

Chemical Engineering_Set2

Topic:- Mathematics_Set2

1) If $A+B = \begin{bmatrix} 1 & -1 \\ 3 & 0 \end{bmatrix}$ and $A-B = \begin{bmatrix} 3 & 1 \\ 1 & 4 \end{bmatrix}$, then $AB =$

[Question ID = 13593]

1. $\begin{bmatrix} -2 & 2 \\ 0 & -6 \end{bmatrix}$

2. $\begin{bmatrix} -2 & -2 \\ 2 & -4 \end{bmatrix}$

3. $\begin{bmatrix} -2 & -2 \\ 0 & -6 \end{bmatrix}$

4. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Correct Answer :-

• $\begin{bmatrix} -2 & -2 \\ 0 & -6 \end{bmatrix}$

2) If $A = \begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix}$; $B = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 2 & 3 \\ 4 & 0 & -1 \end{bmatrix}$, then $A^T B A =$

[Question ID = 13594]

1. $[5]$

2. [0]

3.
$$\begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 0 \\ 0 & 6 & -2 \end{bmatrix}$$

4.
$$\begin{bmatrix} 1 & -1 & 0 \\ 0 & 2 & 3 \\ 4 & 0 & -1 \end{bmatrix}$$

Correct Answer :-

• [5]

3)
$$\begin{vmatrix} x-y & p-q & a-b \\ y-z & q-r & b-c \\ z-x & r-p & c-a \end{vmatrix} =$$

[Question ID = 13595]

1. 1
2. 2
3. xyz- pqr+ abc
4. 0

Correct Answer :-

• 0

4) The solution of the equation
$$\begin{vmatrix} 5-x & 4 & 3 \\ 1-3x & 7 & 6 \\ 1-x & 6 & 5 \end{vmatrix} = 0$$
 is

[Question ID = 13596]

1. $x = 1$
2. $x = 2$
3. $x = 0$

4. $x = 5$

Correct Answer :-

• $x = 1$

5) The inverse of the matrix $A = \begin{bmatrix} a+ib & c+id \\ -c+id & a-ib \end{bmatrix}$,

if $a^2 + b^2 + c^2 + d^2 = 1$ is

[Question ID = 13597]

1. $\begin{bmatrix} a-ib & c-id \\ c+id & a+ib \end{bmatrix}$

2. $\begin{bmatrix} a-ib & -c-id \\ c-id & a+ib \end{bmatrix}$

3. $\begin{bmatrix} c-id & a-ib \\ a+ib & c+id \end{bmatrix}$

4. $\begin{bmatrix} a-ib & c-id \\ -c-id & a+ib \end{bmatrix}$

Correct Answer :-

• $\begin{bmatrix} a-ib & -c-id \\ c-id & a+ib \end{bmatrix}$

6) $\frac{x^2}{x^2 - 3x + 2} =$

[Question ID = 13598]

1. $\frac{1}{x-1} + \frac{2}{x-2}$

2. $1 - \frac{1}{1-x} + \frac{3}{x-2}$

3. $1 + \frac{1}{1-x} + \frac{4}{x-2}$

4. $1 - \frac{1}{x-1} + \frac{2}{x-2}$

Correct Answer :-

• $1 + \frac{1}{1-x} + \frac{4}{x-2}$

7) If $\sin\theta + \operatorname{Cosec}\theta = 2$, then the value of $\sin^3\theta + \operatorname{Cosec}^3\theta =$

[Question ID = 13599]

1. 0
2. 1
3. 2
4. 8

Correct Answer :-

- 2

8) The value of $\sin^2\left(\frac{\pi}{8} + \frac{\theta}{2}\right) - \sin^2\left(\frac{\pi}{8} - \frac{\theta}{2}\right) =$

[Question ID = 13600]

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

2. $\frac{1}{2}\sin\theta$

3. $\frac{1}{\sqrt{2}}\sin\theta$

4. $\sin\left(\frac{\theta}{2}\right)$

Correct Answer :-

• $\frac{1}{\sqrt{2}}\sin\theta$

9) If x, y are in first quadrant, $\tan(x - y) = \frac{7}{24}$ and $\tan(x) = \frac{4}{3}$, then $x + y =$

[Question ID = 13601]

1. $\frac{3}{4}$

2. $\frac{\pi}{2}$

3. $\frac{\pi}{4}$

4. 1

Correct Answer :-

• $\frac{\pi}{2}$

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

[Question ID = 13602]

1. 2

2. 1

3. 0

4. -1

Correct Answer :-

• 2

11) $\sec^2(\tan^{-1} 3) + \operatorname{cosec}^2(\cot^{-1} 3) =$

[Question ID = 13603]

1. 1
2. 10
3. 20
4. 30

Correct Answer :-

- 20

12) $3\operatorname{Cosec} x = 4\operatorname{Sin} x \Rightarrow x =$

[Question ID = 13604]

1. $n\pi \pm \frac{\pi}{2}; n \in \mathbb{Z}$
2. $n\pi \pm \frac{\pi}{3}; n \in \mathbb{Z}$
3. $2n\pi \pm \frac{\pi}{2}; n \in \mathbb{Z}$
4. $n\pi \mp \frac{\pi}{4}; n \in \mathbb{Z}$

Correct Answer :-

- $n\pi \pm \frac{\pi}{3}; n \in \mathbb{Z}$

13) If $x = \log_e(5 + \sqrt{26})$, then $\operatorname{Sin}hx =$

[Question ID = 13605]

1. 5
2. 1
3. 2

4. $\log_e 5$

Correct Answer :-

• 5

14)

If a, b and c are the lengths of the sides opposite to the angles A, B and C of a triangle ABC, then

$$(b-c)^2 \cos^2 \frac{A}{2} + (b+c)^2 \sin^2 \frac{A}{2} =$$

[Question ID = 13606]

1. a

2. b

3. b^2

4. a^2

Correct Answer :-

• a^2

15) If $z = 2 - i\sqrt{7}$, then $2z^2 - 8z + 22 =$

[Question ID = 13607]

1. 0

2. 1

3. 2

4. 4

Correct Answer :-

• 0

16)

The least positive integer n, satisfying $\left(\frac{1+i}{1-i}\right)^n = 1$ is

[Question ID = 13608]

1. 2

- 2. 1
- 3. 4
- 4. 8

Correct Answer :-

- 4

17) The distance between the parallel straight lines $3x + 4y - 3 = 0$ and $6x + 8y - 1 = 0$ is

[Question ID = 13609]

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

2. $\frac{1}{4}$

3. 1

4. $\sqrt{2}$

Correct Answer :-

- $\frac{1}{2}$

18) Angle between the lines $3x - 5y - 9 = 0$; $4x - y + 7 = 0$ is

[Question ID = 13610]

1. $\theta = 30^\circ$

2. $\theta = 45^\circ$

3. $\theta = 60^\circ$

4. $\theta = 15^\circ$

Correct Answer :-

• $\theta = 45^\circ$

19)

Equation of the circle passing through (3,-4) and concentric with $x^2 + y^2 + 4x - 2y + 1 = 0$ is

[Question ID = 13611]

1. $x^2 + y^2 + 4x - 2y - 15 = 0$

2. $x^2 + y^2 + 4x - 2y - 30 = 0$

3. $x^2 + y^2 + x - 2y - 45 = 0$

4. $x^2 + y^2 + 4x - 2y - 45 = 0$

Correct Answer :-

• $x^2 + y^2 + 4x - 2y - 45 = 0$

20) The eccentricity of Ellipse $9x^2 + 16y^2 = 144$ is

[Question ID = 13612]

1. $\frac{7}{4}$

2. $\frac{\sqrt{7}}{4}$

3. $\frac{5}{4}$

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

Correct Answer :-

$$\frac{\sqrt{7}}{4}$$

21)
$$\lim_{x \rightarrow 0} \frac{8^x - 2^x}{x} =$$

[Question ID = 13613]

1. log 2
2. 0
3. log 4
4. 1

Correct Answer :-

- log 4

22) If $y = \cos^{-1}(4x^3 - 3x)$, then $\frac{dy}{dx} =$

[Question ID = 13614]

1. $\frac{-3}{\sqrt{1-x^2}}$

2. $\frac{4}{\sqrt{1-x^2}}$

3. $\frac{1}{\sqrt{1+x^2}}$

4. $\frac{-4}{3\sqrt{1-x^2}}$

Correct Answer :-

- $\frac{-3}{\sqrt{1-x^2}}$

23)

If $y = (\sin x)^{\log x}$, then $\frac{dy}{dx} =$

[Question ID = 13615]

1. $(\sin x)^{\log x} \{ \tan x \cdot \log x + \log(\sin x) \}$

2. $\log x \left\{ \cot x \cdot \sin x + \frac{1}{x} \log(\sin x) \right\}$

3. $(\sin x)^{\log x} \left\{ \cot x \cdot \log x + \frac{1}{x} \log(\sin x) \right\}$

4. $(\cos x)^{\log x} \left\{ \tan x \cdot \log x + \frac{1}{x} \log(\cos x) \right\}$

Correct Answer :-

• $(\sin x)^{\log x} \left\{ \cot x \cdot \log x + \frac{1}{x} \log(\sin x) \right\}$

24) If $y = \log(x + \sqrt{1+x^2})$, then $(1+x^2) \frac{d^2y}{dx^2} + x \frac{dy}{dx} =$

[Question ID = 13616]

1. 1

2. 0

3. x

4. $\frac{1}{\sqrt{1+x^2}}$

Correct Answer :-

• 0

25)

At $\theta = \frac{\pi}{4}$, the slope of the normal to the curve $x = a \cos^3 \theta$; $y = a \sin^3 \theta$ is

[Question ID = 13617]

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

Correct Answer :-

- 1

26)

If $x^y = e^{x-y}$, then $\frac{dy}{dx} =$

[Question ID = 13618]

1. $\frac{\log x}{(1 + \log x)^2}$
2. $\frac{1}{(1 + \log x)^2}$
3. $\frac{\log x}{1 + \log x}$
4. $\frac{(\log x)^2}{(1 + \log x)^2}$

Correct Answer :-

- $\frac{\log x}{(1 + \log x)^2}$

27) Equation of the tangent to the curve $y = 5x^4$ at the point (1,5) is

[Question ID = 13619]

1. $y = 15(x - 1)$

2. $y = 20x - 15$

3. $x = 15y - 20$

4. $y = 20(x - 1)$

Correct Answer :-

• $y = 20x - 15$

28) If $u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$, then $x \frac{\partial u}{\partial y} + y \frac{\partial u}{\partial x} =$

[Question ID = 13620]

1. $\cot u$
2. $\tan u$
3. 1
4. $\sin u$

Correct Answer :-

- $\tan u$

29) $\int \frac{a}{b + ce^x} dx =$

[Question ID = 13621]

1. $\frac{a}{b} \log\left(\frac{e^x}{b + ce^x}\right) + C$

2. $\frac{b}{a} \log\left(\frac{e^{-x}}{b + e^{-x}}\right) + C$

3. $\frac{a}{b} \log\left(\frac{1}{be^x + ce^{-x}}\right) + C$

4. $\frac{b}{a} e^{(b+ce^x)} + C$

Correct Answer :-

• $\frac{a}{b} \log\left(\frac{e^x}{b+ce^x}\right) + C$

30) $\int \frac{1}{(1+x^2)\tan^{-1}x} dx =$

[Question ID = 13622]

1. $\tan^{-1}x + C$
2. $\cot^{-1}x + C$
3. $\log(\sec x)\tan x + C$
4. $\log(\tan^{-1}x) + C$

Correct Answer :-

• $\log(\tan^{-1}x) + C$

31) $\int \frac{\cos(\log x^2)}{x^4} dx =$

[Question ID = 13623]

1. $\frac{1}{x^3} \cos\left[\log x^2 + \tan^{-1}\left(\frac{3}{2}\right)\right] + C$
2. $\frac{x^3}{\sqrt{13}} \cos\left[\log x^2 + \cot^{-1}\left(\frac{2}{3}\right)\right] + C$
3. $\frac{-1}{2x^3} \cos\left[\log x^2 + \tan^{-1}\left(\frac{2}{3}\right)\right] + C$
4. $\frac{1}{x^3\sqrt{13}} \cos\left[\log x^2 + \cot^{-1}\left(\frac{3}{2}\right)\right] + C$

Correct Answer :-

$$\frac{1}{x^3} \text{Cos} \left[\log x^2 + \tan^{-1} \left(\frac{3}{2} \right) \right] + C$$

32) $\int \frac{dx}{e^x - 1} =$

[Question ID = 13624]

1. $\log \left(\frac{1 - e^x}{e^x} \right) + C$

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

3. $\log \left(\frac{e^x - 1}{e^x} \right) + C$

4. $\log \left(\frac{e^{-x} - 1}{e^{-x}} \right) + C$

Correct Answer :-

• $\log \left(\frac{e^x - 1}{e^x} \right) + C$

33) $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx =$

[Question ID = 13625]

1. $\sec x + \cot x$

2. $\cos ecx - \cot x$

3. $\cos ecx + \tan x$

4. $\sec x - \cos ecx$

Correct Answer :-

- $\sec x - \cos ecx$

34) $\int_0^{\pi/4} \frac{e^{\tan x}}{\cos^2 x} dx$

[Question ID = 13626]

1. $e - 1$
2. $e^{-1} - 1$
3. $e^{-1} + 1$
4. $e^{-2} - 1$

Correct Answer :-

- $e - 1$

35) $\int_0^{\pi} \sin^3 x (1 - \cos x)^2 dx =$

[Question ID = 13627]

1. $5/3$
2. $8/5$
3. 1
4. 0

Correct Answer :-

- $8/5$

36)

The volume generated by the revolution of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about its major axis is

[Question ID = 13628]

1. $4\pi ab^2$

2. $\frac{4}{3}\pi ab^2$

3. $\frac{4}{3}\pi a^2 b$

4. $\frac{8}{3}\pi a^2 b^2$

Correct Answer :-

• $\frac{4}{3}\pi ab^2$

37) The general solution of $x \frac{dy}{dx} = y[\log y - \log x + 1]$ is

[Question ID = 13629]

1. $y = Ce^x$

2. $y = Ce^y$

3. $y = xe^{cx}$

4. $x = Ce^{y/x}$

Correct Answer :-

• $y = xe^{cx}$

38) A and B are arbitrary constants, the differential equation having

$xy = Ae^x + Be^{-x} + x^2$ as its general solution is

[Question ID = 13630]

1. $y'' + 2xy' - xy + x^2 = 0$

2. $xy'' + y' - xy - 2 = 0$

3. $xy'' + 2y' - 2xy + 3x^2 - 2 = 0$

4. $xy'' + 2y' - xy + x^2 - 2 = 0$

Correct Answer :-

• $xy'' + 2y' - xy + x^2 - 2 = 0$

39) The solution of $(e^{-2\sqrt{x}} - y)\frac{dx}{dy} = \sqrt{x}$

[Question ID = 13631]

1. $y = e^{-2\sqrt{x}}(2\sqrt{x} + C)$

2. $y = e^{-2\sqrt{x}} + \sqrt{x} + C$

3. $y = e^{-2\sqrt{x}} + e^{\sqrt{x}}\sqrt{x} + C$

4. $y = e^{2\sqrt{x}} + \log x + C$

Correct Answer :-

• $y = e^{-2\sqrt{x}}(2\sqrt{x} + C)$

40) The solution of $\cos x \, dy = (\sin x - y) \, y \, dx$

[Question ID = 13632]

1. $y = \sec x \tan x + C$

2. $y^{-1} \cos x = \cot x + C$

3. $y^{-1} \sec x = \tan x + C$

4. $y = \log \sin x + C$

Correct Answer :-

• $y^{-1} \sec x = \tan x + C$

41) The solution of $\frac{d^2 y}{dx^2} + 4\frac{dy}{dx} + 5y = 0$ satisfying $y(0) = 1$ and $y'(0) = 0$ is

[Question ID = 13634]

1. $y = e^{-2x} [\cos x + 2 \sin x]$

2. $y = e^{-x} [2 \cos x + \sin x]$

3. $y = e^{2x} [2 \cos x + 3 \sin x]$

4. $y = e^x [\cos x + 2 \sin x]$

Correct Answer :-

• $y = e^{-2x} [\cos x + 2 \sin x]$

42) $\frac{d^2 y}{dx^2} - 5\frac{dy}{dx} + 6y = 2e^x$; with $y(0) = 1$; $y'(0) = 1$ satisfies

[Question ID = 13635]

1. $y = c_1 e^{2x} + c_2 e^{3x} + e^x$

2. $y = 2e^{2x} + 3e^{3x} + e^x$

3. $y = e^{2x} + 2e^{3x} + e^{-x}$

4. $y = e^x$

Correct Answer :-

• $y = e^x$

43) The solution of $(y \log x - 2)ydx = xdy$

[Question ID = 13636]

$y = x(\log x + C)$

1.

$y = \frac{1}{x} \log x + x + C$

2.

$\frac{1}{y} = x \log x + x + Cx$

3.

$\frac{1}{y} = x^2 \log x + x + C$

4.

Correct Answer :-

• $\frac{1}{y} = x^2 \log x + x + C$

44) Mean deviation about the median for the data 4,6,9,3,10,13,2 is [Question ID = 13641]

1. 4.31
2. 5.253
3. 3.285
4. 3.785

Correct Answer :-

- 3.285

45) If E_1, E_2 are any two events of a random experiment and P is a probability function then

[Question ID = 13642]

1. $P(E_1 \cap E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$

2. $P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$

3. $P(E_1 \cap E_2) = P(E_1) + P(E_2) + P(E_1 \cup E_2)$

4. $P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cup E_2)$

Correct Answer :-

• $P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$

46) The solution of the initial value problem $\frac{d^2x}{dt^2} - 3\frac{dx}{dt} + 2x = 0;$

with $x(0) = 2;$ $x'(0) = 0$ is

[Question ID = 23975]

1. $x(t) = Ae^t + Be^{2t}$

2. $x(t) = 2e^t - 4e^{2t}$

3. $x(t) = 4e^t - 2e^{2t}$

4. $x(t) = e^t - 2e^{2t}$

Correct Answer :-

• $x(t) = 4e^t - 2e^{2t}$

47) The Laplace transform of $\left\{ \frac{e^{-at}t^{n-1}}{(n-1)!} \right\} =$

[Question ID = 23976]

$$\frac{e^{-at}}{(s+a)^n}$$

1.

$$\frac{1}{(s+a)^n}$$

2.

$$\frac{1}{(s-a)^n}$$

3.

$$\frac{e^{at}}{(s-a)^n}$$

4.

Correct Answer :-

$$\frac{1}{(s+a)^n}$$

•

48) The inverse Laplace transform of $\left\{ \frac{1}{(8s-27)^{1/3}} \right\} =$

[Question ID = 23977]

$$\frac{e^{(3/2)t} t^{-2/3}}{\Gamma\left(\frac{1}{3}\right)}$$

1.

$$\frac{e^{(8/27)t} t^{-3/2}}{2\Gamma\left(\frac{1}{3}\right)}$$

2.

$$\frac{e^{(2/3)t} t^{-3/2}}{2\Gamma\left(\frac{1}{3}\right)}$$

3.

$$\frac{e^{(27/8)t} t^{-2/3}}{2\Gamma\left(\frac{1}{3}\right)}$$

4.

Correct Answer :-

$$\frac{e^{(27/8)t} t^{-2/3}}{2\Gamma\left(\frac{1}{3}\right)}$$

49)

$$\text{If } f(x) = \begin{cases} 0 & ; -\pi \leq x \leq 0 \\ \sin x & ; 0 \leq x \leq \pi \end{cases}, \quad f(x+2\pi) = f(x) \text{ and}$$

$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx), \text{ then } a_0 =$$

[Question ID = 23978]

1. $\frac{1}{\pi}$

2. 1

3. 0

4. $\frac{2}{\pi}$

Correct Answer :-

• $\frac{2}{\pi}$

50)

$$\text{The inverse Laplace transform of } \left\{ \frac{s+3}{s^2+6s+25} \right\} =$$

[Question ID = 23979]

1. $e^{-3t} \cos 4t$

2. $e^{3t} \sin 4t$

3. $e^{3t} \cos 4t$

4. $e^{-3t} \cos 3t$

Correct Answer :-

• $e^{-3t} \cos 4t$

Topic:- Physics_set2

1) The physical quantity having the dimension $[ML^2T^{-3}]$ is

[Question ID = 34198]

1. work
2. power
3. pressure
4. impulse

Correct Answer :-

- power

2) Force F is given by $F=at +bt^2$ where t is time. The dimensions of a and b are

[Question ID = 34199]

1. $[MLT^{-3}]$ and $[MLT^{-4}]$
2. $[MLT^{-1}]$ and $[MLT^0]$
3. $[MLT^{-3}]$ and $[MLT^4]$
4. $[MLT^{-4}]$ and $[MLT^{-1}]$

Correct Answer :-

- $[MLT^{-3}]$ and $[MLT^{-4}]$

3)

The magnitudes of two vectors are 4 and 5 and their scalar product is 10. Then the angle between the two vectors is [Question ID = 34200]

1. 30°
2. 45°
3. 60°
4. 0°

Correct Answer :-

- 60°

4) If $\vec{a} + \vec{b} = \vec{c}$ and $\vec{a}^2 + \vec{b}^2 = \vec{c}^2$, then the angle between the vectors \vec{a} and \vec{b} is

[Question ID = 34201]

1. 0°
2. 20°
3. 45°
4. 90°

Correct Answer :-

- 90°

5)

\vec{a} and \vec{b} are two vectors and θ is the angle between them. If $|\vec{a} \times \vec{b}| = \sqrt{3} (\vec{a} \cdot \vec{b})$, the value of θ is

[Question ID = 34202]

1. 30°
2. 45°

3. 60°

4. 90°

Correct Answer :-

• 30°

6) A body under action of five forces can be in equilibrium [Question ID = 34203]

1. if all forces are equal
2. sum of resolved components along x-axis is zero
3. sum of resolved components along y-axis is zero
4. sum of resolved components along x-axis and y-axis, individually zero

Correct Answer :-

- sum of resolved components along x-axis and y-axis, individually zero

7) Two vibrating systems are said to be in resonance, if their [Question ID = 34204]

1. amplitudes are equal
2. temperatures are equal
3. frequencies are equal
4. phase values are equal

Correct Answer :-

- frequencies are equal

8)

A balloon is ascending at the rate of 9.8 ms^{-1} at a height of 39.2 m above the ground when a food packet is dropped from the balloon. The velocity with which the food packet reach the ground is

[Question ID = 34205]

1. $- 9.8 \text{ ms}^{-1}$

2. $- 58.8 \text{ ms}^{-1}$

3. $- 4.9 \text{ ms}^{-1}$

4. $- 29.4 \text{ ms}^{-1}$

Correct Answer :-

• -29.4 ms^{-1}

9) The walls of hall built for music concerts should [Question ID = 34206]

1. amplify sound
2. reflect sound
3. transmit sound
4. absorb sound

Correct Answer :-

- absorb sound

10) When a star approaches the earth , the waves are shifted towards [Question ID = 34207]

1. green colour
2. yellow colour
3. blue end
4. red end

Correct Answer :-

- blue end

11)

A body of mass m is placed on a rough surface with coefficient of friction μ inclined at θ . If the mass is in equilibrium, then the value of θ is

[Question ID = 34208]

1. $\text{Tan}^{-1}\mu$
2. $\text{Tan}^{-1}(1/\mu)$
3. $\text{Tan}^{-1}(m/\mu)$
4. $\text{Tan}^{-1}(\mu/m)$

Correct Answer :-

- $\text{Tan}^{-1}\mu$

12)

If water falls from a dam into a turbine wheel 19.6 m below, then the velocity of water at the turbine is (given $g=9.8 \text{ ms}^{-2}$)

[Question ID = 34209]

1. 9.8 ms^{-1}
2. 19.6 ms^{-1}
3. 39.2 ms^{-1}
4. 98 ms^{-1}

Correct Answer :-

- 19.6 ms^{-1}

13) Two springs of spring constants 1000 N/m and 1500 N/m respectively are stretched with a same force. Their potential energies will be in the ratio of

[Question ID = 34210]

1. 2:3
2. 1:3
3. 3:2
4. 2:1

Correct Answer :-

- 3:2

14) The mass of a body at the centre of earth is

[Question ID = 34211]

1. less than that at the surface
2. remain constant
3. more than that at the surface
4. zero

Correct Answer :-

- remain constant

15)

The maximum velocity of a particle executing simple harmonic motion with an amplitude 7 mm is 4.4 ms^{-1} . The period of oscillation is

[Question ID = 34212]

1. 0.01 s
2. 0.1 s
3. 10 s
4. 100 s

Correct Answer :-

- 0.01 s

16) In a simple harmonic oscillator, at the mean position [Question ID = 34213]

1. both kinetic energy and potential energies are minimum
2. kinetic energy is maximum, potential energy is minimum
3. kinetic energy is minimum, potential energy is maximum
4. both kinetic energy and potential energies are maximum

Correct Answer :-

- kinetic energy is maximum, potential energy is minimum

17) The intensity of sound produced by thunder is 0.1 Wm^{-2} . The intensity level in decibels is

[Question ID = 34214]

1. 110 dB
2. 100 dB
3. 90 dB
4. 140 dB

Correct Answer :-

- 110 dB

18) A classroom has dimensions $20 \times 15 \times 5 \text{ m}^3$. The reverberation time is 3.5 s. The average absorption coefficient is

[Question ID = 34215]

1. 0.05
2. 0.09
3. 0.03
4. 0.07

Correct Answer :-

- 0.07

19) Which of the following is not a characteristic of musical sound? [Question ID = 34216]

1. pitch
2. loudness
3. frequency
4. quality

Correct Answer :-

- frequency

20) In a simple harmonic motion, the particle is [Question ID = 34217]

1. always accelerated
2. alternately accelerated and retarded
3. always retarded
4. neither accelerated nor retarded

Correct Answer :-

- alternately accelerated and retarded

21)

100 g of water is heated from 30°C to 50°C. Ignoring the slight expansion of water, the change in its internal energy is (specific heat of water is 4200 J kg⁻¹K⁻¹)

[Question ID = 34218]

1. 4.2 kJ
2. 84 kJ
3. 2.1 kJ
4. 8.4 kJ

Correct Answer :-

- 8.4 kJ

22) Which of the following is correct [Question ID = 34219]

1. $(T_1/H_2) + (T_2/H_1) = 0$
2. $(H_1/T_1) = (H_2/T_2)$
3. $H_1 T_1 = H_2 T_2$
4. $H_1 T_1 + H_2 T_2 = 0$

Correct Answer :-

• $(H_1/T_1) = (H_2/T_2)$

23) An ideal gas in a cylinder is compressed adiabatically to one-third its original volume. During the process 50J of work is done on the gas by the compressing agent. The change in the internal energy of the gas in the process is [Question ID = 34220]

1. 50 J
2. 50/3 J
3. 150 J
4. 45 J

Correct Answer :-

- 50 J

24) The maximum kinetic energy of photoelectrons ejected from a potassium surface by ultraviolet light of wavelength 200 nm is (photoelectric threshold wavelength for potassium is 440 nm) [Question ID = 34221]

1. 2.82 eV
2. 4.40 eV
3. 6.20 eV
4. 3.38 eV

Correct Answer :-

- 3.38 eV

25)

For a light wave to undergo total internal reflection (' i_c ' is critical angle, ' i ' is incident angle)

[Question ID = 34222]

1. light moves from rarer to denser medium and $i > i_c$
2. light moves from denser to rarer medium and $i > i_c$
3. light moves from rarer to denser medium and $i < i_c$
4. light moves from denser to rarer medium and $i < i_c$

Correct Answer :-

- light moves from denser to rarer medium and $i > i_c$

Topic:- Chemistry_Set2

1) For an f-orbital, the values of 'm' are [Question ID = 23999]

1. -1, 0, +1
2. -3, -2, -1, 0, +1, +2, +3
3. 0, +1, +2, +3
4. -2, -1, 0, +1, +2

Correct Answer :-

- -3, -2, -1, 0, +1, +2, +3

2) Among LiCl, BeCl₂, BCl₃ and CCl₄, the covalent character follows the order:

[Question ID = 24000]

1. LiCl > BeCl₂ > BCl₃ > CCl₄
2. LiCl < BeCl₂ < BCl₃ < CCl₄
3. LiCl > BeCl₂ < BCl₃ > CCl₄
4. LiCl < BeCl₂ < BCl₃ > CCl₄

Correct Answer :-

- LiCl < BeCl₂ < BCl₃ < CCl₄

3) Lowest oxidation state in its compound is exhibited by

[Question ID = 24001]

1. N
2. O
3. C
4. F

Correct Answer :-

- F

4) Which of the following contains ionic, covalent and coordinate covalent bonds

[Question ID = 24002]

1. NH₄Cl
2. K₃[Fe(CN)₆]
3. CuSO₄
4. NH₄Cl, CuSO₄ and K₃[Fe(CN)₆]

Correct Answer :-

- NH_4Cl , CuSO_4 and $\text{K}_3[\text{Fe}(\text{CN})_6]$

5) Molarity of 4% (W/V) solution of NaOH is [Question ID = 24003]

1. 0.1
2. 0.5
3. 0.001
4. 1

Correct Answer :-

- 1

6) The weight of $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ required to prepare 500mL of 0.2 N solution is

[Question ID = 24004]

1. 1.26 g
2. 6.3g
3. 1.575g
4. 3.15g

Correct Answer :-

- 6.3g

7) The conjugate base of hydrogen molecule is [Question ID = 24005]

1. Electron
2. Hydride ion
3. Proton
4. Hydroxide ion

Correct Answer :-

- Hydride ion

8) p^{H} of a solution is 1. It is diluted by 1×10^3 times. The p^{H} of the resulting solution will be

[Question ID = 24006]

1. 1
2. 3
3. 4
4. 5

Correct Answer :-

- 4

9) Which of the following is a basic flux

[Question ID = 24007]

1. $\text{Na}_2\text{B}_4\text{O}_7$

2. **CaO**

3. SiO_2

4. P_2O_5

Correct Answer :-

- **CaO**

10) Roasting of a metal oxide is carried out in which of the following furnaces

[Question ID = 24008]

1. Blast furnace

2. Reverberatory furnace

3. Both reverberatory furnace and blast furnace

4. Muffle furnace

Correct Answer :-

- Reverberatory furnace

11) Three faradays of electricity was passed through an aqueous solution of Ferrous chloride. The weight of iron metal (at $Wt = 56$) deposited at the cathode in grams is [Question ID = 24009]

1. 56

2. 84

3. 112

4. 168

Correct Answer :-

- 84

12) Which one of the following could not be liberated from a suitable electrolyte by the passage of 0.25 Faraday of electricity through the electrolyte

[Question ID = 24010]

1. 0.25 mole of Ag

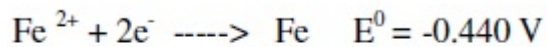
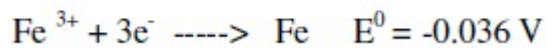
2. 16 gms of Cu

3. 2gms of O₂ (g)
4. 2.8 lit of H₂ at STP

Correct Answer :-

- 16 gms of Cu

13) Given standard electrode potentials



The standard electrode potential E⁰ for Fe³⁺ + e⁻ ----> Fe²⁺ is

[Question ID = 24011]

1. 0.476 V
2. -0.404 V
3. 0.40 V
4. 0.772 V

Correct Answer :-

- 0.772 V

14) Water acts as an excellent solvent, due to which property among the following:

[Question ID = 24012]

1. High viscosity
2. High Enthalpy of formation
3. High dielectric constant
4. High density

Correct Answer :-

- High dielectric constant

15) A sample of water has Mg(HCO₃)₂ = 73 mg/L, Ca(HCO₃)₂ = 162 mg/L, MgCl₂ = 95 mg/L and CaSO₄ = 136 mg/L. Temporary hardness in ppm is

[Question ID = 24013]

1. 150

2. 350

3. 500

4. 200

Correct Answer :-

- 150

16) The process which removes all ionic, colloidal and high molecular weight organic matter in water is [Question ID = 24014]

1. Ion exchange process
2. zeolite process
3. Reverse osmosis
4. Lime soda process

Correct Answer :-

- Reverse osmosis

17) The monomer used in PVC preparation is [Question ID = 24015]

1. Ethene
2. Chloroethene
3. Dichloroethene
4. Tetrachloroethene

Correct Answer :-

- Chloroethene

18) The chemical used for accelerating Vulcanization is [Question ID = 24016]

1. ZnO
2. SiO₂
3. Sulphur
4. Zinc stearate

Correct Answer :-

- Sulphur

19) Which one of the following type of forces are present in Nylon-6,6 [Question ID = 24017]

1. Electrostatic forces of attraction
2. Hydrogen bonding
3. Three dimensional network of bonds
4. Metallic bonding

Correct Answer :-

- Hydrogen bonding

20) Which one of the following is a primary pollutant

[Question ID = 24018]

1. **CO**
2. **PAN**
3. **Aldehyde**

4. H_2SO_4

Correct Answer :-

- **CO**

21) Ozone layer of upper atmosphere is being destroyed by

[Question ID = 24019]

1. Photochemical oxidants like O_2 and CO_2

2. **Chloro fluorocarbon**
3. **Smog**

4. SO_2

Correct Answer :-

- **Chloro fluorocarbon**

22) Eutrophication causes reduction in [Question ID = 24020]

1. Dissolved salts
2. Dissolved hydrogen
3. Dissolved oxygen
4. Dissolved solids

Correct Answer :-

- Dissolved oxygen

23) Which one of the chemical substance is maximum in natural gas [Question ID = 24021]

1. CH_4

2. C_2H_6

3. H_2

4. $\text{CO} + \text{CO}_2$

Correct Answer :-

• CH_4

24) Which one of the following metals could provide cathodic protection to iron [Question ID = 24022]

1. Cu and Ni
2. Zn and Cu
3. Al and Zn
4. Al, Zn and Ni

Correct Answer :-

• Al and Zn

25) Rusting of iron is catalysed by which of the following

[Question ID = 24023]

1. **Fe**

2. **Zn**

3. O_2

4. H^+

Correct Answer :-

• H^+

Topic:- Chem_Engg_Set2

1) The reversible hydrogen electrode potential is given by: [Question ID = 13067]

1. $E_H = 0.0592 \text{ pH}$
2. $E_H = 0.0592 \text{ pOH}$
3. $E_H = - 0.0592 \text{ pH}$
4. $E_H = - 0.0592 \text{ pOH}$

Correct Answer :-

- $E_H = - 0.0592 \text{ pH}$

2) Presence of manganese in alloy steel improves its: [Question ID = 13068]

1. corrosion resistance
2. cutting ability
3. abrasion resistance and toughness
4. elasticity and creep resistance

Correct Answer :-

- abrasion resistance and toughness

3) Hydrochloric acid is stored in: [Question ID = 13069]

1. lead lined steel vessel
2. rubber lined steel vessel
3. stainless steel
4. cast iron vessel

Correct Answer :-

- rubber lined steel vessel

4) Bronze is an alloy of: [Question ID = 13070]

1. lead and copper
2. copper and tin
3. nickel and copper
4. copper and zinc

Correct Answer :-

- copper and tin

5) Chalcopyrite is an ore of: [Question ID = 13071]

1. lead
2. aluminium
3. copper
4. zinc

Correct Answer :-

- copper

6) Copper, iron, cobalt, nickel are examples of metals that form oxide films of a _____ type on their surfaces at room temperature: [Question ID = 13072]

1. linear
2. parabolic
3. logarithmic
4. cubic

Correct Answer :-

- parabolic

7) The weight percent of toluene in an equimolar solution of benzene-toluene is: [Question ID = 13073]

1. 50%
2. 46%
3. 54%
4. 75%

Correct Answer :-

- 54%

8) The point representing composition where extract and raffinate phases become mutually soluble is called: [Question ID = 13074]

1. boiling point
2. plait point
3. critical point
4. tripple point

Correct Answer :-

- plait point

9) A producer gas has the following composition by volume:

CO : 22% ; CO₂ : 5.5% ; O₂ : 0.5% ; N₂ : 72%

If the combustion is 96% complete, the moles of CO in products are:

[Question ID = 13075]

1. 21.12
2. 10.56
3. 0.88
4. 0.44

Correct Answer :-

- 0.88

10) _____ have lowest hydrogen content. [Question ID = 13076]

1. paraffins
2. naphthenes
3. olefins
4. aromatics

Correct Answer :-

- aromatics

11) Consider the four types of coals, namely, anthracite, semi-anthracite, semi-bituminous, bituminous. Write them in the increasing order of fuel ratio: [Question ID = 13077]

1. anthracite, semi-anthracite, semi-bituminous, bituminous
2. semi-anthracite, anthracite, semi-bituminous, bituminous
3. bituminous, semi-bituminous, semi-anthracite, anthracite
4. semi-bituminous, bituminous, semi-anthracite, anthracite

Correct Answer :-

- bituminous, semi-bituminous, semi-anthracite, anthracite

12) Consider the four gases: Ethylene, propylene, butylene, amylene. Write them in the increasing order of total heating value. [Question ID = 13078]

1. ethylene, propylene, butylene, amylene
2. amylene, butylene, propylene, ethylene
3. butylene, propylene, ethylene, amylene
4. amylene, ethylene, propylene, butylene

Correct Answer :-

- ethylene, propylene, butylene, amylene

13) Flue gas analysis is done using: [Question ID = 13079]

1. boiling point apparatus
2. othmer still
3. orsat apparatus
4. distillation unit

Correct Answer :-

- orsat apparatus

14) The mole fraction of N_2 in a mixture of N_2 and O_2 having an average molecular weight of 30.6 is:

[Question ID = 13080]

1. 0.3
2. 0.35

3. 0.4
4. 0.45

Correct Answer :-

- 0.35

15)

The partial pressure of ethanol in a hydrogen - ethanol mixture at 50 °C and 1 atm is 100 mm Hg. The vapor pressure of ethanol at 50 °C is 235 mm Hg. The relative saturation of ethanol is:

[Question ID = 13081]

1. 38.65
2. 42.55
3. 49.25
4. 51.45

Correct Answer :-

- 42.55

16) The density of a liquid is 1200 kg/m³. Its value in g/litre is:

[Question ID = 13082]

1. 1200
2. 120
3. 1.2
4. 12000

Correct Answer :-

- 1200

17) Which of the following is a detergent? [Question ID = 13083]

1. fatty alcohol
2. alkyl benzene sulphonate
3. fatty acids
4. methylene chloride

Correct Answer :-

- alkyl benzene sulphonate

18) The main product of high temperature carbonization is: [Question ID = 13084]

1. coke
2. ammonia
3. tar
4. phenol

Correct Answer :-

- coke

19) Poly vinyl chloride is: [Question ID = 13085]

1. thermosetting
2. thermoplastic
3. a fibrous material
4. chemically active

Correct Answer :-

- thermoplastic

20) Nylon 6-6 is manufactured from: [Question ID = 13086]

1. hexamethylene diamine and adipic acid
2. hexamethylene diamine and maleic anhydride
3. caprolactum
4. dimethyl terephthalate and ethylene glycol

Correct Answer :-

- hexamethylene diamine and adipic acid

21) Salt is added in the kettle during soap manufacture to separate: [Question ID = 13087]

1. soap from lye
2. glycerine from lye
3. the metallic soap
4. the unsaponified fat from soap

Correct Answer :-

- soap from lye

22) The most economical pulp for production of news print would be: [Question ID = 13088]

1. groundwood pulp
2. sulphate pulp
3. sulphite pulp
4. semi-chemical pulp

Correct Answer :-

- groundwood pulp

23) Teflon is: [Question ID = 13089]

1. phenol formaldehyde
2. an inorganic polymer
3. poly tetraflouroethylene (PTFE)
4. a monomer

Correct Answer :-

- poly tetraflouroethylene (PTFE)

24) Oil is : [Question ID = 13090]

1. a mixture of esters
2. a mixture of glycerides of fatty acids
3. solid at normal temperature
4. esters of alcohols other than glycerin

Correct Answer :-

- a mixture of glycerides of fatty acids

25) Widely used method for conditioning of boiler feed water is: [Question ID = 13091]

1. cold lime soda process
2. coagulation
3. hot lime soda process
4. sequestration

Correct Answer :-

- hot lime soda process

26) Carborundum consists mainly of: [Question ID = 13092]

1. bauxite
2. silicon carbide
3. boron carbide
4. calcium carbide

Correct Answer :-

- silicon carbide

27) Which of the following is an yellow pigment? [Question ID = 13093]

1. titanium dioxide
2. ferrous sulphate
3. lead chromates
4. zinc sulphides

Correct Answer :-

- lead chromates

28) Sulphuric acid is used mainly in: [Question ID = 13094]

1. fertiliser industry
2. steel industry
3. paper making
4. paint industry

Correct Answer :-

- fertiliser industry

29) In the production of soda ash by Solvay process, the by-product formed is:

[Question ID = 13095]

1. CaCl_2
2. NH_4Cl
3. NH_3
4. **NaOH**

Correct Answer :-

- CaCl_2

30) Triple superphosphate is made by reacting phosphate rock with: [Question ID = 13096]

1. phosphoric acid
2. nitric acid
3. sulphuric acid
4. hydrochloric acid

Correct Answer :-

- phosphoric acid

31) The most adverse factor challenging the mercury electrolytic cell process for the manufacture of caustic soda is: [Question ID = 13097]

1. high cost of mercury
2. high specific gravity of mercury
3. non-availability of mercury of high purity
4. pollution of water stream by mercury

Correct Answer :-

- pollution of water stream by mercury

32) Which of the following contains least amount of nitrogen? [Question ID = 13098]

1. coke oven gas
2. blast furnace gas
3. producer gas
4. water gas

Correct Answer :-

- coke oven gas

33) A liquid which does not flow at all, till a threshold shear stress is attained is: [Question ID = 13099]

1. pseudoplastic
2. bingham plastic

3. dilatant
4. rheopectic

Correct Answer :-

- bingham plastic

34) For a pump, the relation between inlet pressure, vapor pressure and NPSH is: [Question ID = 13100]

1. inlet pressure = vapor pressure + NPSH
2. inlet pressure = vapor pressure - NPSH
3. inlet pressure = vaor pressure X NPSH
4. inlet pressure = vapor pressure/NPSH

Correct Answer :-

- inlet pressure = vapor pressure + NPSH

35) A jet ejector is a: [Question ID = 13101]

1. compressor
2. blower
3. vacuum pump
4. positive displacement pump

Correct Answer :-

- vacuum pump

36) In the Stokes law regime, drag coefficient, C_D is given by:

[Question ID = 13102]

1. $C_D = 16/Re_p$
2. $C_D = 24/Re_p$
3. $C_D = 18.5/Re_p$
4. $C_D = 0.079/Re_p^{0.25}$

Correct Answer :-

- $C_D = 24/Re_p$

37) Check valves are used: [Question ID = 13103]

1. at high pressure
2. in bends

3. for controlling water flow
4. for unidirectional flow

Correct Answer :-

- for unidirectional flow

38) For pumping slurry, one can use a pump of the type: [Question ID = 13104]

1. reciprocating
2. diaphragm
3. centrifugal
4. pneumatic

Correct Answer :-

- diaphragm

39) Assuming the flow to be laminar, if the diameter of the pipe is halved then the pressure drop will: [Question ID = 13105]

1. increase
2. decrease
3. remain same
4. be quadrupled

Correct Answer :-

- increase

40) Which of the following is not a dimensionless parameter? [Question ID = 13106]

1. pressure coefficient
2. Froude number
3. kinematic viscosity
4. Weber number

Correct Answer :-

- kinematic viscosity

41) Thermal conductivity of a liquid decreases with increase in temperature due to: [Question ID = 13107]

1. decrease in density
2. increase in density
3. decrease in viscosity
4. increase in viscosity

Correct Answer :-

- decrease in density

42) A composite flat wall of a furnace is made of two materials, A and B. The thermal conductivity of A is twice that of B, while the thickness of layer A is half of that of B. If the temperatures at the

two sides of the walls are 600 K and 1400 K, then the temperature drop (in K) across the material A is:

[Question ID = 13108]

1. 130
2. 140
3. 150
4. 160

Correct Answer :-

- 160

43) Grashof number is the ratio of: [Question ID = 13109]

1. buoyancy to viscous force
2. buoyancy to inertia force
3. buoyancy to gravity force
4. buoyancy to surface tension force

Correct Answer :-

- buoyancy to viscous force

44) Peclet number in heat transfer is a product of: [Question ID = 13110]

1. Reynolds number and Prandtl number
2. Nusselt number and Prandtl number
3. Stanton number and Prandtl number
4. Grashof number and Prandtl number

Correct Answer :-

- Reynolds number and Prandtl number

45) Unsteady state heat conduction occurs when: [Question ID = 13111]

1. temperature distribution is independent of time
2. temperature distribution varies with time
3. heat flows in one direction only
4. three dimensional heat flow occurs

Correct Answer :-

- temperature distribution varies with time

46) Pick the correct statement: [Question ID = 13112]

1. Rate = driving force X resistance
2. Driving force = rate X resistance
3. Resistance = driving force X rate
4. Rate = resistance / driving force

Correct Answer :-

- Driving force = rate X resistance

47) Maximum heat transfer rate is obtained in: [Question ID = 13113]

1. laminar flow
2. turbulent flow
3. creeping flow
4. transition region

Correct Answer :-

- turbulent flow

48) The heat transfer coefficient in film type condensation is: [Question ID = 13114]

1. higher than that for dropwise condensation
2. lower than that for dropwise condensation
3. same as that for dropwise condensation
4. half that of dropwise condensation

Correct Answer :-

- lower than that for dropwise condensation

49) The energy radiated from a surface, Q at absolute temperature, T is related as: [Question ID = 13115]

1. $Q \propto T^2$

1.

2. $Q \propto T^4$

2.

3. $Q \propto T^3$

3.

4. $Q \propto T^{1.5}$

4.

Correct Answer :-

• $Q \propto T^4$

50) In a feed forward multiple effect evaporator, the pressure is: [Question ID = 13116]

1. highest in last effect
2. lowest in last effect
3. same in all effects
4. dependent on the number of effects

Correct Answer :-

- lowest in last effect

51) The critical speed of a ball mill depends on: [Question ID = 13117]

1. the density of the feed material
2. the size of the feed
3. the diameter of the ball
4. the length of the ball

Correct Answer :-

- the diameter of the ball

52) The overall efficiency of a cyclone is primarily a function of: [Question ID = 13118]

1. average particle size of the feed
2. particle density of feed
3. radial velocity of the fluid
4. particle size distribution of the feed

Correct Answer :-

- particle size distribution of the feed

53) Dust laden air can be purified using: [Question ID = 13119]

1. cyclone separator
2. bag filter
3. gravity settler
4. tubular centrifuge

Correct Answer :-

- cyclone separator

54) Ultrafine grinders operate by: [Question ID = 13120]

1. slow compression
2. impact
3. attrition
4. cutting action

Correct Answer :-

- attrition

55) Most efficient equipment for removal of sub-micron dust particles from blast furnace gas is: [Question ID = 13121]

1. venturi atomiser
2. gravity settling chamber
3. electro-static precipitator
4. cyclone separator

Correct Answer :-

- electro-static precipitator

56) Traces of solids are removed from a liquid in a: [Question ID = 13122]

1. classifier
2. clarifier
3. sparkler filter
4. rotary vacuum filter

Correct Answer :-

- clarifier

57) For preliminary breaking of hard rock, we use: [Question ID = 13123]

1. gyratory crusher
2. ball mill
3. tube mill
4. squirrel cage disintegrator

Correct Answer :-

- gyratory crusher

58) For the removal of large amount of solids from liquid, the recommended device is: [Question ID = 13124]

1. cross flow filter
2. cake filter
3. clarifying filter
4. screens

Correct Answer :-

- cake filter

59) Roasting of ores is a: [Question ID = 13125]

1. homogeneous catalytic reaction
2. homogeneous non-catalytic reaction
3. heterogeneous catalytic reaction
4. heterogeneous non-catalytic reaction

Correct Answer :-

- heterogeneous non-catalytic reaction

60) According to half life method, a plot of $\log(t_{1/2})$ vs $\log C_{A0}$ gives a straight line of slope:

[Question ID = 13126]

1. (n-1)
2. (1-n)
3. n
4. 1/n

Correct Answer :-

- (1-n)

61) As the number of mixed flow reactors in series tends to infinity, the behaviour of the system tends to: [Question ID = 13127]

1. plug flow
2. mixed flow
3. dispersed plug flow
4. segregated flow

Correct Answer :-

- plug flow

62) For a steady state mixed flow reactor, the material balance is: [Question ID = 13128]

1. input = output + disappearance + accumulation
2. 0 = output + disappearance + accumulation
3. input = disappearance + accumulation
4. input = output + disappearance

Correct Answer :-

- input = output + disappearance

63) For a gas obeying the equation, $Z = 1 + (BP/RT)$, the residual volume is given by: [Question ID = 13129]

1. B
2. B/RT
3. RT/B
4. BRT

Correct Answer :-

- B

64) In refrigerators, expansion through throttle valve occurs at: [Question ID = 13130]

1. constant entropy
2. constant enthalpy
3. constant temperature
4. constant pressure

Correct Answer :-

- constant enthalpy

65) Trichlorotrifluoroethane is represented as: [Question ID = 13131]

1. R-114
2. R-113
3. R-112
4. R-111

Correct Answer :-

- R-113

66) In the two phase region of liquid and vapour, the H-S diagram is: [Question ID = 13132]

1. linear
2. nonlinear
3. vertical
4. horizontal

Correct Answer :-

- linear

67) Consider the quaternary system of components L, M, N and P in the decreasing order of their volatilities. In differential distillation of the mixture, the second cut contains mainly component: [Question ID = 13133]

1. L
2. M
3. N
4. P

Correct Answer :-

- M

68) For a binary non-ideal solution of components 1 and 2 with activity coefficients, γ_1 and γ_2 , relative volatility is given by:

[Question ID = 13134]

$$\frac{\gamma_2 P_2^{\text{Sat}}}{\gamma_1 P_1^{\text{Sat}}}$$

1.

$$\frac{\gamma_1 P_1^{\text{Sat}}}{\gamma_2 P_2^{\text{Sat}}}$$

2.

$$\frac{\gamma_2 P_1^{\text{Sat}}}{\gamma_1 P_2^{\text{Sat}}}$$

3.

$$\frac{\gamma_1 P_2^{\text{Sat}}}{\gamma_2 P_1^{\text{Sat}}}$$

4.

Correct Answer :-

$$\frac{Y_1 P_1^{\text{Sat}}}{Y_2 P_2^{\text{Sat}}}$$

69) In a distillation operation with a feed flow rate of 200 moles/h and with q-value of 1.08 and when the liquid flow rate in the enriching section being 75 mole/h, the liquid flow rate in the stripping section is: [Question ID = 13135]

1. 291 moles/h
2. 141 moles/h
3. 183 moles/h
4. 33 moles/h

Correct Answer :-

- 291 moles/h

70) A wet solid has a moisture content of 70%. The moisture content on dry basis is: [Question ID = 13136]

1. 0.21
2. 1.19
3. 0.412
4. 2.33

Correct Answer :-

- 2.33

71) Potato slurry is dried in a _____ to give potato flakes: [Question ID = 13137]

1. tray dryer
2. fluidized bed dryer
3. spray dryer
4. drum dryer

Correct Answer :-

- drum dryer

72) Tannin is removed from tree barks by _____ with water: [Question ID = 13138]

1. absorption
2. extraction
3. leaching
4. distillation

Correct Answer :-

- leaching

73) In gas absorption, if x is the mole fraction of the solute, the non-volatile solvent rate, L_S is given by _____:

[Question ID = 13139]

1. $L(1-x)$
2. $L/(1-x)$
3. $L(1+x)$
4. $L/(1+x)$

Correct Answer :-

- $L(1-x)$

74) In triangular coordinate system representing liquid-liquid extraction data, any point inside the triangle represents a _____ : [Question ID = 13140]

1. binary system
2. ternary system
3. pure component
4. quaternary system

Correct Answer :-

- ternary system

75) Lewis number is related to Prandtl number (Pr) and Schmidt number (Sc) as: [Question ID = 13141]

1. $Sc \times Pr$
2. Sc / Pr
3. Pr / Sc
4. $1 / (Pr \times Sc)$

Correct Answer :-

- Sc / Pr

76) The diffusivity, D of a binary gas mixture is related to temperature, T as: [Question ID = 13142]

1. $D \propto T$

2. $D \propto T^{0.5}$

3. $D \propto T^{1.5}$

4. $D \propto T^2$

Correct Answer :-

• $D \propto T^{1.5}$

77) Steam distillation is used to : [Question ID = 13143]

1. reduce the number of plates
2. avoid thermal decomposition of a component
3. increase the efficiency of separation
4. increase the total pressure of distillation

Correct Answer :-

- avoid thermal decomposition of a component

78) Among the following, for a given set of conditions, the pressure drop is least in: [Question ID = 13144]

1. wetted wall tower
2. bubble cap tower
3. perforated tray tower
4. packed tower

Correct Answer :-

- wetted wall tower

79) As damping coefficient increases, for $\xi < 1$, the response of a second order system becomes:

[Question ID = 13145]

1. more and more oscillatory
2. more and more less oscillatory
3. sustained oscillatory
4. non-oscillatory

Correct Answer :-

- more and more less oscillatory

80) Reset rate is: [Question ID = 13146]

1. variation of integral time
2. variation of proportional gain
3. reciprocal of proportional gain
4. reciprocal of integral time

Correct Answer :-

- reciprocal of integral time

81) The controlled variable is returned fast to the original value without oscillations in a: [Question ID = 13147]

1. proportional controller
2. integral controller
3. PI controller
4. PID controller

Correct Answer :-

- PID controller

82) For a system with transportation lag, the response to a forcing function, $X = A \sin\omega t$ is given by:

[Question ID = 13148]

$$Y = A \sin\omega t$$

1.

$$Y = A \sin\omega(t+\tau)$$

2.

$$Y = A \sin\omega(t-\tau)$$

3.

$$Y = A \sin\omega\tau$$

4.

Correct Answer :-

$$Y = A \sin\omega(t-\tau)$$

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83) For accurate measurement of temperature of a molten metal at 1500°C , the measuring device used is:

[Question ID = 13149]

1. resistance thermometer
2. thermocouple
3. bimetallic thermometer
4. optical pyrometer

Correct Answer :-

- optical pyrometer

84) Psychrometer determines: [Question ID = 13150]

1. humidity of gases

2. moisture content of solids
3. water of crystallization
4. hygroscopic nature of solids

Correct Answer :-

- humidity of gases

85) Out of the following flow measuring instruments, which is area meter? [Question ID = 13151]

1. venturimeter
2. rotameter
3. pitot tube
4. hot wire anemometer

Correct Answer :-

- rotameter

86) The time constant of a first order system for a step input change is the time for system to reach: [Question ID = 13152]

1. 63.2% of its final value
2. 99.8% of its final value
3. 85.4% of its final value
4. 18.8% of its final value

Correct Answer :-

- 63.2% of its final value

87) Destruction of Ozone layer is due to: [Question ID = 13153]

1. chloroflorocarbons
2. methane
3. carbon dioxide
4. sulphur dioxide

Correct Answer :-

- chloroflorocarbons

88) Methaemoglobin anemia or The blue baby disease is due to high concentrations of _____ in drinking water: [Question ID = 13154]

1. sulphate
2. chloride
3. carbonate
4. nitrate

Correct Answer :-

- nitrate

89) Among the following metals that are of particular concern in industrial waste waters, the most aquatic pollutant is: [Question ID = 13155]

1. cadmium
2. mercury
3. lead
4. silver

Correct Answer :-

- mercury

90) Equipment operating with centrifugal force to separate particulate matter is: [Question ID = 13156]

1. electrostatic precipitator
2. mist eliminator
3. gravity settler
4. cyclone separator

Correct Answer :-

- cyclone separator

91) Venturi scrubber: [Question ID = 13157]

1. is used for flow measurement
2. is used to remove fine particles from dirty gas
3. is used to remove gaseous pollutant by chemical reaction
4. is used to remove gaseous pollutant by diffusion

Correct Answer :-

- is used to remove fine particles from dirty gas

92) Standard method to determine ammonia is: [Question ID = 13158]

1. Nessler method
2. colorimetric method
3. by using flame photometer
4. by using atomic absorption spectrophotometer

Correct Answer :-

- Nessler method

93) _____ is a primary method for wastewater treatment [Question ID = 13159]

1. biological treatment
2. sedimentation
3. solvent extraction
4. adsorption by activated carbon

Correct Answer :-

- sedimentation

94) Which of the following is a moderating material used in a nuclear reactor? [Question ID = 13160]

1. graphite
2. cadmium
3. Zircalloy
4. stainless steel

Correct Answer :-

- graphite

95) Pick the odd term out: [Question ID = 13161]

1. solar power
2. wind power
3. tidal power
4. thermal power

Correct Answer :-

- thermal power

96) Which of the following is most poisonous gas? [Question ID = 13162]

1. coke oven gas
2. producer gas
3. blast furnace gas
4. L. D. converter gas

Correct Answer :-

- L. D. converter gas

97) Fossil fuels mean: [Question ID = 13163]

1. solid fuels
2. liquid fuels
3. those which are found in the crust of the earth
4. premature fuels with low calorific value

Correct Answer :-

- those which are found in the crust of the earth

98) LPG used for household cooking comprises mainly of: [Question ID = 13164]

1. propane and butane
2. butane and ethane
3. methane and ethane
4. methane and carbon monoxide

Correct Answer :-

- propane and butane

99) A coal containing high amount of volatile matter will have: [Question ID = 13165]

1. low ignition temperature
2. very little ash content

3. high fusion point of its ash
4. low adiabatic flame temperature

Correct Answer :-

- low ignition temperature

100) With increase in carbonization temperature: [Question ID = 13166]

1. gas yield increases
2. tar yield increases
3. hydrogen percentage in coke oven gas decreases
4. methane percentage in coke oven gas decreases

Correct Answer :-

- gas yield increases