 ID : 4058592511

Option 3 ID : 4058592513

Option 4 ID : 4058592514

Status : Answered

Chosen Option : 2

Q.43  $N$  moles of a polyatomic gas ( $f=6$ ) must be mixed with two moles of a monoatomic gas so that the mixture behaves as a diatomic gas. The value of  $N$  is :

- Options
1. 3
  2. 2
  3. 6
  4. 4

Question Type : MCQ

Question ID : 405859782

Option 1 ID : 4058592542

Option 2 ID : 4058592540

Option 3 ID : 4058592541

Option 4 ID : 4058592539

Status : Not Answered

Chosen Option : --

Q.44 A wire of length  $L$  and radius  $r$  is clamped at one end. If its other end is pulled by a force  $F$ , its length increases by  $l$ . If the radius of the wire and the applied force both are reduced to half of their original values keeping original length constant, the increase in length will become

- Options
1. 2 times
  2. 3 times
  3. 4 times
  4.  $\frac{3}{2}$  times

Question Type : MCQ

Question ID : 405859793

Option 1 ID : 4058592584

Option 2 ID : 4058592583

Option 3 ID : 4058592585

Option 4 ID : 4058592586

Status : Answered

Chosen Option : 3

Q.45 A planet takes 200 days to complete one revolution around the Sun. If the distance of the planet from Sun is reduced to one fourth of the original distance, how many days will it take to complete one revolution :

- Options
1. 100
  2. 50
  3. 20
  4. 25

Question Type : MCQ

Question ID : 405859780

Option 1 ID : 4058592531

Option 2 ID : 4058592533

Option 3 ID : 4058592534

Option 4 ID : 4058592532

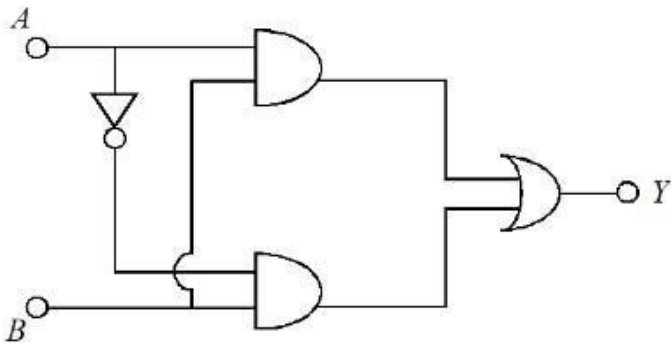
Status : Answered

Chosen Option : 1

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Q.46 The truth table for this given circuit is :



Options

1.

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

2.

A	B	Y
0	0	0
0	1	1
1	0	0
1	1	1

3.

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

4.

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

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Question Type : MCQ

Question ID : 405859792

Option 1 ID : 4058592582

Option 2 ID : 4058592580

Option 3 ID : 4058592581

Option 4 ID : 4058592579

Status : Answered

Chosen Option : 2

Q.47 In an a.c. circuit, voltage and current are given by:

$$V = 100 \sin(100t) \text{ V and}$$

$$I = 100 \sin\left(100t + \frac{\pi}{3}\right) \text{ mA respectively.}$$

The average power dissipated in one cycle is:

- Options
1. 2.5 W
  2. 10 W
  3. 25 W
  4. 5 W

Question Type : MCQ

Question ID : 405859787

Option 1 ID : 4058592561

Option 2 ID : 4058592559

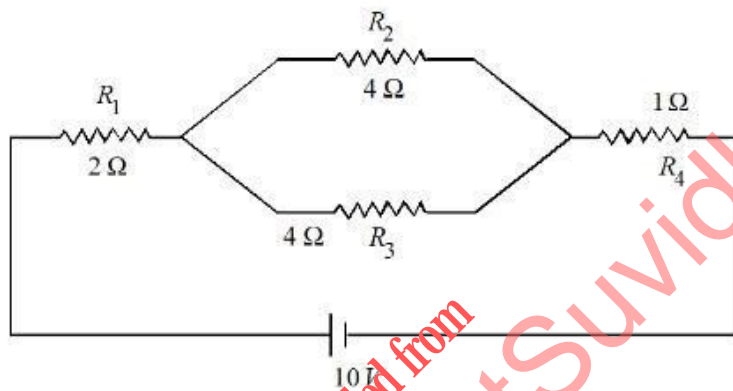
Option 3 ID : 4058592560

Option 4 ID : 4058592562

Status : Answered

Chosen Option : 1

Q.48 In the given circuit, the current in resistance  $R_3$  is :



- Options
1. 1.5 A
  2. 2.5 A
  3. 1 A
  4. 2 A

Question Type : MCQ

Question ID : 405859785

Option 1 ID : 4058592551

Option 2 ID : 4058592552

Option 3 ID : 4058592554

Option 4 ID : 4058592553

Status : Answered

Chosen Option : 3

Q.49 Two sources of light emit with a power of 200W. The ratio of number of photons of visible light emitted by each source having wavelengths 300nm and 500nm respectively, will be :

- Options
1. 1:5
  2. 5:3
  3. 1:3
  4. 3:5

Question Type : MCQ

Question ID : 405859790

Option 1 ID : 4058592572

Option 2 ID : 4058592574

Option 3 ID : 4058592571

Option 4 ID : 4058592573

Status : Answered

Chosen Option : 2

Q.50 Given below are two statements:

**Statement I** : Most of the mass of the atom and all its positive charge are concentrated in a tiny nucleus and the electrons revolve around it, is Rutherford's model.

**Statement II** : An atom is a spherical cloud of positive charges with electrons embedded in it, is a special case of Rutherford's model.

In the light of the above statements, choose the *most appropriate* from the options given below

- Options
1. Both statement I and statement II are false
  2. Both Statement I and Statement II are true
  3. Statement I is true but Statement II is false
  4. Statement I is false but Statement II is true

Question Type : MCQ

Question ID : 405859791

Option 1 ID : 4058592576

Option 2 ID : 4058592575

Option 3 ID : 4058592577

Option 4 ID : 4058592578

Status : Answered

Chosen Option : 3

Section : Physics Section B

Q.51 A body of mass 5 kg moving with a uniform speed  $3\sqrt{2} \text{ ms}^{-1}$  in  $X - Y$  plane along the line  $y = x + 4$ . The angular momentum of the particle about the origin will be \_\_\_\_\_  $\text{kg m}^2\text{s}^{-1}$ .

Given --  
Answer :

Question Type : SA

Question ID : 405859796

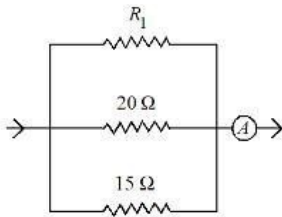
Status : Not Answered

Q.52 A particle is moving in a circle of radius 50 cm in such a way that at any instant the normal and tangential components of its acceleration are equal. If its speed at  $t=0$  is 4m/s, the time taken to complete the first revolution will be  $\frac{1}{\alpha} [1 - e^{-2\pi}]$  s, where  $\alpha =$  \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859795  
Status : Not Answered

Q.53 In the given circuit, the current flowing through the resistance  $20\Omega$  is 0.3 A, while the ammeter reads 0.9 A. The value of  $R_1$  is \_\_\_\_\_  $\Omega$ .



Given --  
Answer :

Question Type : SA  
Question ID : 405859800  
Status : Not Answered

Q.54 In a single slit diffraction pattern, a light of wavelength  $6000 \text{ \AA}$  is used. The distance between the first and third minima in the diffraction pattern is found to be 3 mm when the screen is placed 50 cm away from slits. The width of the slit is \_\_\_\_\_  $\times 10^{-4}$  m.

Given --  
Answer :

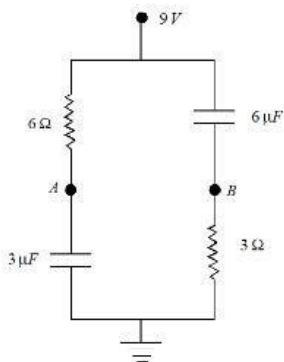
Question Type : SA  
Question ID : 405859803  
Status : Not Answered

Q.55 Hydrogen atom is bombarded with electrons accelerated through a potential difference of V, which causes excitation of hydrogen atoms. If the experiment is being performed at  $T = 0 \text{ K}$ , the minimum potential difference needed to observe any Balmer series lines in the emission spectra will be  $\frac{\alpha}{10}$  V, where  $\alpha =$  \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859804  
Status : Not Answered

Q.56 In the given figure, the charge stored in  $6\mu F$  capacitor, when points  $A$  and  $B$  are joined by a connecting wire is \_\_\_\_\_  $\mu C$ .



Given 18  
Answer :

Question Type : SA  
Question ID : 405859799  
Status : Answered

Q.57 Two metallic wires  $P$  and  $Q$  have same volume and are made up of same material. If their area of cross sections are in the ratio 4:1 and force  $F_1$  is applied to  $P$ , an extension of  $\Delta l$  is produced. The force which is required to produce same extension in  $Q$  is  $F_2$ .

The value of  $\frac{F_1}{F_2}$  is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859797  
Status : Not Answered

Q.58 A horizontal straight wire 5 m long extending from east to west falling freely at right angle to horizontal component of earth's magnetic field  $0.60 \times 10^{-4} \text{ Wbm}^{-2}$ . The instantaneous value of emf induced in the wire when its velocity is  $10 \text{ ms}^{-1}$  is \_\_\_\_\_  $\times 10^{-3} \text{ V}$ .

Given 3  
Answer :

Question Type : SA  
Question ID : 405859802  
Status : Answered

Q.59 A charge of  $4.0\mu C$  is moving with a velocity of  $4.0 \times 10^6 \text{ ms}^{-1}$  along the positive  $y$ -axis under a magnetic field  $\vec{B}$  of strength  $(2\hat{k})\text{T}$ . The force acting on the charge is  $x \hat{i} \text{ N}$ . The value of  $x$  is \_\_\_\_\_.

Given 32  
Answer :

Question Type : SA  
Question ID : 405859801  
Status : Answered

Q.60 A simple harmonic oscillator has an amplitude  $A$  and time period  $6\pi$  second. Assuming the oscillation starts from its mean position, the time required by it to travel from  $x = A$  to  $x = \frac{\sqrt{3}}{2} A$  will be  $\frac{\pi}{x}$  s, where  $x =$  \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859798  
Status : Not Answered

Section : Chemistry Section A

Q.61 Which of the following statements are correct about Zn, Cd and Hg?

- A. They exhibit high enthalpy of atomization as the d-subshell is full.
- B. Zn and Cd do not show variable oxidation state while Hg shows +I and +II.
- C. Compounds of Zn, Cd and Hg are paramagnetic in nature.
- D. Zn, Cd and Hg are called soft metals.

Choose the **most appropriate** from the options given below:

- Options
- 1. A, D only
  - 2. C, D only
  - 3. B, C only
  - 4. B, D only

Question Type : MCQ  
Question ID : 405859810  
Option 1 ID : 4058592621  
Option 2 ID : 4058592624  
Option 3 ID : 4058592622  
Option 4 ID : 4058592623  
Status : Answered  
Chosen Option : 4

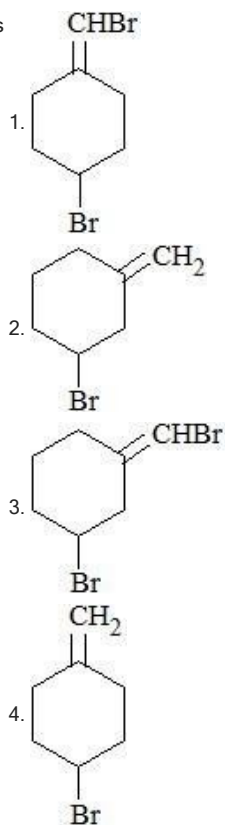
Q.62 Which of the following acts as a strong reducing agent? (Atomic number : Ce=58, Eu=63, Gd=64, Lu=71)

- Options
- 1.  $Ce^{4+}$
  - 2.  $Eu^{2+}$
  - 3.  $Gd^{3+}$
  - 4.  $Lu^{3+}$

Question Type : MCQ  
Question ID : 405859809  
Option 1 ID : 4058592619  
Option 2 ID : 4058592620  
Option 3 ID : 4058592617  
Option 4 ID : 4058592618  
Status : Answered  
Chosen Option : 2

Q.63 Which one of the following will show geometrical isomerism?

Options



Question Type : MCQ

Question ID : 405859813

Option 1 ID : 4058592635

Option 2 ID : 4058592633

Option 3 ID : 4058592636

Option 4 ID : 4058592634

Status : Answered

Chosen Option : 2

Q.64 The element having the highest first ionization enthalpy is

- Options
1. Al
  2. Si
  3. C
  4. N

Question Type : MCQ

Question ID : 405859806

Option 1 ID : 4058592606

Option 2 ID : 4058592608

Option 3 ID : 4058592607

Option 4 ID : 4058592605

Status : Answered

Chosen Option : 1

Q.65 Match List I with List II

LIST I (Bio Polymer)		LIST II (Monomer)	
A.	Starch	I.	nucleotide
B.	Cellulose	II.	$\alpha$ -glucose
C.	Nucleic acid	III.	$\beta$ -glucose
D.	Protein	IV.	$\alpha$ -amino acid

Choose the correct answer from the options given below:

- Options
1. A-I, B-III, C-IV, D-II
  2. A-IV, B-II, C-I, D-III
  3. A-II, B-I, C-III, D-IV
  4. A-II, B-III, C-I, D-IV

Question Type : MCQ  
Question ID : 405859822  
Option 1 ID : 4058592670  
Option 2 ID : 4058592672  
Option 3 ID : 4058592669  
Option 4 ID : 4058592671  
Status : Answered  
Chosen Option : 1

Q.66 Match List I with List II

LIST I (Spectral Series for Hydrogen)		LIST II (Spectral Region / Higher Energy State)	
A.	Lyman	I.	Infrared region
B.	Balmer	II.	UV region
C.	Paschen	III.	Infrared region
D.	Pfund	IV.	Visible region

Choose the correct answer from the options given below:

- Options
1. A-I, B-II, C-III, D-IV
  2. A-I, B-III, C-II, D-IV
  3. A-II, B-III, C-I, D-IV
  4. A-II, B-IV, C-III, D-I

Question Type : MCQ  
Question ID : 405859805  
Option 1 ID : 4058592604  
Option 2 ID : 4058592601  
Option 3 ID : 4058592602  
Option 4 ID : 4058592603  
Status : Answered  
Chosen Option : 4



Q.67 Chromatographic technique/s based on the principle of differential adsorption is / are

- A. Column chromatography
- B. Thin layer chromatography
- C. Paper chromatography

Choose the *most appropriate* answer from the options given below:

- Options
- 1. A only
  - 2. B only
  - 3. A & B only
  - 4. C only

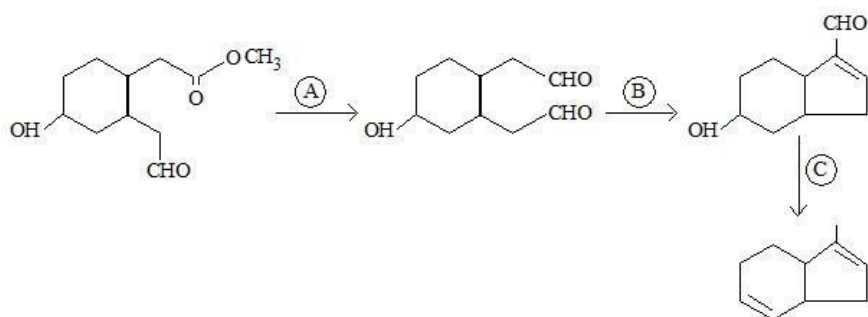
Question Type : MCQ  
Question ID : 405859812  
Option 1 ID : 4058592629  
Option 2 ID : 4058592630  
Option 3 ID : 4058592632  
Option 4 ID : 4058592631  
Status : Answered  
Chosen Option : 2

Q.68 Alkyl halide is converted into alkyl isocyanide by reaction with

- Options
- 1. NaCN
  - 2. KCN
  - 3. AgCN
  - 4. NH<sub>4</sub>CN

Question Type : MCQ  
Question ID : 405859817  
Option 1 ID : 4058592650  
Option 2 ID : 4058592649  
Option 3 ID : 4058592651  
Option 4 ID : 4058592652  
Status : Answered  
Chosen Option : 4

Q.69 Identify the reagents used for the following conversion



Options 1.

A = DIBAL-H, B = NaOH<sub>(aq)</sub>, C = NH<sub>2</sub>-NH<sub>2</sub>/KOH, ethylene glycol

2. A = LiAlH<sub>4</sub>, B = NaOH<sub>(aq)</sub>, C = NH<sub>2</sub>-NH<sub>2</sub>/KOH, ethylene glycol

3. A = LiAlH<sub>4</sub>, B = NaOH<sub>(alc)</sub>, C = Zn/HCl

4. A = DIBAL-H, B = NaOH<sub>(alc)</sub>, C = Zn/HCl

Question Type : MCQ

Question ID : 405859818

Option 1 ID : 4058592655

Option 2 ID : 4058592656

Option 3 ID : 4058592654

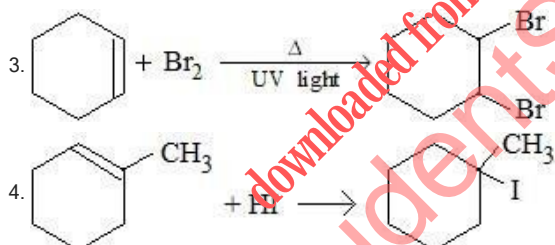
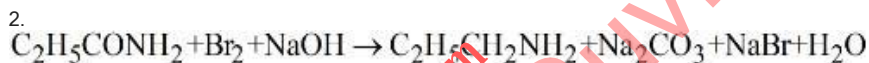
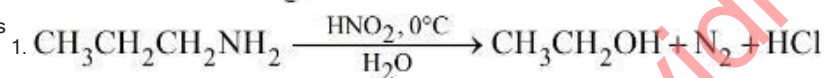
Option 4 ID : 4058592653

Status : Answered

Chosen Option : 4

Q.70 Which of the following reaction is correct?

Options



Question Type : MCQ

Question ID : 405859821

Option 1 ID : 4058592665

Option 2 ID : 4058592666

Option 3 ID : 4058592667

Option 4 ID : 4058592668

Status : Answered

Chosen Option : 4

Q.71 On passing a gas, 'X', through Nessler's reagent, a brown precipitate is obtained.  
The gas 'X' is

- Options
1.  $\text{H}_2\text{S}$
  2.  $\text{NH}_3$
  3.  $\text{Cl}_2$
  4.  $\text{CO}_2$

Question Type : MCQ  
Question ID : 405859824  
Option 1 ID : 4058592679  
Option 2 ID : 4058592678  
Option 3 ID : 4058592677  
Option 4 ID : 4058592680  
Status : Answered  
Chosen Option : 1

Q.72 Given below are two statements:

**Statement I** : Fluorine has most negative electron gain enthalpy in its group.

**Statement II** : Oxygen has least negative electron gain enthalpy in its group.

In the light of the above statements, choose the *most appropriate* from the options given below

- Options
1. Both Statement I and Statement II are true
  2. Statement I is false but Statement II is true
  3. Statement I is true but Statement II is false
  4. Both Statement I and Statement II are false

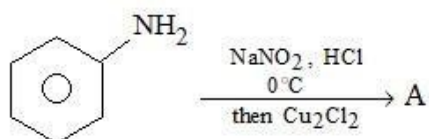
Question Type : MCQ  
Question ID : 405859808  
Option 1 ID : 4058592613  
Option 2 ID : 4058592616  
Option 3 ID : 4058592615  
Option 4 ID : 4058592614  
Status : Answered  
Chosen Option : 3

Q.73 Phenol treated with chloroform in presence of sodium hydroxide, which further hydrolyzed in presence of an acid results

- Options
1. 2-Hydroxybenzaldehyde
  2. Benzene-1,3-diol
  3. Benzene-1,2-diol
  4. Salicylic acid

Question Type : MCQ  
Question ID : 405859819  
Option 1 ID : 4058592657  
Option 2 ID : 4058592660  
Option 3 ID : 4058592659  
Option 4 ID : 4058592658  
Status : Not Answered  
Chosen Option : --

Q.74 The product A formed in the following reaction is



Options

- 1.
- 2.
- 3.
- 4.

Question Type : MCQ

Question ID : 405859816

Option 1 ID : 4058592645

Option 2 ID : 4058592646

Option 3 ID : 4058592647

Option 4 ID : 4058592648

Status : Answered

Chosen Option : 1

Q.75 Match List I with List II

LIST I (Compound)	LIST II (pK <sub>a</sub> value)
A. Ethanol	I. 16.0
B. Phenol	II. 15.9
C. m-Nitrophenol	III. 7.1
D. p-Nitrophenol	IV. 8.3

Choose the correct answer from the options given below:

- Options
1. A-IV, B-I, C-II, D-III
  2. A-I, B-II, C-III, D-IV
  3. A-III, B-IV, C-I, D-II
  4. A-II, B-I, C-IV, D-III

Question Type : MCQ

Question ID : 405859820

Option 1 ID : 4058592661

Option 2 ID : 4058592662

Option 3 ID : 4058592664

Option 4 ID : 4058592663

Status : Not Answered

Chosen Option : --

Q.76 The correct IUPAC name of  $K_2MnO_4$  is

- Options
1. Potassium tetraoxopermanganate (VI)
  2. Potassium tetraoxidomanganate (VI)
  3. Potassium tetraoxidomanganese (VI)
  4. Dipotassium tetraoxidomanganate (VII)

Question Type : MCQ

Question ID : 405859811

Option 1 ID : 4058592627

Option 2 ID : 4058592626

Option 3 ID : 4058592625

Option 4 ID : 4058592628

Status : Answered

Chosen Option : 1

Q.77 A reagent which gives brilliant red precipitate with Nickel ions in basic medium is

- Options
1. meta-dinitrobenzene
  2. neutral  $FeCl_3$
  3. dimethyl glyoxime
  4. sodium nitroprusside

Question Type : MCQ

Question ID : 405859823

Option 1 ID : 4058592676

Option 2 ID : 4058592673

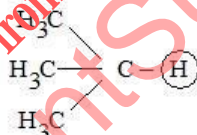
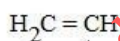
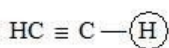
Option 3 ID : 4058592674

Option 4 ID : 4058592675

Status : Not Answered

Chosen Option : --

Q.78 The ascending acidity order of the following H atoms is



A

B

C

D

- Options
1.  $A < B < C < D$
  2.  $C < D < B < A$
  3.  $D < C < B < A$
  4.  $A < B < D < C$

Question Type : MCQ

Question ID : 405859815

Option 1 ID : 4058592643

Option 2 ID : 4058592644

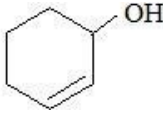
Option 3 ID : 4058592642

Option 4 ID : 4058592641

Status : Not Answered

Chosen Option : --

Q.79

According to IUPAC system, the compound  is named as

- Options
1. 1-Hydroxyhex-2-ene
  2. Cyclohex-1-en-2-ol
  3. Cyclohex-1-en-3-ol
  4. Cyclohex-2-en-1-ol

Question Type : MCQ

Question ID : 405859814

Option 1 ID : 4058592640

Option 2 ID : 4058592638

Option 3 ID : 4058592637

Option 4 ID : 4058592639

Status : Answered

Chosen Option : 2

Q.80 Anomalous behavior of oxygen is due to its

- Options
1. small size and low electronegativity
  2. large size and high electronegativity
  3. small size and high electronegativity
  4. large size and low electronegativity

Question Type : MCQ

Question ID : 405859807

Option 1 ID : 4058592611

Option 2 ID : 4058592612

Option 3 ID : 4058592610

Option 4 ID : 4058592609

Status : Answered

Chosen Option : 4

Section : Chemistry Section B

Q.81 The total number of molecules with zero dipole moment among  $\text{CH}_4$ ,  $\text{BF}_3$ ,  $\text{H}_2\text{O}$ ,  $\text{HF}$ ,  $\text{NH}_3$ ,  $\text{CO}_2$  and  $\text{SO}_2$  is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA

Question ID : 405859827

Status : Not Answered

Q.82 The half-life of radioisotope bromine - 82 is 36 hours. The fraction which remains after one day is \_\_\_\_\_  $\times 10^{-2}$ .

(Given antilog 0.2006 = 1.587)

Given --  
Answer :

Question Type : SA

Question ID : 405859833

Status : Not Answered

Q.83 The following concentrations were observed at 500K for the formation of  $\text{NH}_3$  from  $\text{N}_2$  and  $\text{H}_2$ . At equilibrium :  $[\text{N}_2] = 2 \times 10^{-2} \text{ M}$ ,  $[\text{H}_2] = 3 \times 10^{-2} \text{ M}$  and  $[\text{NH}_3] = 1.5 \times 10^{-2} \text{ M}$ . Equilibrium constant for the reaction is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859830  
Status : Not Answered

Q.84 The total number of 'Sigma' and 'Pi' bonds in 2-formylhex-4-enoic acid is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859834  
Status : Not Answered

Q.85 The total number of anti bonding molecular orbitals, formed from 2s and 2p atomic orbitals in a diatomic molecule is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859826  
Status : Not Answered

Q.86 Standard enthalpy of vapourisation for  $\text{CCl}_4$  is  $30.5 \text{ kJ mol}^{-1}$ . Heat required for vapourisation of 284g of  $\text{CCl}_4$  at constant temperature is \_\_\_\_\_ kJ.

(Given molar mass in  $\text{g mol}^{-1}$ ; C=12, Cl=35.5)

Given --  
Answer :

Question Type : SA  
Question ID : 405859828  
Status : Not Answered

Q.87 The oxidation number of iron in the compound formed during brown ring test for  $\text{NO}_3^-$  ion is \_\_\_\_\_.

Given --  
Answer :

Question Type : SA  
Question ID : 405859831  
Status : Not Answered

Q.88 Molality of 0.8 M  $\text{H}_2\text{SO}_4$  solution (density  $1.06 \text{ g cm}^{-3}$ ) is \_\_\_\_\_  $\times 10^{-3} \text{ m}$ .

Given --  
Answer :

Question Type : SA  
Question ID : 405859829  
Status : Not Answered

Q.89 A constant current was passed through a solution of  $\text{AuCl}_4^-$  ion between gold electrodes. After a period of 10.0 minutes, the increase in mass of cathode was 1.314g. The total charge passed through the solution is \_\_\_\_\_  $\times 10^{-2}$  F.

(Given atomic mass of Au = 197)

Given --  
Answer :

Question Type : SA  
Question ID : 405859832  
Status : Not Answered

Q.90 If 50 mL of 0.5M oxalic acid is required to neutralise 25 mL of NaOH solution, the amount of NaOH in 50 mL of given NaOH solution is \_\_\_\_\_ g.

Given --  
Answer :

Question Type : SA  
Question ID : 405859825  
Status : Not Answered

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