Andhra Pradesh State Council of Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	Chemical Engineering 19th Sep 2021 Shift1 mock
Duration :	180
Total Marks :	200
Display Marks:	No
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? (SA type of questions will be always auto saved) :	Yes
Is this Group for Examiner? :	No

Mathematics

Section Id :	477203362
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	50
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 1 Question Id : 47720318429 Display Question Number : Yes Is Question Mandatory : No

If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$ then $AB^T =$

Options :

1. ✖ $\begin{bmatrix} 19 & 22 \\ 43 & 50 \end{bmatrix}$

2. ✔ $\begin{bmatrix} 17 & 23 \\ 39 & 53 \end{bmatrix}$

3. ✖ $\begin{bmatrix} 26 & 38 \\ 30 & 44 \end{bmatrix}$

4. ✖ $\begin{bmatrix} 19 & 23 \\ 30 & 53 \end{bmatrix}$

Question Number : 2 Question Id : 47720318430 Display Question Number : Yes Is Question Mandatory : No

If A is any square matrix, then $A - A^T$ is

Options :

1. ✖ a null matrix

2. ✖ an identity matrix

3. ✖ a symmetric matrix

4. ✔ a skew-symmetric matrix

Question Number : 3 Question Id : 47720318431 Display Question Number : Yes Is Question Mandatory : No

$$\text{If } \begin{vmatrix} 4 & -5 & 6 \\ 7 & x & 8 \\ -1 & 2 & -3 \end{vmatrix} = 0, \text{ then, } x =$$

Options :

1. ✖ 0

2. ✖ $-\frac{55}{6}$

3. ✔ $-\frac{15}{2}$

4. ✖ 1

Question Number : 4 Question Id : 47720318432 Display Question Number : Yes Is Question

Mandatory : No

If $A = \begin{bmatrix} 3 & -5 \\ -7 & 2 \end{bmatrix}$, $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and B is a square matrix such that $AB = I$, then, $B =$

Options :

1. ✖ $\begin{bmatrix} 2 & 5 \\ 7 & 3 \end{bmatrix}$

2. ✖ $\begin{bmatrix} -2 & 5 \\ 7 & -3 \end{bmatrix}$

3. ✔ $-\frac{1}{29}\begin{bmatrix} 2 & 5 \\ 7 & 3 \end{bmatrix}$

4. ✖ $-\frac{1}{29}\begin{bmatrix} -2 & 5 \\ 7 & -3 \end{bmatrix}$

Question Number : 5 Question Id : 47720318433 Display Question Number : Yes Is Question Mandatory : No

If $x = \alpha, y = \beta, z = \gamma$ is the unique solution of the system of simultaneous linear equations $x - 2y + z = 5$, $2x + y - 2z = -3$ and $x - 2y + 3z = 9$, then, $\gamma =$

Options :

1. ✔ 2

2. ✖ -2

3. ✖ -3

4. ✖ 3

Question Number : 6 Question Id : 47720318434 Display Question Number : Yes Is Question Mandatory : No

If $\frac{4x-22}{3x^2+2x-8} = \frac{A}{x+2} + \frac{B}{3x-4}$, then, $A+B =$

Options :

1. ✔ -2

2. ✖ 0

3. ✖ 2

4. ✖ 4

Question Number : 7 Question Id : 47720318435 Display Question Number : Yes Is Question Mandatory : No

If $\frac{4-7x^2}{3x^3+6x^2} = \frac{A}{x} + \frac{Bx+C}{x^2+2}$, then, $A+C =$

Options :

1. ✖ 0

2. ✔ $\frac{2}{3}$

3. ✖

$\frac{3}{2}$

4. ✖ 2

Question Number : 8 Question Id : 47720318436 Display Question Number : Yes Is Question Mandatory : No

If $\tan\theta = -\frac{4}{3}$ and θ is not in the second quadrant, then, $\cos\theta + \csc\theta =$

Options :

1. ✔ $-\frac{13}{20}$

2. ✖ $-\frac{1}{5}$

3. ✖ $\frac{27}{20}$

4. ✖ $\frac{7}{5}$

Question Number : 9 Question Id : 47720318437 Display Question Number : Yes Is Question Mandatory : No

The sine function, whose period is $\frac{4}{5}$, is

Options :

1. ✖

$\sin\frac{5\pi}{4}x$

$\sin\frac{4\pi}{5}x$

2. ✖

$\sin\frac{5\pi}{2}x$

3. ✔

$\sin\frac{2\pi}{5}x$

4. ✖

Question Number : 10 Question Id : 47720318438 Display Question Number : Yes Is Question Mandatory : No

If $A+B=\frac{3\pi}{4}$, then, $(1-\tan A)(1-\tan B)=$

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ -2

Question Number : 11 Question Id : 47720318439 Display Question Number : Yes Is Question

Mandatory : No

If $0 < A < \frac{\pi}{4}$ and $\sin A = \frac{3}{5}$, then, $\sin 2A + \cos 2A =$

Options :

1. ✖ $\frac{17}{25}$

2. ✖ $\frac{24}{25}$

3. ✖ $\frac{9}{25}$

4. ✔ $\frac{31}{25}$

Question Number : 12 Question Id : 47720318440 Display Question Number : Yes Is Question Mandatory : No

$\cos 56^0 + \sin 26^0 - \sin 86^0 =$

Options :

1. ✖ -1

2. ✔ 0

3. ✖ 1

4. ✖ 2

Question Number : 13 Question Id : 47720318441 Display Question Number : Yes Is Question Mandatory : No

The general solution of the trigonometric equation $\sec x = 4\cos x$ is $x =$

Options :

1. ✔ $2n\pi \pm \frac{\pi}{3}$ or $2n\pi \pm \frac{2\pi}{3}$

2. ✖ $2n\pi \pm \frac{\pi}{6}$ or $2n\pi \pm \frac{5\pi}{6}$

3. ✖ $2n\pi \pm \frac{\pi}{4}$ or $2n\pi \pm \frac{3\pi}{4}$

4. ✖ $n\pi + (-1)^n \frac{\pi}{3}$ or $n\pi + (-1)^n \frac{2\pi}{3}$

Question Number : 14 Question Id : 47720318442 Display Question Number : Yes Is Question Mandatory : No

The general solution of the trigonometric equation $\cos 4\theta = \cos 3\theta$ is $\theta =$

Options :

1. ✖ $n\pi + \frac{\pi}{6}$

2. ✖ $2n\pi + \frac{\pi}{3}$

3. ✔ $\frac{2n\pi}{7}$ or $2n\pi$

$\frac{n\pi}{7}$ or $n\pi$

4. ✖

Question Number : 15 Question Id : 47720318443 Display Question Number : Yes Is Question Mandatory : No

$$\cos\left[\frac{\pi}{2}+\cos^{-1}\left(-\frac{3}{5}\right)\right]=$$

Options :

1. ✖ $\frac{4}{5}$

2. ✖ $\frac{3}{5}$

3. ✔ $-\frac{4}{5}$

4. ✖ $-\frac{3}{5}$

Question Number : 16 Question Id : 47720318444 Display Question Number : Yes Is Question Mandatory : No

$$\cot\left[\mathrm{Tan}^{-1}\left(\frac{1}{6}\right)+\mathrm{Tan}^{-1}\left(\frac{5}{7}\right)\right]=$$

Options :

1. ✖

0

2. ✖ $\frac{1}{\sqrt{3}}$

3. ✔ 1

4. ✖ $\sqrt{3}$

Question Number : 17 Question Id : 47720318445 Display Question Number : Yes Is Question Mandatory : No

In a triangle ABC, if $b = 3, c = 4$ and $\cos A = \frac{7}{8}$, then, $a =$

Options :

1. ✖ 5

2. ✔ 2

3. ✖ 6

4. ✖ 8

Question Number : 18 Question Id : 47720318446 Display Question Number : Yes Is Question Mandatory : No

If $i^2 = -1$, then, $(1 - i)^{2020} =$

Options :

1. ✔ -2^{1010}

2. ✖ 2^{1010}

3. ✖ 2^{2020}

4. ✖ -2^{2020}

Question Number : 19 Question Id : 47720318447 Display Question Number : Yes Is Question Mandatory : No

If $i^2 == -1$, then, $(\sqrt{3}+i)^4 + (\sqrt{3}-i)^4 =$

Options :

1. ✖ 32

2. ✖ -32

3. ✖ 16

4. ✔ -16

Question Number : 20 Question Id : 47720318448 Display Question Number : Yes Is Question Mandatory : No

If (1,2) and (2,1) are the ends of one of the diameters of a circle, then the equation of the circle is

Options :

1. ✖ $x^2 + y^2 - 3x - 3y - 4 = 0$

2. ✖ $x^2 + y^2 - 3x + 3y - 4 = 0$

3. ✖ $x^2 + y^2 + 3x - 3y - 4 = 0$

4. ✔ $x^2 + y^2 - 3x - 3y + 4 = 0$

Question Number : 21 Question Id : 47720318449 Display Question Number : Yes Is Question Mandatory : No

The equation of the circle of radius 2 with its centre at (2,2) is

Options :

1. ✔ $x^2 + y^2 - 4x - 4y + 4 = 0$

2. ✖ $x^2 + y^2 + 4x + 4y + 4 = 0$

3. ✖ $x^2 + y^2 - 4x - 4y + 12 = 0$

4. ✖ $x^2 + y^2 + 4x + 4y + 12 = 0$

Question Number : 22 Question Id : 47720318450 Display Question Number : Yes Is Question Mandatory : No

If the centre of the circle $x^2 + y^2 - 6x + ky + 9 = 0$ lies on the line $2x + y - 4 = 0$, then, the radius of that circle is

Options :

1. ✖ 1

2. ✔ 2

3. ✖ 3

4. ✖ 4

Question Number : 23 Question Id : 47720318451 Display Question Number : Yes Is Question Mandatory : No

Distance from the focus of the parabola $y^2 = 8x$ to the point $(2,4)$ on it is

Options :

1. ✖ 1

2. ✖ 2

3. ✖ 3

4. ✔ 4

Question Number : 24 Question Id : 47720318452 Display Question Number : Yes Is Question Mandatory : No

If e is the eccentricity and a is the length of the semi-minor axis of the ellipse $9x^2 + 4y^2 = 36$, then, $e^2 + a^2 =$

Options :

1. ✔ $\frac{41}{9}$

2. ✖ $\frac{23}{9}$

3. ✖ $\frac{17}{3}$

4. ✖ $\frac{11}{3}$

Question Number : 25 Question Id : 47720318453 Display Question Number : Yes Is Question Mandatory : No

One of the foci of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = -1$ is

Options :

1. ✖ $(5,0)$

2. ✔ $(0,5)$

3. ✖ $(4,0)$

4. ✖ $(0,3)$

Question Number : 26 Question Id : 47720318454 Display Question Number : Yes Is Question Mandatory : No

$$\lim_{x\to 0}\frac{2^x-1}{\sqrt{2+x}-\sqrt{2}}=$$

Options :

1. ✖ $\sqrt{2}\log 2$

2. ✖ $2\log 2$

3. ✔ $2\sqrt{2}\log 2$

4. ✖ $\text{Log } 2$

Question Number : 27 Question Id : 47720318455 Display Question Number : Yes Is Question Mandatory : No

$$\text{If } y=\sqrt{\frac{2+x^2}{2-x^2}}\text{, then, } \frac{dy}{dx}=$$

Options :

1. ✔ $\frac{4x}{(2-x^2)\sqrt{4-x^4}}$

2. ✖ $\frac{4x}{(2-x^2)\sqrt{4-x^2}}$

3. ✖

$$\frac{4x}{(4-x^2)\sqrt{2-x^4}}$$

4. ✖ $$\frac{2x}{(2-x^2)\sqrt{4-x^4}}$$

Question Number : 28 Question Id : 47720318456 Display Question Number : Yes Is Question Mandatory : No

If $2x^2 - 3xy + y^2 - 4x + 6y - 7 = 0$, then, $\frac{dy}{dx} =$

Options :

1. ✖ $$\frac{-4x-3y+4}{3x+2y+6}$$

2. ✔ $$\frac{4x-3y-4}{3x-2y-6}$$

3. ✖ $$\frac{4x+3y+4}{3x-2y-6}$$

4. ✖ $$\frac{4x-3y-4}{3x+2y-6}$$

Question Number : 29 Question Id : 47720318457 Display Question Number : Yes Is Question Mandatory : No

If the radius of a sphere is increased from 5 cm to 5.03 cm, then, the approximate relative error in its surface area is

Options :

1. ✔ 0.012

2. ✖ 0.06

3. ✖ 0.08

4. ✖ 0.1

Question Number : 30 Question Id : 47720318458 Display Question Number : Yes Is Question Mandatory : No

The equation of the normal at $(1,1)$ to the curve $y = 2x^3 - 3x^2 + x + 1$ is

Options :

1. ✔ $x + y - 2 = 0$

2. ✖ $x - y = 0$

3. ✖ $2x - 3y + 1 = 0$

4. ✖ $x - 2y + 1 = 0$

Question Number : 31 Question Id : 47720318459 Display Question Number : Yes Is Question Mandatory : No

The angle between the curves $x^2 + y^2 = 2$ and $y^2 = x$ is

Options :

1. ✔ $\mathrm{Tan}^{-1}(3)$

2. ✖ $\mathrm{Tan}^{-1}(2)$

3. ✖ $\frac{\pi}{4}$

4. ✖ $\frac{\pi}{2}$

Question Number : 32 Question Id : 47720318460 Display Question Number : Yes Is Question Mandatory : No

If the volume of a cube is increasing at the rate of 5 cu. cm./sec , the rate of change in the length of the edge of the cube, when the length of the edge is 5 cm., is

Options :

1. ✖ $\frac{1}{15}$ sq. cm. /sec

2. ✖ 15 cm. /sec

3. ✔ $\frac{1}{15}$ cm. /sec

4. ✖ $\frac{1}{3}$ cm. /sec

Question Number : 33 Question Id : 47720318461 Display Question Number : Yes Is Question

Mandatory : No

The interval in which the function $f(x) = 2x^3 - 9x^2 + 12x - 6$ is strictly increasing is

Options :

1. ✖ $(1,2)$

2. ✖ $[1,2]$

3. ✖ $(-\infty, 1] \cup [2, \infty)$

4. ✔ $(-\infty, 1) \cup (2, \infty)$

Question Number : 34 Question Id : 47720318462 Display Question Number : Yes Is Question Mandatory : No

If the perimeter of a rectangle is 40 units, then the area of that rectangle is maximum when its dimensions are

Options :

1. ✖ 14, 6

2. ✖ 22, 18

3. ✔ 10, 10

4. ✖ 20, 20

Question Number : 35 Question Id : 47720318463 Display Question Number : Yes Is Question Mandatory : No

If $u = \frac{x^2+y^2}{x-y}$, then, $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} =$

Options :

1. ✖ 0

2. ✖ u

3. ✔ $2\left(\frac{x+y}{x-y}\right)$

4. ✖ $2u$

Question Number : 36 Question Id : 47720318464 Display Question Number : Yes Is Question Mandatory : No

$$\int \frac{x^2+2x-1}{\sqrt{x^3+3x^2-3x+6}}\,dx =$$

Options :

1. ✔ $\frac{2}{3}\sqrt{x^3+3x^2-3x+6}+c$

2. ✖ $\frac{1}{3}\sqrt{x^3+3x^2-3x+6}+c$

3. ✖ $\frac{2}{3\sqrt{x^3+3x^2-3x+6}}+c$

4. ✖ $\frac{1}{6\sqrt{x^3+3x^2-3x+6}}+c$

Question Number : 37 Question Id : 47720318465 Display Question Number : Yes Is Question Mandatory : No

$$\int e^{2x}\sec 2x(1+\tan 2x)\,dx =$$

Options :

1. ✖ $e^{2x}\sec 2x+c$

2. ✖ $e^{2x}\tan 2x+c$

3. ✔ $\frac{1}{2}e^{2x}\sec 2x+c$

4. ✖ $2e^{2x}\sec 2x+c$

Question Number : 38 Question Id : 47720318466 Display Question Number : Yes Is Question Mandatory : No

$$\int \frac{dx}{\sqrt{x^2-2x+5}} =$$

Options :

1. ✖ $\text{Tanh}^{-1}\left(\frac{x-1}{2}\right)+c$

2. ✖ $\mathrm{Sinh}^{-1}(x-1)+c$

3. ✖ $\mathrm{Cosh}^{-1}\left(\frac{x-1}{2}\right)+c$

4. ✔ $\mathrm{Sinh}^{-1}\left(\frac{x-1}{2}\right)+c$

Question Number : 39 Question Id : 47720318467 Display Question Number : Yes Is Question Mandatory : No

$$\int_{-2}^{2}\frac{x^2}{x-1}\,dx=$$

Options :

1. ✖ $8+\log\frac{1}{3}$

2. ✔ $4-\log 3$

3. ✖ $2-\log 3$

4. ✖ $4+\log 3$

Question Number : 40 Question Id : 47720318468 Display Question Number : Yes Is Question Mandatory : No

The area enclosed between the X-axis and the curve $y = (x-2)^2 - 9$ is

Options :

1. ✖ 54

2. ✖ $\frac{320}{3}$

3. ✔ 36

4. ✖ $\frac{124}{3}$

Question Number : 41 Question Id : 47720318469 Display Question Number : Yes Is Question Mandatory : No

The volume formed when the area bounded by the parabola $y^2 = 8x$, the X-axis and the ordinates at $x = 0$ and $x = 2$ rotates about the X-axis is (in cubic units)

Options :

1. ✖ 4π

2. ✖ 8π

3. ✖ 32π

4. ✔ 16π

Question Number : 42 Question Id : 47720318470 Display Question Number : Yes Is Question

Mandatory : No

Mean value of $\frac{1}{4+x^2}$ on $[-2,2]$ is

Options :

1. ✖ $\frac{\pi}{4}$

2. ✖ $\frac{\pi}{8}$

3. ✖ $\frac{\pi}{32}$

4. ✔ $\frac{\pi}{16}$

Question Number : 43 Question Id : 47720318471 Display Question Number : Yes Is Question Mandatory : No

Root Mean Square value of $\sqrt{9-2x^2}$ over the range $x = 0$ to $x = 3$ is

Options :

1. ✔ $\sqrt{3}$

2. ✖ 3

3. ✖ $\sqrt{6}$

4. ✖ 9

Question Number : 44 Question Id : 47720318472 Display Question Number : Yes Is Question Mandatory : No

The differential equation of the family of curves $y = Ae^{3x} + Be^{-2x}$, where A and B are arbitrary constants, is

Options :

1. ✖ $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$

2. ✖ $\frac{d^2y}{dx^2} - \frac{dy}{dx} + 6y = 0$

3. ✖ $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0$

4. ✔ $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 6y = 0$

Question Number : 45 Question Id : 47720318473 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $\frac{dy}{dx} = e^{x+y}$ is

Options :

1. ✖ $e^x + e^y = c$

2. ✖ $e^x - e^y = c$

3. ✔ $e^{x+y} + ce^{y} + 1 = 0$

4. ✖ $e^{x+y} = ce^{y} + 1$

Question Number : 46 Question Id : 47720318474 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $\frac{dy}{dx} - \frac{3y}{x} = \frac{2y^2}{x^2}$ is

Options :

1. ✔ $y = cx^2(x + y)$

2. ✖ $\frac{y}{x - y} = cx^2$

3. ✖ $y = cx(x + y)$

4. ✖ $y = cx(x - y)$

Question Number : 47 Question Id : 47720318475 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $\frac{dy}{dx} - \frac{2y}{x} = x^2e^{2x}$ is

Options :

1. ✖ $2y = xe^{2x} + 2cx^2$

2. ✔ $2y = x^2e^{2x} + 2cx^2$

3. ✖ $y = 2x^2e^{2x} + cx^2$

4. ✖ $y = x^2e^{2x} + cx$

Question Number : 48 Question Id : 47720318476 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $\frac{dy}{dx} + y\cot x = y^3 \sin^2 x$ is

Options :

1. ✖ $2x^2y + \csc^2 x = cy$

2. ✖ $2xy^2 + \sin^2 x = cy^2$

3. ✔ $2xy^2 + \csc^2 x = cy^2$

4. ✖ $2xy + \csc^2 x = cy^2$

Question Number : 49 Question Id : 47720318477 Display Question Number : Yes Is Question Mandatory : No

The particular integral of the differential equation $(D^2 - 3D + 2)y = e^{3x}$ is

Options :

1. ✖ $\frac{1}{20}e^{3x}$

2. ✖ $\frac{1}{16}e^{3x}$

3. ✖ $\frac{1}{3}e^{3x}$

4. ✔ $\frac{1}{2}e^{3x}$

Question Number : 50 Question Id : 47720318478 Display Question Number : Yes Is Question Mandatory : No

The particular integral of the differential equation $(D^2 + 9)y = \sin 3x$ is

Options :

1. ✔ $-\frac{x\cos 3x}{6}$

2. ✖ $\frac{x\cos 3x}{6}$

3. ✖ $-\frac{x\sin 3x}{6}$

4. ✖

$$\frac{x \sin 3x}{6}$$

Physics

Section Id :	477203363
Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 51 Question Id : 47720318479 Display Question Number : Yes Is Question Mandatory : No

The dimension of Universal Gas Constant "R" is:

Options :

1. ✖ $[M^2 L^2 T^{-2} K^{-1}]$

2. ✖ $[M^1 L^2 T^{-2}]$

3. ✔ $[M^1 L^2 T^{-2} K^{-1}]$

4. ✖ $[M^2 L^2 T^{-2} K^0]$

Question Number : 52 Question Id : 47720318480 Display Question Number : Yes Is Question Mandatory : No

The value of Planck's constant 'h' is 6.626×10^{-34} J.Hz^{-1}. Its value in eV is

Options :

1. ✖ 1.054×10^{-34}

2. ✔ 4.135×10^{-15}

3. ✖ 0.241×10^{15}

4. ✖ Unchanged

Question Number : 53 Question Id : 47720318481 Display Question Number : Yes Is Question Mandatory : No

A unit vector perpendicular to $A=\hat{i}+\hat{j}-\hat{k}$ and $B=2\hat{i}-\hat{j}+3\hat{k}$ is

Options :

1. ✖ $\hat{n}=(2\hat{i}-\hat{j}-3\hat{k})/\sqrt{14}$

2. ✔ $\hat{n}=(2\hat{i}-5\hat{j}-3\hat{k})/\sqrt{38}$

3. ✖ $\hat{n}=(2\hat{i}-5\hat{j}-3\hat{k})/\sqrt{28}$

4. ✖ $\hat{n}=(\hat{i}-\hat{j}-\hat{k})/\sqrt{3}$

Question Number : 54 Question Id : 47720318482 Display Question Number : Yes Is Question Mandatory : No

If the two vectors **A** and **B** are such that |**A-B**|= |**A+B**| then

Options :

1. ✖ **A = B**

2. ✖ **A** is parallel to **B**

3. ✖ $|\mathbf{B}| = 0$

4. ✔ **A** is perpendicular to **B**

Question Number : 55 Question Id : 47720318483 Display Question Number : Yes Is Question Mandatory : No

A rubber ball of mass 0.2 kg falls onto the floor. The ball hits with a speed of 8 m/s and rebounds with approximately the same speed. High speed photographs show that the ball is in contact with the floor for 10^{-3} s. Then the average force exerted on the ball by the floor is

Options :

1. ✖ 1,600 N

2. ✖ 0 N

3. ✔ 3,200 N

4. ✖ 320 N

Question Number : 56 Question Id : 47720318484 Display Question Number : Yes Is Question Mandatory : No

A projectile is fired with a speed 'u' at an angle θ with the horizontal. Find its speed when its direction of motion makes an angle α with the horizontal.

Options :

1. ✖ $u\cos(\theta)\cos(\alpha)$

2. ✖ $u\cos(\theta)$

3. ✖ $u\cos(\alpha)$

4. ✔ $u\cos(\theta)\sec(\alpha)$

Question Number : 57 Question Id : 47720318485 Display Question Number : Yes Is Question Mandatory : No

A person travelling on a straight line moves with a uniform velocity 'v_1' for a distance 'x' and with a uniform velocity 'v_2' for the next equal distance. The average velocity 'v' is given by

Options :

1. ✖ $v = \frac{v_1 + v_2}{2}$

2. ✖ $v = \sqrt{v_1 v_2}$

3. ✔ $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

4. ✖ $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

Question Number : 58 Question Id : 47720318486 Display Question Number : Yes Is Question Mandatory : No

A ball is dropped from a height 'H'. If it takes 0.2 sec to cross the last 6.0 m before hitting the ground, the value of height 'H' from which it was dropped is

Options :

1. ✔ 48 m

2. ✖ 42 m

3. ✖ 12 m

4. ✖ 30 m

Question Number : 59 Question Id : 47720318487 Display Question Number : Yes Is Question Mandatory : No

Mark the correct statement about the frictional force 'f' when a body slides across a surface with coefficient of friction μ.

Options :

1. ✖ The magnitude of 'f' is less than μN

2. ✔ 'f' is independent of the area of contact

3. ✖ 'f' depends on the area of contact

4. ✖ 'f' is directly proportional to the instantaneous velocity of the body

Question Number : 60 Question Id : 47720318488 Display Question Number : Yes Is Question Mandatory : No

A body starts slipping down an incline and moves half meter in half second. How long will it take to move the next half meter?

Options :

1. ✔ 0.2 sec

2. ✖ 0.5 sec

3. ✖ 1.0 sec

4. ✖ 0.1 sec

Question Number : 61 Question Id : 47720318489 Display Question Number : Yes Is Question Mandatory : No

The energy needed to eject a 50kg spacecraft from the surface of the earth is (radius of the earth is 6.4×10^6 m)

Options :

1. ✖ 1.1×10^4 J

2. ✖ 1.1×10^9 J

3. ✖ 3.13×10^4 J

4. ✔ 3.13×10^9 J

Question Number : 62 Question Id : 47720318490 Display Question Number : Yes Is Question Mandatory : No

A particle of mass 'm' moves in one dimension along the positive x-axis. It is acted on by a constant force directed towards the origin with magnitude 'B', and an inverse square law repulsive force with magnitude (A/x^2) away from the origin. The equilibrium position x_0 of the mass is at

Options :

1. ✖ $x_0=0$

2. ✔ $x_0=(A/B)^{1/2}$

3. ✖ $x_0=(A/B)$

4. ✖ $x_0=(B/A)^{1/2}$

Question Number : 63 Question Id : 47720318491 Display Question Number : Yes Is Question Mandatory : No

Ocean thermal energy is due to

Options :

1. ✖ Energy stored by waves in the ocean

2. ✖ Tides arising out in the ocean

3. ✖ Pressure difference at different levels in the ocean

4. ✔ Temperature difference at different levels in the ocean

Question Number : 64 Question Id : 47720318492 Display Question Number : Yes Is Question Mandatory : No

Consider the wave $y = (10\ mm)\ \sin[(2\ cm^{-1})x - (60\ s^{-1})t]$. The time period of this wave is

Options :

1. ✔ $\frac{\pi}{30}$sec

2. ✖ $\frac{30}{\pi}$sec

3. ✖ $\frac{\pi}{60}$sec

4. ✖ $\frac{\pi}{120}$sec

Question Number : 65 Question Id : 47720318493 Display Question Number : Yes Is Question Mandatory : No

If the speed of sound at 0^0 C is 332ms^{-1}, then the atmospheric temperature of a day when sound travels 336 m in one second is

Options :

1. ✖ 4^0 C

2. ✖ 20^0 C

3. ✖ 17^0 C

4. ✔ 7^0 C

Question Number : 66 Question Id : 47720318494 Display Question Number : Yes Is Question Mandatory : No

A sound source vibrates with a frequency of 1.0 kHz. Two sound waves, originating from this source, travel along different paths in air, where one path is 166 cm longer than other and then meet at a point. Then what will be the nature of interference? The speed of sound in air is 332 ms^{-1}.

Options :

1. ✔ It will be a constructive interference

2. ✖ It will be a destructive interference

3. ✖ Provided information is insufficient to say about nature of interference

4. ✖ It will depend on the type of source

Question Number : 67 Question Id : 47720318495 Display Question Number : Yes Is Question Mandatory : No

A simple pendulum is taken to a place in space where its distance from the surface of the earth is equal to the radius of the earth. What will be the time period of small oscillations of the pendulum if the length of the string is 1.0 m. Take g = π^2 m/ s^2 at the surface of the earth.

Options :

1. ✖ 2 sec

2. ✔ 4 sec

3. ✖ $\frac{1}{\pi}$sec

4. ✖ 2πsec

Question Number : 68 Question Id : 47720318496 Display Question Number : Yes Is Question Mandatory : No

The motion of a block of mass 'm' is restricted on x-axis by attaching two identical springs of spring constant 'k' on its opposite sides. The other ends of the springs are fixed on walls. When the mass is displaced from its equilibrium position on either side, it executes a simple harmonic motion. The period of oscillations for this oscillation is

Options :

1. ✖ $2\pi\sqrt{\frac{m}{k}}$

2. ✖ $2\pi\sqrt{\frac{k}{m}}$

3. ✖ $2\pi\sqrt{\frac{2k}{m}}$

4. ✔ $2\pi\sqrt{\frac{m}{2k}}$

Question Number : 69 Question Id : 47720318497 Display Question Number : Yes Is Question Mandatory : No

Is it always true that $dU = C_v dT$?

Options :

1. ✖ Yes.

2. ✖ No, it is never true

3. ✔ It is true only for ideal gas

4. ✖ It is true only for non-ideal gas

Question Number : 70 Question Id : 47720318498 Display Question Number : Yes Is Question Mandatory : No

One mole of ideal monatomic gas is confined in a cylinder by a piston and is maintained at a constant temperature T_0 by thermal contact with a heat reservoir. The gas slowly expands from V_1 to V_2 while being held at the same temperature T_0. The change in internal energy of the gas is

Options :

1. ✖ $RT_0\ln(V_2/V_1)$

2. ✔ zero

3. ✖ RT_0

4. ✖ $RT_0\ln(V_1/V_2)$

Question Number : 71 Question Id : 47720318499 Display Question Number : Yes Is Question Mandatory : No

A pan filled with hot food cools from 94 °C to 86 °C in 2 minutes when the room temperature is at 20 °C. How long will it take to cool from 71 °C to 69 °C?

Options :

1. ✔ 0.7 min

2. ✖ 0.5 min

3. ✖ 0.4 min

4. ✖ 2 min.

Question Number : 72 Question Id : 47720318500 Display Question Number : Yes Is Question Mandatory : No

In an adiabatic expansion of an ideal gas

Options :

1. ✖ PV = constant

2. ✖ $PV^{\gamma-1} = \text{constant}$

3. ✖ $TV^{\gamma} = \text{constant}$

4. ✔ $P^{1-\gamma}T^{\gamma} = \text{constant}$

Question Number : 73 Question Id : 47720318501 Display Question Number : Yes Is Question Mandatory : No

The rms speed of a nitrogen (N_2) molecule at 300K is (One mole of N_2 has a mass of 28 g and kB = 1.38×10^{23} JK^{-1})

Options :

1. ✖ 450 ms^{-1}

2. ✖ 123 ms^{-1}

3. ✔ 517 ms^{-1}

4. ✖ 230 ms^{-1}

Question Number : 74 Question Id : 47720318502 Display Question Number : Yes Is Question Mandatory : No

Which of the following are not the properties of superconductors?

Options :

1. ✖ They possess infinite conductivity

2. ✖ They possess zero resistivity

3. ✔ They are ferromagnetic in nature

4. ✖ They are diamagnetic in nature

Question Number : 75 Question Id : 47720318503 Display Question Number : Yes Is Question Mandatory : No

The minimum energy required for a photoelectron to escape from a metal plate in a photocell is called

Options :

1. ✖ Planck's constant

2. ✔ Work function

3. ✖ Threshold energy

4. ✖ Stopping voltage

Chemistry

Section Id :	477203364
Section Number :	3
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 76 Question Id : 47720318504 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a fundamental particle?

Options :

1. ✖ Electron

2. ✖ Proton

3. ✔ Alpha particle

4. ✖ Neutron

Question Number : 77 Question Id : 47720318505 Display Question Number : Yes Is Question Mandatory : No

A given orbital labelled by the magnetic quantum number, m=-1. This cannot be

Options :

1. ✔ s-orbital

2. ✖ p-orbital

3. ✖ d-orbital

4. ✖ f-orbital

Question Number : 78 Question Id : 47720318506 Display Question Number : Yes Is Question Mandatory : No

Maximum number of electrons that may be present in one 4f-orbital is

Options :

1. ✔ 2

2. ✖ 4

3. ✖ 7

4. ✖ 14

Question Number : 79 Question Id : 47720318507 Display Question Number : Yes Is Question Mandatory : No

Which of the following is favourable condition for the formation of ionic bond?

Options :

1. ✖ Small cation with small charge

2. ✖ Small anion with large charge

3. ✔ Large difference in the electronegativity

4. ✖ Small cation with large charge

Question Number : 80 Question Id : 47720318508 Display Question Number : Yes Is Question Mandatory : No

The covalency of nitrogen in HNO_2 is

Options :

1. ✖ 0

2. ✖ 2

3. ✔ 3

4. ✖ 5

Question Number : 81 Question Id : 47720318509 Display Question Number : Yes Is Question Mandatory : No

The normality of 0.98%(w/v) H_2SO_4 solution is

Options :

1. ✖ 0.1N

2. ✔ 0.2N

3. ✖ 0.4N

4. ✖ 1 N

Question Number : 82 Question Id : 47720318510 Display Question Number : Yes Is Question Mandatory : No

The equivalent weight of $CuSO_4$ when it is converted to Cu_2I_2 (M= Mol.wt)

Options :

1. ✔

M/1

2. ✖ M/2

3. ✖ M/3

4. ✖ 2M

Question Number : 83 Question Id : 47720318511 Display Question Number : Yes Is Question Mandatory : No

Which of the following is centi-normal solution ?

Options :

1. ✖ 1 N

2. ✖ N/10

3. ✖ N/20

4. ✔ N/100

Question Number : 84 Question Id : 47720318512 Display Question Number : Yes Is Question Mandatory : No

The unit for ionic product of water is

Options :

1. ✖ Mole/kg

2. ✖ $Mole\text{-}kg$

3. ✔ $Mole^{2}lit^{-2}$

4. ✖ $Mole^{2}lit^{2}$

Question Number : 85 Question Id : 47720318513 Display Question Number : Yes Is Question Mandatory : No

Which of the following is relatively strong Lewis acid?

Options :

1. ✖ BF_3

2. ✖ BCl_3

3. ✖ BBr_3

4. ✔ BI_3

Question Number : 86 Question Id : 47720318514 Display Question Number : Yes Is Question Mandatory : No

The decrease in electrical conductivity of metals with increase in temperature is due to increase in

Options :

1. ✖ the velocity of electrons

2. ✔ the resistance of the metal

3. ✖ the number of electrons

4. ✖ the number of metal atoms

Question Number : 87 Question Id : 47720318515 Display Question Number : Yes Is Question Mandatory : No

In the electrolytic cell, flow of electrons is from:

Options :

1. ✖ Cathode to anode in the solution

2. ✖ Cathode to anode through external circuit

3. ✔ Anode to cathode through external circuit

4. ✖ Anode to cathode in the solution

Question Number : 88 Question Id : 47720318516 Display Question Number : Yes Is Question Mandatory : No

The product of electrolysis of aqueous NaCl solution are

Options :

1. ✖ Na at cathode and Cl_2 at anode

2. ✔ H_2 at cathode and Cl_2 at anode

3. ✖ H_2 at cathode and O_2 at anode

4. ✖ Na at cathode and O_2 at anode

Question Number : 89 Question Id : 47720318517 Display Question Number : Yes Is Question Mandatory : No

When zinc piece is kept in $CuSO_4$ solution, copper get precipitated because

Options :

1. ✖ Standard reduction potential of zinc is more than copper

2. ✔ Standard reduction potential of zinc is less than copper

3. ✖ Atomic number of zinc is larger than copper

4. ✖ Atomic number of zinc is lower than copper

Question Number : 90 Question Id : 47720318518 Display Question Number : Yes Is Question Mandatory : No

Hardness of water is expressed in terms of ------- equivalents.

Options :

1. ✔ $CaCO_3$

2. ✖ $MgCO_3$

3. ✖ Na_2CO_3

4. ✖ K_2CO_3

Question Number : 91 Question Id : 47720318519 Display Question Number : Yes Is Question Mandatory : No

Anion exchange resin is regenerated by using

Options :

1. ✖ dil NaCl

2. ✖ dil HCl

3. ✔ dil NaOH

4. ✖ dil KCl

Question Number : 92 Question Id : 47720318520 Display Question Number : Yes Is Question Mandatory : No

Which of the following is responsible for temporary hardness?

Options :

1. ✖ $MgCl_2$

2. ✖ $CaSO_4$

3. ✖ $MgSO_4$

4. ✔ $Mg(HCO_3)_2$

Question Number : 93 Question Id : 47720318521 Display Question Number : Yes Is Question Mandatory : No

Corrosion is an example of ---------

Options :

1. ✔ Oxidation

2. ✖ Reduction

3. ✖ Electrolysis

4. ✖ Hydrolysis

Question Number : 94 Question Id : 47720318522 Display Question Number : Yes Is Question Mandatory : No

In electrochemical corrosion, if the formed corrosion product is insoluble in the medium then the corrosion rate further ---------

Options :

1. ✖ Increases

2. ✔ Decreases

3. ✖ Partially increases

4. ✖ No change

Question Number : 95 Question Id : 47720318523 Display Question Number : Yes Is Question Mandatory : No

Which of the following is an example of co-polymer ?

Options :

1. ✖ PVC

2. ✖ Teflon

3. ✖ Polythene

4. ✔ Buna-S rubber

Question Number : 96 Question Id : 47720318524 Display Question Number : Yes Is Question Mandatory : No

Which of the following polymer contains nitrogen atoms ?

Options :

1. ✖ PVC

2. ✖ Bakelite

3. ✔ Nylon

4. ✖ Teflon

Question Number : 97 Question Id : 47720318525 Display Question Number : Yes Is Question Mandatory : No

Isoprene is monomer of

Options :

1. ✖ Teflon

2. ✖ Nylon

3. ✔ Natural rubber

4. ✖ PVC

Question Number : 98 Question Id : 47720318526 Display Question Number : Yes Is Question Mandatory : No

The only liquid fuel in nature is

Options :

1. ✖ Kerosene

2. ✖ Diesel

3. ✖ Petrol

4. ✔ Petroleum

Question Number : 99 Question Id : 47720318527 Display Question Number : Yes Is Question Mandatory : No

The medium which reacts with pollutant is called

Options :

1. ✔ Sink

2. ✖ Receptor

3. ✖ Speciation

4. ✖ Contaminant

Question Number : 100 Question Id : 47720318528 Display Question Number : Yes Is Question Mandatory : No

Which of the following is used in the estimation of Chemical Oxygen Demand (COD) ?

Options :

1. ✖ Methyl orange

2. ✔ $K_2Cr_2O_7 + 50\% H_2SO_4$

3. ✖ $CaOCl_2 + 50\% H_2SO_4$

4. ✖ Alum +CaO

Chemical Engineering

Section Id :	477203365
Section Number :	4
Mandatory or Optional :	Mandatory
Number of Questions :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 101 Question Id : 47720318529 Display Question Number : Yes Is Question Mandatory : No

A metal's ability to withstand bending or the application of shear stresses without fracture is referred as

Options :

1. ✖ Tenacity

2. ✖ Ductility

3. ✖ Hardness

4. ✔ Toughness

Question Number : 102 Question Id : 47720318530 Display Question Number : Yes Is Question Mandatory : No

In a thermal-equilibrium diagram, the line indicating the temperature at which any given alloy in the series will commence to solidify is called?

Options :

1. ✖

Solidus

2. ✔ Liquidus

3. ✖ Pasty

4. ✖ Insoluble

Question Number : 103 Question Id : 47720318531 Display Question Number : Yes Is Question Mandatory : No

The product from blast furnace is called?

Options :

1. ✖ Cast Iron

2. ✖ Pig Iron

3. ✔ Wrought Iron

4. ✖ Steel

Question Number : 104 Question Id : 47720318532 Display Question Number : Yes Is Question Mandatory : No

What are the four major sequential processes for the manufacturing of glass?

Options :

1. ✔ Melting, shaping, annealing and finishing

2. ✖ Annealing, melting, shaping and finishing

3. ✖ Melting, annealing, shaping and finishing

4. ✖ Annealing, shaping, melting and finishing

Question Number : 105 Question Id : 47720318533 Display Question Number : Yes Is Question Mandatory : No

Which tree gives out the latex to obtain natural rubber?

Options :

1. ✔ Hevea brasillians

2. ✖ Eucalyptus

3. ✖ Anogeissus

4. ✖ Astragalus

Question Number : 106 Question Id : 47720318534 Display Question Number : Yes Is Question Mandatory : No

Which of the following comes under the wet corrosion?

Options :

1. ✖ Oxidation corrosion

2. ✖ Liquid metal corrosion

3. ✖ Corrosion by other gases

4. ✔ Concentration cell corrosion

Question Number : 107 Question Id : 47720318535 Display Question Number : Yes Is Question Mandatory : No

Number of moles of solutes dissolved per litre of solution is called?

Options :

1. ✖ Normality

2. ✔ Molarity

3. ✖ Molality

4. ✖ Mole fraction

Question Number : 108 Question Id : 47720318536 Display Question Number : Yes Is Question Mandatory : No

Incorrect equation for an ideal gas is?

(where; P – absolute pressure; V – total volume; n – number of moles; T – absolute temperature; v – Specific molar volume; M – molar mass; ρ – density)

Options :

1. ✖ $PV = nRT$

2. ✖ $Pv = RT$

3. ✖ $PM = \rho RT$

4. ✔ $PT = nRT$

Question Number : 109 Question Id : 47720318537 Display Question Number : Yes Is Question Mandatory : No

According to the Dalton's law of partial pressures, the total pressure of a mixture of ideal gases is equal to?

Options :

1. ✔ Sum of the partial pressures

2. ✖ Product of the partial pressures

3. ✖ Difference of the highest and lowest pressure

4. ✖ Sum of the highest and lowest pressure

Question Number : 110 Question Id : 47720318538 Display Question Number : Yes Is Question Mandatory : No

What phenomenon occurs when a solution's equilibrium vapor pressure equals the surrounding atmospheric pressure?

Options :

1. ✖ Melting

2. ✔ Boiling

3. ✖ Condensation

4. ✖ Sublimation

Question Number : 111 Question Id : 47720318539 Display Question Number : Yes Is Question Mandatory : No

The heat change for the reaction, $C(s)+2S(s)\rightarrow CS_2(l)$, is?

Options :

1. ✔ Formation of $CS_2(l)$

2. ✖ Transition of $CS_2(l)$

3. ✖ Combustion of $CS_2(l)$

4. ✖ Fusion of $CS_2(l)$

Question Number : 112 Question Id : 47720318540 Display Question Number : Yes Is Question Mandatory : No

Which of the following fuels require the maximum percentage of 'excess air' for complete combustion?

Options :

1. ✖ Liquid

2. ✖ Gaseous

3. ✔ Solid

4. ✖ Nuclear

Question Number : 113 Question Id : 47720318541 Display Question Number : Yes Is Question Mandatory : No

A bypass stream in a chemical process is useful, because it?

Options :

1. ✖ Improves the conversion

2. ✔ Facilitates better control of the process

3. ✖ Increases the yield of products

4. ✖ Enhance the purity of the products

Question Number : 114 Question Id : 47720318542 Display Question Number : Yes Is Question Mandatory : No

Which of the following ratios defines the recycle ratio in a chemical process?

Options :

1. ✖ Gross feed stream/recycle feed stream

2. ✔ Recycle stream/fresh feed stream

3. ✖ Recycle stream/gross feed stream

4. ✖

Fresh feed stream/recycle stream

Question Number : 115 Question Id : 47720318543 Display Question Number : Yes Is Question Mandatory : No

In the given tank, there are two feeds and one output. Consider a 2 hour operation; the feed rates are 4000 kg/hr and 6000 kg/hr. The accumulated material inside the tank is 2000 kg. What is the output rate kg/hr of the material?

Options :

1. ✔ 9000

2. ✖ 8000

3. ✖ 7000

4. ✖ 6000

Question Number : 116 Question Id : 47720318544 Display Question Number : Yes Is Question Mandatory : No

Which of the following series comprises the largest fraction of petroleum crude?

Options :

1. ✔ n-paraffin series

2. ✖ Naphthene series

3. ✖ Asphalts

4. ✖ Isoparaffin series

Question Number : 117 Question Id : 47720318545 Display Question Number : Yes Is Question Mandatory : No

Percentage of alcohol in beer is?

Options :

1. ✔ 8 - 10% alcohol

2. ✖ 95% alcohol

3. ✖ 10 - 15% alcohol

4. ✖ 50% alcohol

Question Number : 118 Question Id : 47720318546 Display Question Number : Yes Is Question Mandatory : No

Aviation Fuel Contains?

Options :

1. ✖ Light Naphtha

2. ✖ Medium Naphtha

3. ✔ Kerosene

4. ✖ Diesel

Question Number : 119 Question Id : 47720318547 Display Question Number : Yes Is Question Mandatory : No

Which of the coal has highest percentage of carbon?

Options :

1. ✖ Lignite

2. ✖ Bituminous coal

3. ✖ Peat

4. ✔ Anthracite coal

Question Number : 120 Question Id : 47720318548 Display Question Number : Yes Is Question Mandatory : No

Aniline point is related to?

Options :

1. ✖ Octane number

2. ✔ Aromaticity of an oil

3. ✖ Smoke

4. ✖ Pour point

Question Number : 121 Question Id : 47720318549 Display Question Number : Yes Is Question Mandatory : No

Cracking is _____

Options :

1. ✖ Favoured at very low temperature

2. ✔ An endothermic reaction

3. ✖ An exothermic reaction

4. ✖ An autocatalytic reaction

Question Number : 122 Question Id : 47720318550 Display Question Number : Yes Is Question Mandatory : No

Glycerine is produced during production of?

Options :

1. ✔ Soap

2. ✖ Detergent

3. ✖ Grease

4. ✖ Petrol

Question Number : 123 Question Id : 47720318551 Display Question Number : Yes Is Question Mandatory : No

Waste product obtained in the conversion of pulpwood to paper pulp by Kraft process is?

Options :

1. ✖ Yellow liquor

2. ✖ Green liquor

3. ✖ White liquor

4. ✔ Black liquor

Question Number : 124 Question Id : 47720318552 Display Question Number : Yes Is Question Mandatory : No

What is the molecular weight of Ammonia?

Options :

1. ✔ 17

2. ✖ 18

3. ✖ 19

4. ✖ 20

Question Number : 125 Question Id : 47720318553 Display Question Number : Yes Is Question Mandatory : No

What is the undesirable product in urea production?

Options :

1. ✖ Ammonium carbonate

2. ✔ Biuret formation

3. ✖ Liquid NH3

4. ✖ Flakes formation

Question Number : 126 Question Id : 47720318554 Display Question Number : Yes Is Question Mandatory : No

Which process is used in order to concentrate nitric acid?

Options :

1. ✖ Concentration by H_3PO_4

2. ✔ Concentration by $Mg(NO_3)^2$

3. ✖ Concentration by $Ca(NO_3)^2$

4. ✖ Concentration by $Ba(NO_3)^2$

Question Number : 127 Question Id : 47720318555 Display Question Number : Yes Is Question Mandatory : No

Which one of the following product is manufactured by Finnish Process?

Options :

1. ✔ Elemental sulfur

2. ✖ Chlorine

3. ✖ Pyrrhotite

4. ✖ Sour gas

Question Number : 128 Question Id : 47720318556 Display Question Number : Yes Is Question Mandatory : No

Which are the variable mixture components of synthesis gas for synthesis of organic compounds?

Options :

1. ✔ CO and H_2

2. ✖ H_2 and N_2

3. ✖ Only H_2

4. ✖ CO and N_2

Question Number : 129 Question Id : 47720318557 Display Question Number : Yes Is Question Mandatory : No

Which evaporator is used to concentrate the dilute acid produced in wet process method by H_2SO_4 leaching?

Options :

1. ✔ Single effect evaporator

2. ✖

Film evaporator

3. ✖ Triple effect evaporator

4. ✖ Circulation evaporator

Question Number : 130 Question Id : 47720318558 Display Question Number : Yes Is Question Mandatory : No

Which of the following statements regarding graphite is wrong?

Options :

1. ✖ Graphite is a semi-metal

2. ✖ Graphite is a form of coal

3. ✖ Graphite is used as heat resistant material

4. ✔ Graphite is an amorphous allotrope of carbon

Question Number : 131 Question Id : 47720318559 Display Question Number : Yes Is Question Mandatory : No

Which one mentioned below is not a raw material used in the Portland cement production?

Options :

1. ✖ Clay

2. ✖ Limestone

3. ✖ Gypsum

4. ✔ Quicklime

Question Number : 132 Question Id : 47720318560 Display Question Number : Yes Is Question Mandatory : No

The value of the compressibility of an ideal fluid is

Options :

1. ✔ Zero

2. ✖ Unity

3. ✖ Infinity

4. ✖ More than that of a real fluid

Question Number : 133 Question Id : 47720318561 Display Question Number : Yes Is Question Mandatory : No

The viscosity of a fluid in motion is 1 Poise. What will be its viscosity (in Poise) when the fluid is at rest?

Options :

1. ✖ 0

2. ✖ 0.5

3. ✔ 1

4. ✖ 2

Question Number : 134 Question Id : 47720318562 Display Question Number : Yes Is Question Mandatory : No

The ratio of inertial forces to viscous forces is called?

Options :

1. ✖ Weber's number

2. ✖ Mach's number

3. ✖ Froude's number

4. ✔ Reynold's number

Question Number : 135 Question Id : 47720318563 Display Question Number : Yes Is Question Mandatory : No

Which is the cheapest device for measuring flow?

Options :

1. ✖ Venturi meter

2. ✖ Pitot tube

3. ✔ Orifice meter

4. ✖ Rotameter

Question Number : 136 Question Id : 47720318564 Display Question Number : Yes Is Question Mandatory : No

Navier- Stokes equation describes the motion of?

Options :

1. ✖ Solid substance

2. ✖ Non-viscous fluid

3. ✔ Viscous fluid

4. ✖ Gas

Question Number : 137 Question Id : 47720318565 Display Question Number : Yes Is Question Mandatory : No

Newton's law of viscosity is a relationship between:

Options :

1. ✖ Pressure, velocity and temperature

2. ✔ Shear stress and rate of shear

3. ✖ Shear stress and velocity

4. ✖ Rate of shear strain and temperature

Question Number : 138 Question Id : 47720318566 Display Question Number : Yes Is Question Mandatory : No

The Bernoulli's equation in fluid dynamics is valid for?

Options :

1. ✖ Compressible flows

2. ✖ Transient flows

3. ✔ Continuous flows

4. ✖ Viscous flows

Question Number : 139 Question Id : 47720318567 Display Question Number : Yes Is Question Mandatory : No

A reciprocating pump is a class of?

Options :

1. ✖ Negative displacement

2. ✔ Positive displacement

3. ✖ Zero displacement

4. ✖ Infinite displacement

Question Number : 140 Question Id : 47720318568 Display Question Number : Yes Is Question Mandatory : No

Drag coefficient for Stoke's law regime?

Options :

1. ✖ $C_d = 1/Re$

2. ✖ $C_d = 16/Re$

3. ✔ $C_d = 24/Re$

4. ✖ $C_d = 2/Re$

Question Number : 141 Question Id : 47720318569 Display Question Number : Yes Is Question Mandatory : No

A non-dimensional number generally associated with natural convection heat transfer is:

Options :

1. ✖ Nusselt number

2. ✔ Grashoff number

3. ✖ Prandtl number

4. ✖ Reynolds number

Question Number : 142 Question Id : 47720318570 Display Question Number : Yes Is Question

Mandatory : No

Fourier's law of heat conduction gives the rate of heat flow for which of the following conditions?

Options :

1. ✔ One dimensional steady-state heat transfer

2. ✖ Two dimensional no-equilibrium, unsteady-state heat transfer

3. ✖ Heat transfer due to external convection

4. ✖ Heat transfer due to external convection and radiation

Question Number : 143 Question Id : 47720318571 Display Question Number : Yes Is Question Mandatory : No

Unit of thermal diffusivity is

Options :

1. ✔ m^2/s

2. ✖ $M^2/s\ ^\circ C$

3. ✖ $Kcal/m^2\ hr$

4. ✖ $Kcal/mhr\ ^\circ C$

Question Number : 144 Question Id : 47720318572 Display Question Number : Yes Is Question Mandatory : No

Ratio of emissive power of a body to the emissive power of a perfectly block body is called

Options :

1. ✔ Emissivity

2. ✖ Transmissivity

3. ✖ Absorptivity

4. ✖ Reflectivity

Question Number : 145 Question Id : 47720318573 Display Question Number : Yes Is Question Mandatory : No

Unit of thermal conductivity is

Options :

1. ✔ $W/m.K$

2. ✖ $N/m2.K$

3. ✖ W/K

4. ✖ K/W

Question Number : 146 Question Id : 47720318574 Display Question Number : Yes Is Question Mandatory : No

For evaporators and condensers, the logarithmic mean temperature difference for the parallel flow is

Options :

1. ✖ Not dependent on counter flow

2. ✖ Smaller than counter flow

3. ✖ Greater than counter flow

4. ✔ Equal to counter flow

Question Number : 147 Question Id : 47720318575 Display Question Number : Yes Is Question Mandatory : No

Total radian from a black body per second per unit area is directly proportional to the fourth power of absolute temperature. This statement is

Options :

1. ✔ Stefan-Boltzmann law

2. ✖ Planck's law

3. ✖ Kirchhoff's law

4. ✖ Wien's law

Question Number : 148 Question Id : 47720318576 Display Question Number : Yes Is Question Mandatory : No

A sphere of radius R with initial temperature 100 °C is placed in stagnant air of temperature 20 °C. The value of Nusselt number is

Options :

1. ✖ $Nu > 2$

2. ✖ $Nu < 2$

3. ✔ $Nu = 2$

4. ✖ $Nu = -2$

Question Number : 149 Question Id : 47720318577 Display Question Number : Yes Is Question Mandatory : No

Convective heat transfer coefficient doesn't depend on _____

Options :

1. ✔ Surface area

2. ✖ Space

3. ✖ Time

4. ✖ Orientation of the solid surface

Question Number : 150 Question Id : 47720318578 Display Question Number : Yes Is Question Mandatory : No

Which of the following is an example of forced convection?

Options :

1. ✖ Chilling effect of cold wind on a warm body

2. ✔ Flow of water in condenser tubes

3. ✖ Cooling of billets in the atmosphere

4. ✖ Heat exchange on cold and warm pipes

Question Number : 151 Question Id : 47720318579 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not categorised as a “mechanical operation"?

Options :

1. ✖ Filtration

2. ✖ Agitation

3. ✖ Size enlargement

4. ✔ Humidification

Question Number : 152 Question Id : 47720318580 Display Question Number : Yes Is Question Mandatory : No

Water is flowing at a flow rate of 3600 m^3/hr through unit area of cross section, its velocity is

Options :

1. ✖ 10 m/s

2. ✔ 1 m/s

3. ✖ 3.6 m/s

4. ✖ 0.36 m/s

Question Number : 153 Question Id : 47720318581 Display Question Number : Yes Is Question Mandatory : No

The shape having lowest sphericity is

Options :

1. ✖ Sphere

2. ✖ Cube

3. ✖ Hemisphere

4. ✔ Needle

Question Number : 154 Question Id : 47720318582 Display Question Number : Yes Is Question Mandatory : No

The most accurate law for estimating the power is _____

Options :

1. ✖ Rittingers law

2. ✖ Power law

3. ✖ Kick's law

4. ✔ Bond's law

Question Number : 155 Question Id : 47720318583 Display Question Number : Yes Is Question Mandatory : No

Which is most efficient screening equipment?

Options :

1. ✔ Gyratory screen

2. ✖ Trommel screen

3. ✖ Grizzly screen

4. ✖ Vibratory screen

Question Number : 156 Question Id : 47720318584 Display Question Number : Yes Is Question Mandatory : No

Which of the following works on the principle of shearing?

Options :

1. ✖ Roll crusher

2. ✖ Ball mill

3. ✔ Toothed crusher

4. ✖ Rod mill

Question Number : 157 Question Id : 47720318585 Display Question Number : Yes Is Question Mandatory : No

As the solids are deposited the cake resistance will _____

Options :

1. ✖ Decrease

2. ✖ Be constant

3. ✖ Be stable

4. ✔ Increase

Question Number : 158 Question Id : 47720318586 Display Question Number : Yes Is Question Mandatory : No

In a rotary drum, the cake is discharged by

Options :

1. ✔ Doctor's knife

2. ✖ Athlete's head

3. ✖ Prank's Tip

4. ✖ Eject tool

Question Number : 159 Question Id : 47720318587 Display Question Number : Yes Is Question Mandatory : No

All spontaneous processes are

Options :

1. ✖ Reversible

2. ✔ Irreversible

3. ✖ Reversible adiabatic

4. ✖ Adiabatic

Question Number : 160 Question Id : 47720318588 Display Question Number : Yes Is Question Mandatory : No

Entropy is

Options :

1. ✔ An extensive property

2. ✖ An intensive property

3. ✖ A path property

4. ✖ A reference property

Question Number : 161 Question Id : 47720318589 Display Question Number : Yes Is Question Mandatory : No

A 3 m^3 rigid tank contains nitrogen gas at 500 kPa and 300 K. Now heat is transferred to the nitrogen in the tank and the pressure of nitrogen rises to 800 kPa. The work done during the process is

Options :

1. ✖ 500 kJ

2. ✖ 1500 kJ

3. ✔ 0 kJ

4. ✖ 900 kJ

Question Number : 162 Question Id : 47720318590 Display Question Number : Yes Is Question Mandatory : No

Degree of freedom of a system consisting of a gaseous mixture of H_2 and NH_3 will be

Options :

1. ✖ 0

2. ✖ 1

3. ✖ 2

4. ✔ 3

Question Number : 163 Question Id : 47720318591 Display Question Number : Yes Is Question Mandatory : No

Gibbs free energy (F) is defined as

Options :

1. ✖ $F = E - TS$

2. ✔ $F = H - TS$

3. ✖ $F = H + TS$

4. ✖ $F = E + TS$

Question Number : 164 Question Id : 47720318592 Display Question Number : Yes Is Question Mandatory : No

The first law of thermodynamics is a restatement of the law of conservation of

Options :

1. ✖ Mass

2. ✔ Energy

3. ✖ Momentum

4. ✖ Both mass and momentum

Question Number : 165 Question Id : 47720318593 Display Question Number : Yes Is Question

Mandatory : No

$-r_A$ is a universal notation for reaction rate. What does the negative sign indicate?

Options :

1. ✖ Rate of formation of A

2. ✔ Rate of disappearance of A

3. ✖ Rate of dissociation of A

4. ✖ Rate of association of A

Question Number : 166 Question Id : 47720318594 Display Question Number : Yes Is Question Mandatory : No

Order of a reaction is?

Options :

1. ✖ Number of molecules of reactants taking part in the reaction

2. ✖ Power of any one of the reactant concentrations

3. ✖ Concentration of intermediate species formed

4. ✔ Sum of the powers of the concentrations of all the reactants

Question Number : 167 Question Id : 47720318595 Display Question Number : Yes Is Question Mandatory : No

The unit of frequency factor in Arrhenius equation is

Options :

1. ✖ mol/m^3

2. ✔ Same as that of rate constant

3. ✖ mol / m^3s

4. ✖ mol

Question Number : 168 Question Id : 47720318596 Display Question Number : Yes Is Question Mandatory : No

The catalyst does not affect the reaction's

Options :

1. ✖ Rate

2. ✔ Equilibrium

3. ✖ Selectivity

4. ✖ Activation energy

Question Number : 169 Question Id : 47720318597 Display Question Number : Yes Is Question Mandatory : No

The dimension of diffusion coefficient is given by (M-Mass, L-Length, T-Time)

Options :

1. ✖ $M L T^{-2}$

2. ✔ $L^{2} T^{-1}$

3. ✖ $L T^{-1}$

4. ✖ $M L^{-2} T$

Question Number : 170 Question Id : 47720318598 Display Question Number : Yes Is Question Mandatory : No

The real driving force of the mass transfer is

Options :

1. ✔ Chemical potential

2. ✖ Physical potential

3. ✖ Pressure gradient

4. ✖ Concentration gradient

Question Number : 171 Question Id : 47720318599 Display Question Number : Yes Is Question Mandatory : No

Diffusion of components between the phases at equilibrium is

Options :

1. ✔ Zero

2. ✖ Infinity

3. ✖ Changes continuously

4. ✖ Diffusion never occurs

Question Number : 172 Question Id : 47720318600 Display Question Number : Yes Is Question Mandatory : No

In an operation, the enthalpy is similar throughout the initial and final condition . Such operation is

Options :

1. ✔ Adiabatic

2. ✖ Non-adiabatic

3. ✖ Isothermal

4. ✖ Non-isothermal

Question Number : 173 Question Id : 47720318601 Display Question Number : Yes Is Question Mandatory : No

Find the false statement for the better choice of the absorbent

Options :

1. ✖ Gas solubility should be high

2. ✔ Vapour pressure should be low

3. ✖ Viscosity should be high

4. ✖ Low freezing point

Question Number : 174 Question Id : 47720318602 Display Question Number : Yes Is Question Mandatory : No

Find the rate of non-diffusing solute, if the mole fraction of the gas phase is 0.65 and the diffusing rate is 70 moles/hr

Options :

1. ✔ 24.5 moles/hr

2. ✖ 200 moles/hr

3. ✖ 18.18 moles/hr

4. ✖ 37.7 moles/hr

Question Number : 175 Question Id : 47720318603 Display Question Number : Yes Is Question Mandatory : No

The equation applicable for batch distillation is

Options :

1. ✖ Frenske's equation

2. ✔ Rayleigh equation

3. ✖ Wilke-chan equation

4. ✖ Both Frenske's and Wilke-chan equation

Question Number : 176 Question Id : 47720318604 Display Question Number : Yes Is Question Mandatory : No

Solvent extraction is basically known as

Options :

1. ✖ Gas-liquid extraction

2. ✔ Liquid-liquid extraction

3. ✖ Liquid-solid extraction

4. ✖ Gas-solid extraction

Question Number : 177 Question Id : 47720318605 Display Question Number : Yes Is Question Mandatory : No

The moisture inside the substance is known as

Options :

1. ✔ Bound moisture

2. ✖

Unbound moisture

3. ✖ Equilibrium moisture

4. ✖ Free moisture

Question Number : 178 Question Id : 47720318606 Display Question Number : Yes Is Question Mandatory : No

The gauge pressure is

Options :

1. ✔ The amount by which the measured pressure exceeds the atmospheric pressure

2. ✖ The amount by which the measured pressure is less than the atmospheric pressure

3. ✖ Same as atmospheric pressure

4. ✖ Same as absolute pressure

Question Number : 179 Question Id : 47720318607 Display Question Number : Yes Is Question Mandatory : No

What is the main purpose of the control valve positioner?

Options :

1. ✖ Change the valve characteristic

2. ✔

Improve the precision of the valve

3. ✖ Minimize cavitation in the valve

4. ✖ Reduce leakage of process fluid

Question Number : 180 Question Id : 47720318608 Display Question Number : Yes Is Question Mandatory : No

Which of the following is a non-contacting type instrument?

Options :

1. ✖ Resistance temperature detector

2. ✖ Thermometer

3. ✔ Optical pyrometer

4. ✖ Bourdon pressure gage

Question Number : 181 Question Id : 47720318609 Display Question Number : Yes Is Question Mandatory : No

A thermocouple transduces the temperature signal in the form of

Options :

1. ✔ Voltage

2. ✖ Current

3. ✖ Resistance

4. ✖ Capacitance

Question Number : 182 Question Id : 47720318610 Display Question Number : Yes Is Question Mandatory : No

Which of the following controllers has the least maximum deviation?

Options :

1. ✖ P-controller

2. ✖ P-I controller

3. ✖ P-I-D controller

4. ✔ P-D controller

Question Number : 183 Question Id : 47720318611 Display Question Number : Yes Is Question Mandatory : No

For a variable volume stirred tank heater, the gain between the outlet temperature and the feed flowrate is

Options :

1. ✖ Zero

2. ✖ Increases with feed flowrate

3. ✔ Decreases with feed flowrate

4. ✖ Independent of the feed flowrate

Question Number : 184 Question Id : 47720318612 Display Question Number : Yes Is Question Mandatory : No

For a ON/OFF controller, the controller action depends on

Options :

1. ✔ Sign of the error

2. ✖ Current value of the error

3. ✖ Historical value of the error

4. ✖ Future value of the error

Question Number : 185 Question Id : 47720318613 Display Question Number : Yes Is Question Mandatory : No

A shell and tube heat exchanger is used to pre-heat reactor feed to the desired reactor inlet temperature. The heating is done by condensing high pressure steam in the shell-side. If the flow-rate of steam is used to control the tube-side outlet temperature, the corresponding controller should be a

Options :

1. ✖ ON/OFF controller

2. ✖ P controller

3. ✔ PI controller

4. ✖ Advanced controller

Question Number : 186 Question Id : 47720318614 Display Question Number : Yes Is Question Mandatory : No

Which of the following plant emits large amount of SO_2 as an air pollutant?

Options :

1. ✖ Nitric acid

2. ✔ Sulphuric acid

3. ✖ Chlor alkali

4. ✖ Iron and steel

Question Number : 187 Question Id : 47720318615 Display Question Number : Yes Is Question Mandatory : No

Which is the warmest layer of the atmosphere?

Options :

1. ✔ Thermosphere

2. ✖ Troposphere

3. ✖ Stratosphere

4. ✖ Mesosphere

Question Number : 188 Question Id : 47720318616 Display Question Number : Yes Is Question Mandatory : No

Turbidity of water is an indication of the presence of

Options :

1. ✔ Suspended inorganic matter

2. ✖ Dissolved solids

3. ✖ Floating solids

4. ✖ Dissolved gases

Question Number : 189 Question Id : 47720318617 Display Question Number : Yes Is Question Mandatory : No

Basic operating principle of cyclone separator for the collection of dust particles is the application of

Options :

1. ✖ Diffusion

2. ✔ Centrifugal force

3. ✖ Gravitational force

4. ✖ Electrostatic force

Question Number : 190 Question Id : 47720318618 Display Question Number : Yes Is Question Mandatory : No

Which is a secondary air pollution?

Options :

1. ✔ Photochemical smog

2. ✖ Sulphur dioxide

3. ✖ Nitrogen dioxide

4. ✖ Dust particles

Question Number : 191 Question Id : 47720318619 Display Question Number : Yes Is Question Mandatory : No

Composting and lagooning are the methods of

Options :

1. ✖ Sludge digestion

2. ✔ Sludge disposal

3. ✖

Sedimentation

4. ✖ Filtration

Question Number : 192 Question Id : 47720318620 Display Question Number : Yes Is Question Mandatory : No

In sugar industry press mud is generated from

Options :

1. ✖ Crushing

2. ✔ Filtering the lime sludge

3. ✖ Centrifugation

4. ✖ Evaporators

Question Number : 193 Question Id : 47720318621 Display Question Number : Yes Is Question Mandatory : No

Which of these resources does not produce CO_2 during electricity generation

Options :

1. ✖ Coal

2. ✖ Methane

3. ✔ Uranium

4. ✖ Biogas

Question Number : 194 Question Id : 47720318622 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not an application of wind energy?

Options :

1. ✖ Electricity

2. ✔ Steam engine

3. ✖ Agriculture

4. ✖ Energy storage for emergencies

Question Number : 195 Question Id : 47720318623 Display Question Number : Yes Is Question Mandatory : No

Which of the following is an example of physio-chemical conversion technique to convert biomass into usable forms of energy?

Options :

1. ✖ Pyrolysis

2. ✖ Gasification

3. ✖ Anaerobic Digestion

4. ✔ Extraction with esterification

Question Number : 196 Question Id : 47720318624 Display Question Number : Yes Is Question Mandatory : No

Fusion point of an acidic refractory materials is

Options :

1. ✖ Increased by the addition of basic oxides

2. ✖ Reduced by the addition of basic oxides

3. ✔ Not affected by the addition of basic oxides

4. ✖ None of the above mentioned

Question Number : 197 Question Id : 47720318625 Display Question Number : Yes Is Question Mandatory : No

Which of the following have the same mass number, but different nuclear charge?

Options :

1. ✖ Isotopes

2. ✔ Isobers

3. ✖ Isotones

4. ✖ Both isotopes and isotones

Question Number : 198 Question Id : 47720318626 Display Question Number : Yes Is Question Mandatory : No

Three elements for hazard triangle are?

Options :

1. ✖ Hazard, risk, target/threat

2. ✖ Hazardous element, risk, initiating mechanism

3. ✔ Hazardous element, initiating mechanism, target/threat

4. ✖ Hazard, mishap, initiating mechanism

Question Number : 199 Question Id : 47720318627 Display Question Number : Yes Is Question Mandatory : No

An unplanned event or series of event resulting in death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment is

Options :

1. ✖ Hazard

2. ✖ Risk

3. ✔ Mishap

4. ✖ Safety

Question Number : 200 Question Id : 47720318628 Display Question Number : Yes Is Question Mandatory : No

An expression of the impact and possibility of a mishap in terms of potential mishap severity and probability occurrence is

Options :

1. ✖ Hazard

2. ✔ Risk

3. ✖ Mishap

4. ✖ Safety