# Civil 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 $A^TBA=$

**[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 :-**

- $[5]$

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**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

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**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 :-**

- $x=1$

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**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)** $\dfrac{x^2}{x^2-3x+2}=$

**[Question ID = 13598]**

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

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 $Sin\theta+Cosec\theta=2$, then the value of $Sin^3\theta+Cosec^3\theta=$

**[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. $\sin(\frac{\theta}{2})$

**Correct Answer :-**

- $\frac{1}{\sqrt{2}}\sin\theta$

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**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 :-**

- $\frac{\pi}{2}$

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**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)** $\sec^2(\tan^{-1}3)+\cos ec^2(\cot^{-1}3)=$

**[Question ID = 13603]**

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

**Correct Answer :-**

- 20

**12)** $3Co\sec x=4Sinx \Rightarrow x=$

**[Question ID = 13604]**

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

**Correct Answer :-**

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

**13)** If $x=\log_e\left(5+\sqrt{26}\right)$, then $Sinhx=$

**[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. $\theta=30^0$
2. $\theta=45^0$
3. $\theta=60^0$
4. $\theta=15^0$

**Correct Answer :-**

• $\theta = 45^0$

**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)** $\lim_{x \to 0} \frac{8^x - 2^x}{x} =$

**[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. $(\sin x)^{\log x}\{\tan x.\log x+\log(\sin x)\}$

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

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

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

**Correct Answer :-**

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

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**24)**

If $y=\log\left(x+\sqrt{1+x^2}\right)$, 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 $x = aCos^3\theta$; $y = aSin^3\theta$ is

**[Question ID = 13617]**

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

**Correct Answer :-**

- 1

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**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 :-**

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

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**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 $x\frac{\partial u}{\partial y} + y\frac{\partial u}{\partial y} =$

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

**Correct Answer :-**

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

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

**[Question ID = 13624]**

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

**Correct Answer :-**

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

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**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 :-**

- $\sec x - \cos ecx$

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**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 :-**

- $e-1$

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**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

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**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 :-**

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

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

**[Question ID = 13631]**

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

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 :-**

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

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**40)** The solution of $Cosx\, dy = (Sinx - y)ydx$

**[Question ID = 13632]**

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

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

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

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

**Correct Answer :-**

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

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**41)** The solution of $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 5y = 0$ 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 :-**

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

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

**[Question ID = 13635]**

1. $y = c_1e^{2x} + c_2e^{3x} + e^x$

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]**

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

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

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

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

**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 $x(0) = 2; \quad x'(0) = 0$ 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]**

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

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

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

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

**Correct Answer :-**

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

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

**[Question ID = 23977]**

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

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

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

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

**Correct Answer :-**

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

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**49)**

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

$f(x)=\dfrac{a_0}{2}+\sum_{n=1}^{\infty}\left(a_n Cos\, nx + b_n Sin\, nx\right)$, then $a_0=$

**[Question ID = 23978]**

1. $\dfrac{1}{\pi}$
2. $1$
3. $0$
4. $\dfrac{2}{\pi}$

**Correct Answer :-**

- $\dfrac{2}{\pi}$

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**50)**

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

**[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 :-**

- $60°$

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

**[Question ID = 34201]**

1. $0°$
2. $20°$
3. $45°$
4. $90°$

**Correct Answer :-**

- $90°$

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**5)**

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

**[Question ID = 34202]**

1. $30°$
2. $45°$

3. $60°$

4. $90°$

**Correct Answer :-**

- $30°$

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**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

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**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

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

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

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

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

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

**Correct Answer :-**

- $Tan^{-1}\mu$

**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 $ms^{-2}$)

**[Question ID = 34209]**

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

**Correct Answer :-**

- $19.6\ ms^{-1}$

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**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

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**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 x 15 x 5 $m^3$. 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 $kg^{-1}K^{-1)}$

**[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, $BeCl_2$, $BCl_3$ and $CCl_4$, the covalent character follows the order:**

**[Question ID = 24000]**

1. $LiCl > BeCl_2 > BCl_3 > CCl_4$
2. $LiCl < BeCl_2 < BCl_3 < CCl_4$
3. $LiCl > BeCl_2 < BCl_3 > CCl_4$
4. $LiCl < BeCl_2 < BCl_3 > CCl_4$

**Correct Answer :-**

- $LiCl < BeCl_2 < BCl_3 < CCl_4$

**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. $NH_4Cl$
2. $K_3[Fe(CN)_6]$
3. $CuSO_4$
4. $NH_4Cl$, $CuSO_4$ and $K_3[Fe(CN)_6]$

**Correct Answer :-**

- $NH_4Cl$, $CuSO_4$ and $K_3[Fe(CN)_6]$

**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 $H_2C_2O_4.2H_2O$ 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 $1X\ 10^3$ 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. $Na_2B_4O_7$

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 reverbaratory 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 $O_2$ (g)

4. 2.8 lit of $H_2$ at STP

**Correct Answer :-**

- 16 gms of Cu

---

**13)** . Given standard electrode potentials

$Fe^{3+} + 3e^- \text{ -----> } Fe \quad E^0 = -0.036$ V

$Fe^{2+} + 2e^- \text{ -----> } Fe \quad E^0 = -0.440$ V

The standard electrode potential $E^0$ for $Fe^{3+} + e^- \text{ -----> } Fe^{2+}$ 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 Entholpy of formation

3. High dielectric constant

4. High density

**Correct Answer :-**

- High dielectric constant

---

**15) A sample of water has $Mg(HCO_3)_2$=73 mg/L, $Ca(HCO_3)_2$ = 162 mg/L, $MgCl_2$ = 95 mg/L and $CaSO_4$ = 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. $SiO_2$

3. Sulphur

4. Zinc sterate

**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. $CO+CO_2$

**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:- Civil_Engg_Set2

**1) Hooke's law states that the stress varies linearly with strain _____ [Question ID = 12667]**

1. Within the proportionality limit
2. Between the proportionality limit and yield limit
3. Between the yield limit and plastic limit
4. Between plastic limit and ultimate

**Correct Answer :-**

- Within the proportionality limit

**2) Number of independent stresses at a point in a two dimensional problem is ___ [Question ID = 12668]**

1. Two
2. Three
3. Six
4. Nine

**Correct Answer :-**

- Three

**3) For a steel bar having rectangular cross section (300 mm x 20 mm) the ratio of radius of gyration with respect to major axis of bending to that of minor axis of bending is _____ [Question ID = 12669]**

1. 300 x 20
2. $300 \div 20$
3. $300^2 + 20^2$
4. $300^3 + 20^3$

**Correct Answer :-**

- $300 \div 20$

**4) The shear force at any cross section of a beam subjected to uniform bending is __ [Question ID = 12670]**

1. Always zero
2. Proportional to bending moment
3. Equal to the square root of bending moment
4. Inversely proportional to the rate of bending moment

**Correct Answer :-**

- Always zero

**5) The Young's modulus is equal to Shear modulus for a material whose Poisson's ratio equal to _____ [Question ID = 12671]**

1. Zero
2. 0.2
3. 0.4
4. 0.5

**Correct Answer :-**

- 0.5

**6) The necessity of compatibility conditions arise in the analysis of [Question ID = 12672]**

1. Simply supported beams
2. Cantilever beams
3. Fixed beams
4. Simply supported overhanging beams

**Correct Answer :-**

- Fixed beams

**7)** Two bars of different cross sections (A1 and A2) but made of same material and having same length are subjected to the same tensile force. If the bars have unit elongation ($\Delta_A : \Delta_B$) in the ratio of 2 : 5, then the ratio of cross sections (A1 : A2) of the two bars will be

**[Question ID = 12673]**

1. 2 : 5
2. 5 : 2
3. 4 : 10
4. 1 : 2.5

**Correct Answer :-**

- 5 : 2

**8) The maximum number of reaction components at a hinged support is __ [Question ID = 12674]**

1. 1
2. 2
3. 3
4. 6

**Correct Answer :-**

- 2

**9) A beam of T-cross section is subjected to a shear force of 'F'. The minimum shear stress will occur at the [Question ID = 12675]**

1. Neutral Axis
2. Junction of Web and Flange
3. Bottom of the section
4. At one third depth below the top of the section

**Correct Answer :-**

- Bottom of the section

---

**10) A steel beam of cross section 10mm wide and 60mm depth is subjected to a bending moment of 60 kNm. The maximum bending stress produced in the cross section is _____ [Question ID = 12676]**

1. $10^5$ MPa
2. $10^4$ MPa
3. $10^3$ MPa
4. $10^2$ MPa

**Correct Answer :-**

- $10^4$ MPa

---

**11) A 10mm dia bar is subjected to a shear force of 31.4N. The maximum shear stress produced in the cross section is _____**

**[Question ID = 12677]**

1. 8/15 MPa
2. 15/8 MPa
3. 8 x 15 MPa
4. $8/15^2$ Mpa

**Correct Answer :-**

- 8/15 MPa

---

**12) A shaft is rotating at 60 r.p.m under a torque of 5kNm. The power transmitted by the shaft is [Question ID = 12678]**

1. 15.7 kW

2. 20.5 kW
3. 62.8 kW
4. 31.4 kW

**Correct Answer :-**

- 31.4 kW

**13) The strain energy stored by a shaft of length L, Modulus of rigidity G, Polar modulus of J and subjected to a torque of T is [Question ID = 12679]**

1. $0.5\ T^2\ L/GJ$

2. O.5 T L/GJ
3. TL/GJ

4. $T^2\ L/GJ$

**Correct Answer :-**

- $0.5\ T^2\ L/GJ$

**14) The angle between the principal plane and the maximum shear plane is [Question ID = 12680]**

1. $90^0$

2. $60^0$

3. $45^0$

4. $30^0$

**Correct Answer :-**

- $45^0$

**15) In a cantilever beam of length L and flexural rigidity EI, is subjected to a moment M at the free end. The maximum deflection at the free end of the cantilever is [Question ID = 12681]**

1. ML/EI

2. $ML^2/EI$

3. $ML^2/2EI$

4. M/LEI

**Correct Answer :-**

- $ML^2/2EI$

**16)** With reference to the stress-strain behaviour of mild steel:

**Assertion(A):** The stress at breaking is less than that at ultimate

**Reason(R):** The above statement refers to nominal stress but not true stress

**[Question ID = 12682]**

1. Both A and R are True and R is the correct explanation of A
2. Both A and R are True and R is not the correct explanation of A
3. A is true but R is false
4. A is false but R is true

**Correct Answer :-**

- Both A and R are True and R is the correct explanation of A

**17) The deflection of any simply supported beam with rectangular cross section, is [Question ID = 12683]**

1. Directly proportional to depth of the beam
2. Inversely proportional to the square of its depth
3. Inversely proportional to the cube of its depth
4. Directly proportional to width of the beam

**Correct Answer :-**

- Inversely proportional to the cube of its depth

**18) For a stable plane frame structure, number of members required, is [Question ID = 12684]**

1. Twice the number of joints
2. Equal to number of joints minus one
3. Twice the number of joints minus three
4. Twice the number of joints minus two

**Correct Answer :-**

- Twice the number of joints minus three

**19)**

Match the Group A with Group-B.

| | Group-A | | | Group-B |
|---|---|---|---|---|
| a) | Column with fixed ends | | 1. | Effective Length = L |
| b) | Column with hinged ends | | 2. | Effective Length = L/2 |
| c) | Column with one end fixed and other end hinged | | 3. | Effective Length = 2L |
| d) | Column with one end fixed and other end free | | 4. | Effective Length = L/ $\sqrt{2}$ |

**[Question ID = 12685]**

1. a-3, b-1, c-4, d-2
2. a-2, b-1,c-4, d-3
3. a-4, b-3, c-2,d-1
4. a-3, b-2, c-1, d-4

**Correct Answer :-**

- a-2, b-1,c-4, d-3

**20) A Cantilever beam is experiencing a maximum deflection of 15mm and maximum slope of 0.02 radians when it is subjected to UDL. Then the length of the cantilever beam is [Question ID = 12686]**

1. 500mm
2. 1000mm
3. 1500mm
4. 1200mm

**Correct Answer :-**

- 1000mm

**21) One of the following is not a mineral admixture. [Question ID = 12687]**

1. Flyash
2. Silicafume
3. Superplasticizer
4. Rice husk ash

**Correct Answer :-**

- Superplasticizer

**22) If the stirrup spacing is doubled then the shear capacity of the stirrups is [Question ID = 12688]**

1. Increased by two times
2. Reduced by half
3. Decreased by two times
4. No change

**Correct Answer :-**

- Reduced by half

**23)** Match the Group A with Group-B.

| | Group-A | | | Group-B |
|---|---|---|---|---|
| a) | Water cement ratio vs Strength of concrete | | 1. | Feret Rule |
| b) | Degree of compaction vs Strength of concrete | | 2. | Duff abraham |
| c) | Gel-Space ratio vs Strength of Concrete | | 3. | Joseph Aspdin |
| d) | Invention of Portland cement | | 4. | Powers Rule |

**[Question ID = 12689]**

1. a-3, b-1, c-4, d-2
2. a-2, b-1,c-4, d-3
3. a-4, b-3, c-2,d-1
4. a-3, b-2, c-1, d-4

**Correct Answer :-**

- a-2, b-1,c-4, d-3

**24) Hydration of Cement is _____ in nature**

**[Question ID = 12690]**

1. Exothermic
2. Endothermic
3. Hydrophobic
4. Inert

**Correct Answer :-**

- Exothermic

**25) The autoclave test is performed on cement to determine _____ [Question ID = 12691]**

1. Soundness
2. Normal Consistency
3. Heat of Hydration
4. Chemical composition

**Correct Answer :-**

- Soundness

**26) The limiting depth of neutral axis in a Reinforced Concrete section in which the tensile steel used has a yield strength of 500 MPa is _____, if d=effective depth of the section. [Question ID = 12692]**

1. 0.53d
2. 0.48d
3. 0.46d
4. 0.33d

**Correct Answer :-**

- 0.46d

**27) The change in Limiting moment of resistance of an RC section if the width is doubled and effective depth is reduced by half is _____ [Question ID = 12693]**

1. Reduced by half
2. Reduced by one third
3. Increased by two times
4. Remains same

**Correct Answer :-**

- Reduced by half

**28)**

With reference to the design of rectangular slab which is simply supported along the two short edges and long edges are free

**Assertion(A):** The distribution steel is provided parallel to the short span
**Reason(R):** To distribute the secondary stresses

**[Question ID = 12694]**

1. Both A and R are True and R is the correct explanation of A
2. Both A and R are True and R is not the correct explanation of A
3. A is true but R is false
4. A is false but R is true

**Correct Answer :-**

- A is false but R is true

**29) For long columns the effective length to the least lateral dimension is more than [Question ID = 12695]**

1. 10
2. 12
3. 18
4. 20

**Correct Answer :-**

- 12

**30) If the lateral steel consists of Spirals instead of ties then the strength of column is [Question ID = 12696]**

1. Increased by 1.05 times
2. Decreased by 1.05 times
3. Increased by 1.5 times
4. Decreased by 1.15 times

**Correct Answer :-**

- Increased by 1.05 times

**31) The minimum longitudinal reinforcement in RC columns as per IS 456 is [Question ID = 12697]**

1. 0.4%
2. 0.6%
3. 0.8%
4. 1.2%

**Correct Answer :-**

- 0.8%

**32) Spacing of longitudinal bars along the periphery of RC columns shall not exceed [Question ID = 12698]**

1. 200mm
2. 300mm
3. 400mm
4. 500mm

**Correct Answer :-**

- 300mm

**33) If the concrete grade is M20 then the modular ratio is [Question ID = 12699]**

1. 18.6
2. 13.3
3. 10.9
4. 9.33

**Correct Answer :-**

- 13.3

**34) In RC design as per working stress method, if d=effective depth, c= Permissible concrete stress in bending, t= Permissible steel stress in tension and m= modular ratio, then the neutral axis depth factor (x/d) is given by [Question ID = 12700]**

1. c/(mc+t)m
2. mc/(m+t)
3. (mc+t)/mc
4. mc/(mc+t)

**Correct Answer :-**

- mc/(mc+t)

**35) The maximum shear stress permitted in RC member as per IS 456 depends on [Question ID = 12701]**

1. Grade of concrete
2. Grade of steel
3. Percent of steel reinforcement
4. Both grade of steel and concrete

**Correct Answer :-**

- Grade of concrete

**36)** The bearing S $25^0$ W means

**[Question ID = 12702]**

1. $155^0$
2. $205^0$
3. $180^0$
4. $305^0$

**Correct Answer :-**

- $205^0$

**37)** The fore bearing of line AB is $60^0$ and that of BC is $130^0$, then the angle at B is

**[Question ID = 12703]**

1. $50^0$
2. $190^0$
3. $110^0$
4. $70^0$

**Correct Answer :-**

- $110^0$

**38) The horizontal angle between the true meridian and magnetic meridian is known as [Question ID = 12704]**

1. Magnetic dip
2. Declination
3. Magnetic bearing
4. Local attraction

**Correct Answer :-**

- Declination

**39)** The following bearings were observed while traversing with a compass.

| Line | FB | BB |
|---|---|---|
| AB | $80^0$ | $260^0$ |
| BC | $90^0$ | $269^0$ |
| CD | $120^0$ | $301^0$ |
| DA | $319^0$ | $140^0$ |

Which stations are affected by local attraction?

**[Question ID = 12705]**

1. A and B
2. B and C
3. C and D
4. D and A

**Correct Answer :-**

- C and D

**40) For a hilly region the ideal method of contouring is [Question ID = 12706]**

1. Method of squares
2. Direct method
3. Radial line method
4. Cross-section method

**Correct Answer :-**

- Radial line method

**41)** The process of turning telescope through $180^0$ in vertical plane is known as

**[Question ID = 12707]**

1. Transiting
2. Reversing
3. Plunging
4. Trunnion

**Correct Answer :-**

- Transiting

**42) The minor instrument used not only to take horizontal sights but also inclined sights is known as [Question ID = 12708]**

1. Pantograph
2. Sextant
3. Planimeter
4. Clinometer

**Correct Answer :-**

- Clinometer

**43) Which one of the following is not used in setting perpendicular? [Question ID = 12709]**

1. Cross staff
2. Line ranger
3. Optical square
4. Prism square

**Correct Answer :-**

- Line ranger

**44) Viscosity of fluid is measured in [Question ID = 12710]**

1. $Ns/m^2$
2. $N/m^2$
3. $m^2/s$
4. m/s

**Correct Answer :-**

- $Ns/m^2$

**45) In case of flow net the streamlines and potential lines are [Question ID = 12711]**

1. Inclined at $45^0$
2. Parallel to each other

3. Perpendicular to each other

4. Inclined at $60^0$

**Correct Answer :-**

- Perpendicular to each other

**46) A vessel contains oil of specific gravity 0.75. Height of oil at a point is 32m. Corresponding height of water at the point would be [Question ID = 12712]**

1. 32m
2. 24m
3. 16m
4. 42.6m

**Correct Answer :-**

- 24m

**47) The head of water over an orifice is 10m and the coefficient of velocity is 0.97, the theoretical velocity of water would be [Question ID = 12713]**

1. 10m/s
2. 12m/s
3. 14m/s
4. 16m/s

**Correct Answer :-**

- 14m/s

**48) The necessary and sufficient condition for a surface to be called as 'Free Surface' is [Question ID = 12714]**

1. A positive stress should be acting on it
2. Tensile stress acting on it must be zero
3. Shear stress acting on it must be zero
4. A negative stress should be acting on it

**Correct Answer :-**

- Shear stress acting on it must be zero

**49) For a submerged body to be in equilibrium the centre of gravity (G) and centre of buoyancy (B) shall be such that [Question ID = 12715]**

1. B does not coincide with the centre of mass of the displaced liquid
2. G coincides with the centre of mass of the displaced liquid
3. B lies below G
4. B lies above G

**Correct Answer :-**

- B lies above G

**50)** Match the Group A with Group-B.

| | Group-A | | | Group-B |
|---|---|---|---|---|
| a) | Pitot tube | | 1. | Pressure in pipe |
| b) | Manometer | | 2. | Velocity of flow |
| c) | Venturimeter | | 3. | Wind velociy |
| d) | Anemometer | | 4. | Discharge in pipe |

**[Question ID = 12716]**

1. a-3, b-1, c-4, d-2
2. a-2, b-1,c-4, d-3
3. a-4, b-3, c-2,d-1
4. a-3, b-2, c-1, d-4

**Correct Answer :-**

- a-2, b-1,c-4, d-3

**51)** The term $V^2/2g$ is known as

**[Question ID = 12717]**

1. Kinetic energy
2. Pressure energy
3. Kinetic energy per unit weight
4. Pressure energy per unit weight

**Correct Answer :-**

- Kinetic energy per unit weight

**52) For a given discharge the critical flow depth in an open channel depends on channel [Question ID = 12718]**

1. Geometry only
2. Geometry and bed slope
3. Geometry, bed slope and roughness
4. Geometry, bed slope, roughness and velocity

**Correct Answer :-**

- Geometry only

**53)** Identify the 'False' statement from the following.

The specific speed of the pump increases with

**[Question ID = 12719]**

1. Increase in shaft speed

2. Increase in discharge
3. Decrease in gravitational acceleration
4. Increase in head

**Correct Answer :-**

- Increase in head

**54) The square root of the ratio of inertia force to force due to compressibility is known as [Question ID = 12720]**

1. Reynolds number
2. Mach number
3. Euler number
4. Froude number

**Correct Answer :-**

- Mach number

**55) If the Froude number in an open channel flow is more than 1.0, the flow is called [Question ID = 12721]**

1. Laminar flow
2. Critical flow
3. Shooting flow
4. Streaming flow

**Correct Answer :-**

- Shooting flow

**56) Francis turbine is [Question ID = 12722]**

1. An impulse turbine
2. A radial flow impulse turbine
3. An axial flow reaction turbine
4. An inword flow reaction turbine

**Correct Answer :-**

- An inword flow reaction turbine

**57) Draft tube is used for discharging water from the exit of [Question ID = 12723]**

1. Kaplan turbine
2. Pelton wheel
3. Orifice
4. Mouthpiece

**Correct Answer :-**

- Kaplan turbine

**58) Infiltration capacity [Question ID = 12724]**

1. Is a constant factor

2. Changes with time
3. Changes with both time and location
4. Changes with place only

**Correct Answer :-**

- Changes with both time and location

**59) Contour bunding is practiced in [Question ID = 12725]**

1. Plain areas
2. Hilly areas
3. Dry areas
4. Water logged areas

**Correct Answer :-**

- Hilly areas

**60) The duty is largest [Question ID = 12726]**

1. at the head of water course
2. at the head of main canal
3. Same at all places
4. On the field

**Correct Answer :-**

- On the field

**61) Crop ratio is defined as the ratio of area irrigated [Question ID = 12727]**

1. in Kharif season to Rabi season
2. in Rabi season to Kharif season
3. under perennial crop to non-perennial crop
4. under perennial crop to total area

**Correct Answer :-**

- in Rabi season to Kharif season

**62) If the irrigation efficiency is 75%, conveyance losses are 25% and the actual depth of watering is 15 cm, the depth of water required at the canal outlet, is [Question ID = 12728]**

1. 10 cm
2. 15 cm
3. 36 cm
4. 26 cm

**Correct Answer :-**

- 26 cm

**63) Nitrogen content in the soil can be increased by raising one of the following crops in crop rotation [Question ID = 12729]**

1. Rice crop

2. Sugar crane
3. Leguminous crop
4. Aquatic crop

**Correct Answer :-**

- Leguminous crop

**64) The two depths of flow for which the specific energy is same are called [Question ID = 12730]**

1. Conjugate depths
2. Sequent depths
3. Alternate depths
4. Initial depths

**Correct Answer :-**

- Alternate depths

**65) The Water conveyance efficiency is defined as ratio of [Question ID = 12731]**

1. Water delivered to the farm to water supplied from reservoir
2. Water stored in the root zone to the water delivered to the farm
3. Water used beneficially to the water delivered
4. Water stored in root zone to the water needed in the root zone

**Correct Answer :-**

- Water delivered to the farm to water supplied from reservoir

**66) The most common type of spillway used in gravity dams is [Question ID = 12732]**

1. Siphon spillway
2. Ogee spillway
3. Side channel spillway
4. Chute spillway

**Correct Answer :-**

- Ogee spillway

**67) A weir in which the tail water level is more than the crest level is called [Question ID = 12733]**

1. Submerged weir
2. Stalled weir
3. Normal weir
4. Natural weir

**Correct Answer :-**

- Submerged weir

**68) A fall in which the crest is kept at or near the canal bed without any glacis is [Question ID = 12734]**

1. Natural fall
2. Gravity fall

3. Free fall
4. Notch fall

**Correct Answer :-**

- Notch fall

**69) Stone pitching laid on the sloping face of an earthen bund to maintain the slope is known as [Question ID = 12735]**

1. Shrouding
2. Filter
3. Revetment
4. bunding

**Correct Answer :-**

- Revetment

**70) Which of the following phenomenon contribute to silting up of a channel?**

**a)Non-regime section b)Inadequate slope c)Excessive velocity**

**[Question ID = 12736]**

1. Only 'a'
2. Only 'b'
3. Only 'c'
4. 'a' and 'b'

**Correct Answer :-**

- 'a' and 'b'

**71) The irrigation canals are generally aligned along [Question ID = 12737]**

1. Ridge line
2. Contour line
3. Valley line
4. Straight line

**Correct Answer :-**

- Ridge line

**72) In case of summit curve, deviation angle will be maximum when [Question ID = 12738]**

1. Ascending gradient meets level surface
2. Ascending gradient meets ascending surface
3. Ascending gradient meets descending surface
4. Descending gradient meets level surface

**Correct Answer :-**

- Ascending gradient meets descending surface

**73) For Indian Railways, vertical curves are provided when the algebraic difference between the grades is equal to or more than _____ [Question ID = 12739]**

1. 0.2%
2. 0.4%
3. 0.6%
4. 0.8%

**Correct Answer :-**

- 0.4%

**74) Aggregate soundness test value indicates which of the following property of aggregates. [Question ID = 12740]**

1. Durability
2. Toughness
3. Strength
4. Hardness

**Correct Answer :-**

- Durability

**75)**

Two bitumen samples 'A' and 'B' have softening point of $50^0$C and $60^0$C, respectively. Then answer the following.

**Assertion(A):** Viscosity of 'A' will be greater than viscosity of 'B' at the same temperature

**Reason(R):** Penetration value of 'A' will be lesser than 'B' under standard conditions.

**[Question ID = 12741]**

1. Both A and R are True and R is the correct explanation of A
2. Both A and R are True and R is not the correct explanation of A
3. A is true but R is false
4. Both A and R is false

**Correct Answer :-**

- Both A and R is false

**76) In a jointed RC pavement, the reinforcement is provided at the joints for [Question ID = 12742]**

1. Flexural strength
2. Control cracking
3. Transfer of loads
4. Shear strength

**Correct Answer :-**

- Control cracking

**77) The Road connecting a city to highway is called [Question ID = 12743]**

1. Arterial street
2. Sub arterial street
3. Collector street
4. Local street

**Correct Answer :-**

- Arterial street

**78) Which one of the following is a False Statement? [Question ID = 12744]**

1. The surface of the rail, if becomes wavy is known as roaring of rail
2. No signals are to be provided on momentum gradients
3. The distance between flanges of wheels is more than the gauge
4. In bull headed rails foot is smaller than the head

**Correct Answer :-**

- The distance between flanges of wheels is more than the gauge

**79) A bascule bridge is a [Question ID = 12745]**

1. Fixed bridge
2. Movable bridge
3. Deck bridge
4. Through bridge

**Correct Answer :-**

- Movable bridge

**80) The Bridge over a dry valley is known as [Question ID = 12746]**

1. Causeway
2. Minor bridge
3. Vent
4. Voaduct

**Correct Answer :-**

- Voaduct

**81) Which one of the following is not a ground water? [Question ID = 12747]**

1. Water from natural springs
2. Water from infiltration galleries
3. Roof water stored underground
4. River side radial collector wells

**Correct Answer :-**

- Roof water stored underground

**82) An egg shaped section of sewer [Question ID = 12748]**

1. is more stable than circular section
2. provides self- cleansing velocity at low discharge
3. is economical compared to circular section
4. is easy to construct

**Correct Answer :-**

- provides self- cleansing velocity at low discharge

**83) Which one of the following is not method of desalination? [Question ID = 12749]**

1. Zeolite process
2. Reverse osmosis
3. Electrodialysis
4. Freezing

**Correct Answer :-**

- Zeolite process

**84) For water with maximum acidity the pH value is [Question ID = 12750]**

1. Zero
2. 7
3. 14
4. 10

**Correct Answer :-**

- Zero

**85)** Match the Group A with Group-B.

| | Group-A | | | Group-B |
|---|---|---|---|---|
| a) | Excess of nitrates | | 1. | Brackish water |
| b) | Excess of fluorides | | 2. | Goiter |
| c) | Lack of iodides | | 3. | Fragile bones |
| d) | Excess of chlorides | | 4. | Blue babies |

**[Question ID = 12751]**

1. a-3, b-1, c-4, d-2
2. a-2, b-1,c-4, d-3
3. a-4, b-3, c-2,d-1
4. a-3, b-2, c-1, d-4

**Correct Answer :-**

- a-4, b-3, c-2,d-1

**86) Which one of the following tests of water/ wastewater employs Erichrome Black T as indicator? [Question ID = 12752]**

1. Hardness
2. COD
3. Residual chlorine
4. DO

**Correct Answer :-**

- Hardness

**87) Which one of the following processes of water softening requires re-carbonation? [Question ID = 12753]**

1. Lime-soda ash process
2. Hydrogen-cation exchanger process
3. Sodium-cation exchanger process
4. Demineralization

**Correct Answer :-**

- Lime-soda ash process

**88)** Consider the following treatment process units in a water treatment plant:

1. Coagulation
2. Disinfection
3. Sedimentation
4. Filtration

Which is the correct sequence of the process units in the water treatment plant?

**[Question ID = 12754]**

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

**Correct Answer :-**

- 1-3-4-2

**89) Which soil can take maximum dose of sewage? [Question ID = 12755]**

1. Loam soil
2. Sandy soil
3. Clayey soil
4. Black cotton soil

**Correct Answer :-**

- Sandy soil

**90) Irrespective of the grade of steel the following property remains nearly same. [Question ID = 12756]**

1. Yield strength
2. Modulus of Elasticity
3. Ultimate strength
4. Percent of elongation

**Correct Answer :-**

- Modulus of Elasticity

**91) Partial safety factor for Shop welding and Field welding are [Question ID = 12757]**

1. 1.25 and 1.5
2. 1.5 and 1.1
3. 1.25 and 1.1
4. 1.5 and 1.66

**Correct Answer :-**

- 1.25 and 1.5

**92) If the bolt grade is 5.6, then the yield strength of bolt is [Question ID = 12758]**

1. 250 MPa
2. 200 MPa
3. 300 MPa
4. 350 MPa

**Correct Answer :-**

- 300 MPa

**93) A Steel Channel section has [Question ID = 12759]**

1. One flange and One Web
2. One Web and Two flanges
3. One flange and two webs
4. Two flanges and two webs

**Correct Answer :-**

- One Web and Two flanges

**94) Which one of the following state of a structure does not belong to Limit state of Collapse? [Question ID = 12760]**

1. Yielding of Gross cross section
2. Block Shear
3. Tearing of plate
4. Floor vibration

**Correct Answer :-**

- Floor vibration

**95) The ratio of partial safety factor applied at Ultimate to that at yield strength of steel is_____ [Question ID = 12761]**

1. 1.25
2. 1.13
3. 1.10
4. 1.50

**Correct Answer :-**

- 1.13

**96) The cross sections which can develop plastic moment, but have inadequate rotation capacity are called as _____ sections. [Question ID = 12762]**

1. Plastic
2. Compact
3. Semi Compact
4. Slender

**Correct Answer :-**

- Compact

**97) For a Steel built-up column subjected to an axial force of 1200 kN, the lacing system is to be designed for resisting transverse shear of [Question ID = 12763]**

1. 15 kN
2. 20 kN
3. 25 kN
4. 30 kN

**Correct Answer :-**

- 30 kN

**98) Grip length correction is applied in bolted joints when the thickness of connecting members exceeds _____ times the diameter (d) of the bolt [Question ID = 12764]**

1. 15
2. 10
3. 5
4. 2.5

**Correct Answer :-**

- 5

**99) The minimum size of fillet weld required to join two plates of 10 mm and 12 mm thickness is [Question ID = 12765]**

1. 3 mm
2. 4 mm
3. 5 mm
4. 6 mm

**Correct Answer :-**

- 5 mm

**100) In case of single lacing, if the lacing flat has effective length of 400mm and 60mm wide then the thickness of flat shall not be less than [Question ID = 12766]**

1. 10 mm
2. 8 mm
3. 6 mm
4. 16 mm

**Correct Answer :-**

- 10 mm