NDA MATHS MOCK TEST - 148 (SOLUTION)

1. (B) Let Probability of success (p) = $\frac{1}{3}$

and probability of unsuccess (q) = $\frac{2}{3}$

Let x is random variable which show for solving 5 questions. It is clear that

x ~ binomial distribution $\left(5, \frac{1}{3}\right)$

$\therefore$ P(X = x) = ${}^5C_x\left(\frac{1}{3}\right)^x\left(\frac{2}{3}\right)^{5-x}$

(where k = 0, 1, ...5)

$\therefore$ Required Probability

P(X $\geq$ 3) = P(X = 3) + P(X = 4) + P(X = 5)

$= {}^5C_3\left(\frac{1}{3}\right)^3\left(\frac{2}{3}\right)^2 + {}^5C_4\left(\frac{1}{3}\right)^4\left(\frac{2}{3}\right)^1 + {}^5C_5\left(\frac{1}{3}\right)^5$

$= \frac{10\times4}{3^5} + \frac{5\times2}{3^5} + \frac{1\times1}{3^5}$

$= \frac{51}{3^5} = \frac{17}{81}$

2. (A) Given that

$\int x^2.e^x dx = ax^2.e^x + bx.e^x + c.e^x + d$ ...(i)

Let I = $\int x^2.e^x\,dx$

I = $x^2.\int e^x\,dx - \int\left\{\frac{d}{dx}(x^2).\int e^x\,dx\right\}dx$

I = $x^2.e^x - \int 2x.e^x\,dx$

I = $x^2.e^x - 2\left[x.\int e^x\,dx - \int\left\{\frac{d}{dx}(x).\int e^x\,dx\right\}dx\right]$

I = $x^2.e^x - 2\left[x.e^x - \int 1.e^x\,dx\right] + d$

I = $x^2.e^x - 2\left[x.e^x - e^x\right] + d$

I = $x^2.e^x - 2x.e^x + 2.e^x + d$

On comparing with eq(i)

a = 1, b = –2 and c = 2

3. (D) In ΔABC, c = 4, A = $\angle$60° and $\angle$B = 75°, then $\angle$C = 45°

Sine Rule

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Now, $\frac{a}{\sin A} = \frac{c}{\sin C}$

$\Rightarrow \frac{a}{\sin 60} = \frac{4}{\sin 45}$

$\Rightarrow \frac{a}{\sqrt{3}/2} = \frac{4}{1/\sqrt{2}}$

$\Rightarrow a = 4\sqrt{2}\times\frac{\sqrt{3}}{2} \Rightarrow a = 2\sqrt{6}$

4. (C) I = $\int_0^{\pi/2}\frac{\phi(x)}{\phi\left(\frac{\pi}{2}-x\right)+\phi(x)}\,dx$ ...(i)

Prop.IV $\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx$

I = $\int_0^{\pi/2}\frac{\phi\left(\frac{\pi}{2}-x\right)}{\phi(x)+\phi\left(\frac{\pi}{2}-x\right)}\,dx$ ...(ii)

from eq(i) and eq(ii)

2I = $\int_0^{\pi/2}\frac{\phi(x)+\phi\left(\frac{\pi}{2}-x\right)}{\phi(x)+\phi\left(\frac{\pi}{2}-x\right)}\,dx$

2I = $\int_0^{\pi/2}1\,dx$

2I = $[x]_0^{\pi/2}$

2I = $\frac{\pi}{2} - 0 \Rightarrow$ I = $\frac{\pi}{4}$

5. (A) tanA = 3 and tanB = –2

Now, tan(A – B) = $\frac{\tan A - \tan B}{1+\tan A.\tan B}$

$\Rightarrow$ tan(A – B) = $\frac{3-(-2)}{1+3\times(-2)}$

$\Rightarrow$ tan(A – B) = $\frac{5}{-5}$

$\Rightarrow$ tan(A – B) = –1

$\Rightarrow$ tan(A – B) = tan $\frac{3\pi}{4}$

$\Rightarrow$ A – B = $\frac{3\pi}{4}$

6. (B) Differential equation

$y^2\,dx = x^3y^2\,dx + x^2\,dy$

$\Rightarrow y^2\,dx - x^2\,dy = x^3y^2\,dx$

$\Rightarrow \dfrac{y^2dx - x^2dy}{x^2y^2} = x\,dx$

$\Rightarrow \dfrac{dx}{x^2} - \dfrac{dy}{y^2} = x\,dx$

On integrating

$\Rightarrow \int\dfrac{dx}{x^2} - \int\dfrac{dy}{y^2} = \int x\,dx$

$\Rightarrow \dfrac{-1}{x} + \dfrac{1}{y} = \dfrac{x^2}{2} + \dfrac{c}{2}$

$\Rightarrow \dfrac{1}{y} - \dfrac{1}{x} = \dfrac{x^2 + c}{2}$

$\Rightarrow \dfrac{2(x-y)}{xy} = x^2 + c$

$\Rightarrow 2(x - y) = x^3y + cxy$

7. (C) $I = \int_0^1 \dfrac{\tan^{-1}x}{1+x^2}\,dx$

Let $\tan^{-1}x = t$ when $x = 0$, $t = 0$

$\dfrac{1}{1+x^2}\,dx = dt$ $\quad x = 1,\ t = \dfrac{\pi}{4}$

$I = \int_0^{\pi/4} t\,dt$

$I = \left[\dfrac{t^2}{2}\right]_0^{\pi/4}$

$I = \dfrac{1}{2}\left[\dfrac{\pi^2}{16} - 0\right] = \dfrac{\pi^2}{32}$

8. (C) We know that

$\cos 36 = \dfrac{\sqrt{5}+1}{4}$ and $\sin 18 = \dfrac{\sqrt{5}-1}{4}$

Now, $\cos 36°.\sin 18°$

$\Rightarrow \dfrac{\sqrt{5}+1}{4} \times \dfrac{\sqrt{5}-1}{4}$

$\Rightarrow \dfrac{5-1}{16} = \dfrac{4}{16} = \dfrac{1}{4}$

9. (A) Odd natural numbers

1, 3, 5,.............n

Sum = 1+ 3 + 5........+ n

Sum = $\dfrac{n}{2}(2\times 1 + (n-1)\times 2)$

Sum = $\dfrac{n}{2}(2 + 2n - 2)$

Sum = $\dfrac{n}{2} \times 2n = n^2$

Mean = $\dfrac{n^2}{n} = n$

10. (D) $z = \dfrac{\sqrt{3} - 2i}{\sqrt{3} + 2i}$

$z = \dfrac{\sqrt{3} - 2i}{\sqrt{3} + 2i} \times \dfrac{\sqrt{3} - 2i}{\sqrt{3} - 2i}$

$z = \dfrac{3 + 4i^2 - 4\sqrt{3}i}{3 - 4i^2}$

$z = \dfrac{-1 - 4\sqrt{3}i}{3 + 4}$

$z = \dfrac{-1 - 4\sqrt{3}i}{7}$

$|z| = \dfrac{\sqrt{(-1)^2 + (4\sqrt{3})^2}}{7}$

$|z| = \dfrac{\sqrt{1 + 48}}{7}$

$|z| = \dfrac{7}{7} = 1$

11. (C)

2	47	1
2	23	1
2	11	1
2	5	1
2	2	0
2	1	1
	0	

Hence $(47)_{10} = (101111)_2$

12. (B) $\sec^{-1}\left(\sec\dfrac{5\pi}{3}\right)$

$\Rightarrow \sec^{-1}\left[\sec\left(2\pi - \dfrac{\pi}{3}\right)\right]$

$\Rightarrow \sec^{-1}\left(\sec\dfrac{\pi}{3}\right) = \dfrac{\pi}{3}$

13. (A) Matrix $\begin{bmatrix} x-1 & 2 & 3 \\ 2 & 6 & 0 \\ 4 & -1 & 3 \end{bmatrix}$ is an invertible,

then $\begin{vmatrix} x-1 & 2 & 3 \\ 2 & 6 & 0 \\ 4 & -1 & 3 \end{vmatrix} = 0$

$\Rightarrow (x-1)(18 - 0) - 2(6 - 0) + 3(-2 - 24) = 0$

$\Rightarrow 18(x-1) - 12 - 78 = 0$

$\Rightarrow 18(x-1) = 90$

$\Rightarrow x - 1 = 5 \Rightarrow x = 6$

14. (B) $\sin^{-1}\frac{7}{25} + \cos^{-1}\frac{3}{5}$

$\Rightarrow \tan^{-1}\frac{7}{24} + \tan^{-1}\frac{4}{3}$

$\Rightarrow \tan^{-1}\left[\frac{\frac{7}{24}+\frac{4}{3}}{1-\frac{7}{24}\times\frac{4}{3}}\right]$

$\Rightarrow \tan^{-1}\left[\frac{21+96}{72-28}\right] \Rightarrow \tan^{-1}\frac{117}{44}$

15. (C) $\begin{vmatrix} 2! & 3! & 4! \\ 5! & 6! & 7! \\ 8! & 9! & 10! \end{vmatrix}$

$\Rightarrow \begin{vmatrix} 2! & 3\times2! & 4\times3\times2! \\ 5! & 6\times5! & 7\times6\times5! \\ 8! & 9\times8! & 10\times9\times8! \end{vmatrix}$

$\Rightarrow 2!\times5!\times8!\begin{vmatrix} 1 & 3 & 12 \\ 1 & 6 & 42 \\ 1 & 9 & 90 \end{vmatrix}$

$R_2 \to R_2 - R_1$ and $R_3 \to R_3 - R_1$

$\Rightarrow 2!\times5!\times8!\begin{vmatrix} 1 & 3 & 12 \\ 0 & 3 & 30 \\ 0 & 6 & 78 \end{vmatrix}$

$\Rightarrow 2!\times5!\times8!\times(3\times78 - 6\times30) - 0$

$\Rightarrow 2!\times5!\times8!\times(234 - 180)$

$\Rightarrow 54\times2!\times5!\times8!$

16. (B) $y = \ln(e^{2x} + e^{-2x})$

On differentiating both side w.r.t 'x'

$\frac{dy}{dx} = \frac{1}{e^{2x}+e^{-2x}}(2e^{2x} - 2e^{-2x})$

$\frac{dy}{dx} = \frac{2\left(e^{2x}-e^{-2x}\right)}{e^{2x}+e^{-2x}}$

Again, differentiating

$\frac{d^2y}{dx^2} = 2\times\frac{\left(e^{2x}+e^{-2x}\right)\left(2e^{2x}+2e^{-2x}\right)-\left(e^{2x}-e^{-2x}\right)\left(2e^{2x}-2e^{-2x}\right)}{\left(e^{2x}+e^{-2x}\right)^2}$

$\frac{d^2y}{dx^2} = 4\times\frac{\left(e^{2x}+e^{-2x}\right)^2-\left(e^{2x}-e^{-2x}\right)^2}{\left(e^{2x}+e^{-2x}\right)^2}$

$\frac{d^2y}{dx^2} = 4\times\frac{\left(e^{4x}+2+e^{-4x}\right)-\left(e^{4x}-2+e^{-4x}\right)}{\left(e^{2x}+e^{-2x}\right)^2}$

$\frac{d^2y}{dx^2} = 4\times\frac{2+2}{\left(e^{2x}+e^{-2x}\right)^2} = \frac{16}{\left(e^{2x}+e^{-2x}\right)^2}$

17. (B) Three points $(x, 1)$, $(-2, 3)$ and $(2, -1)$ are collinear, then $\begin{vmatrix} x & 1 & 1 \\ -2 & 3 & 1 \\ 2 & -1 & 1 \end{vmatrix} = 0$

$\Rightarrow x(3 + 1) - 1(-2 - 2) + 1(2 - 6) = 0$

$\Rightarrow 4x + 4 - 4 = 0 \Rightarrow x = 0$

18. (B) $\cos^2 5 + \cos^2 10 + \cos^2 15 + \ldots\ldots\ldots\ldots + \cos^2 90$

$\Rightarrow \cos^2 5 + \cos^2 10 + \cos^2 15 + \ldots\ldots\ldots\ldots + \cos^2 15 + \cos^2 80 + \cos^2 85 + 0$

$\Rightarrow (\cos^2 5 + \cos^2 85) + (\cos^2 10 + \cos^2 80) + \ldots\ldots\ldots\ldots + (\cos^2 40 + \cos^2 50) + \cos^2 45$

$\Rightarrow (\cos^2 5 + \sin^2 5) + (\cos^2 10 + \sin^2 10) + \ldots\ldots\ldots\ldots + (\cos^2 40 + \sin^2 40) + \left(\frac{1}{\sqrt{2}}\right)^2$

$\Rightarrow 1 + 1 + 1 + \ldots\ldots\ldots\ldots\ldots$ 8 times $+ \frac{1}{2}$

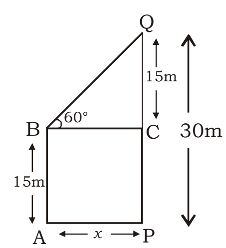
$\Rightarrow 8 + \frac{1}{2} = \frac{17}{2}$

19. (C) $S = \sqrt{3} + 2\sqrt{3} + 4\sqrt{3} + \ldots\ldots\ldots\ldots n$ terms

$S = \frac{\sqrt{3}\left(2^n - 1\right)}{2-1}$

$S = \sqrt{3}\left(2^n - 1\right)$

20. (B) Distance between poles = x m



In ∆BCQ

$\tan 60° = \frac{QC}{BC}$

$\Rightarrow \sqrt{3} = \frac{15}{x}$

$\Rightarrow x = \frac{15}{\sqrt{3}} \Rightarrow x = 5\sqrt{3}$ m

21. (B) $x = \omega^2 + 2 - \omega$

$\Rightarrow x - 2 = \omega^2 - \omega$

On squaring both side

$\Rightarrow x^2 + 4 - 4x = \omega^4 + \omega^2 - 2\omega^3$

$\Rightarrow x^2 + 4 - 4x = \omega + \omega^2 - 2$

$\Rightarrow x^2 - 4x + 4 = -1 - 2$ [$\because 1 + \omega + \omega^2 = 0$]

$\Rightarrow x^2 + 4x + 7 = 0$

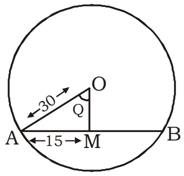
22. (C) $\frac{1}{1\times 5}+\frac{1}{5\times 9}+\frac{1}{9\times 13}+........+\frac{1}{25\times 29}$

$\Rightarrow \frac{1}{4}\left(1-\frac{1}{5}\right)+\frac{1}{4}\left(\frac{1}{5}-\frac{1}{9}\right)+...+\frac{1}{4}\left(\frac{1}{25}-\frac{1}{29}\right)$

$\Rightarrow \frac{1}{4}\left(1-\frac{1}{29}\right)$

$\Rightarrow \frac{1}{4}\times\frac{28}{29} = \frac{7}{29}$

23. (B) Given that d = 60 cm $\Rightarrow r$ = 30 cm and AB = 30 cm



AM = 15 cm

Let $\angle$ AOM = θ

Now, $\sin\theta = \frac{AM}{AO}$

$\Rightarrow \sin\theta = \frac{15}{30}$

$\Rightarrow \sin\theta = \frac{1}{2} \Rightarrow \theta = \frac{\pi}{6}$

Now, $\theta = \frac{S}{\pi}$

$\Rightarrow \frac{\pi}{6} = \frac{5}{30} \Rightarrow S = 5\pi$

Hence length of arc = 5π cm

24. (C) $\cos\left(\frac{\pi}{4}-\theta\right)+\cos\left(\frac{\pi}{4}+\theta\right)$

$\Rightarrow 2\cos\frac{\frac{\pi}{4}-\theta+\frac{\pi}{4}+\theta}{2}.\cos\frac{\frac{\pi}{4}-\theta-\frac{\pi}{4}-\theta}{2}$

$\Rightarrow 2\cos\frac{\pi}{4}.\cos\theta$

$\Rightarrow 2\times\frac{1}{\sqrt{2}}\cos\theta = \sqrt{2}\cos\theta$

25. (B) $1+\frac{1}{(1+2)}+\frac{1}{(1+2+3)}+...........+\frac{1}{(1+2+3+.....+n)}$

$T_n = \frac{1}{1+2+3+.....+n}$

$T_n = \frac{2}{n(n+1)}$

Now, $S_n = \sum T_n$

$S_n = \sum\frac{2}{n(n+1)}$

$S_n = 2\sum\left(\frac{1}{n}-\frac{1}{n+1}\right)$

$S_n = 2\left[\left(1-\frac{1}{2}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)+........+\left(\frac{1}{n}-\frac{1}{n-1}\right)\right]$

$S_n = \left[1-\frac{1}{n+1}\right] = \frac{2n}{n+1}$

26. (B) Given that $z_1 = 2 + i$ and $z_2 = 1 - 2i$

Now, $\left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \left|\frac{2+i+1-2i-1}{2+i-1+2i+1}\right|$

$\Rightarrow \left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \left|\frac{2-i}{2+3i}\right|$

$\Rightarrow \left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \left|\frac{2-i}{2+3i}\times\frac{2-3i}{2-3i}\right|$

$\Rightarrow \left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \left|\frac{1-8i}{4-9i^2}\right|$

$\Rightarrow \left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \left|\frac{1-8i}{13}\right|$

$\Rightarrow \left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \frac{\sqrt{i^2+(-8)^2}}{13}$

$\Rightarrow \left|\frac{z_1+z_2-1}{z_1-z_2+1}\right| = \frac{\sqrt{65}}{13} = \sqrt{\frac{5}{13}}$

27. (C)

1	1	8	7	6	5

= 8 × 7 × 6 × 5

↓ 7 ↓ 5

=1680

28. (D) ${}^nC_r + {}^nC_{r+1}$

$\Rightarrow \frac{n!}{r!(n-r)!}+\frac{n!}{(r+1)!(n-r-1)!}$

$\Rightarrow \frac{n!}{r!(n-r)(n-r-1)!}+\frac{n!}{(r+1)r!(n-r-1)!}$

$\Rightarrow \frac{n!}{r!(n-r-1)!}\left[\frac{1}{n-r}+\frac{1}{r+1}\right]$

$\Rightarrow \frac{n![r+1+n-r]}{r!(n-r-1)!(n-r)(r+1)}$

$\Rightarrow \frac{(n+1)n!}{(r+1)r!(n-r)(n-r-1)!}$

$\Rightarrow \frac{(n+1)!}{(r+1)!(n-r)!} = {}^{n+1}C_{r+1}$

29. (C) A.T.Q.

$a + ar + ar^2 = 27$ ...(i)

and $ar^3 + ar^4 + ar^5 = 729$

$\Rightarrow r^3(a + ar + ar^2) = 729$

$\Rightarrow r^3 \times 27 = 729$

$\Rightarrow r^3 = 27 \Rightarrow r = 3$

from equ. (i)

$a + a \times 3 + a \times 9 = 27$

$\Rightarrow 13a = 27 = a = \frac{27}{13}$

Hence first term = $\frac{27}{13}$

30. (B) Line

$6(2x - 3) = 5(y + 1)$

$\Rightarrow 12x - 18 = 5y + 5$

$\Rightarrow 12x - 5y = 23 \Rightarrow 12x - 5y - 23 = 0$

The required distance = $\frac{12\times1-5(-2)-23}{\sqrt{12^2+(-5)^2}}$

$= \frac{|12+10-32|}{\sqrt{169}} = \frac{1}{13}$

31. (C) Given that $m_1 = 3$, $\theta = 45°$

then $\tan\theta = \frac{m_1 - m_2}{1+m_1m_2}$

$\Rightarrow \tan45° = \frac{3-m_2}{1+3\times m_2}$

$\Rightarrow 1 = \frac{3-m_2}{1+3\times m_2}$

$\Rightarrow 1 + 3m_2 = 3 - m_2 \Rightarrow m_2 = \frac{1}{2}$

Equation of line passing through the point (2, – 3)

$y + 3 = \frac{1}{2}(x - 2)$

$\Rightarrow 2y + 6 = x - 2 \Rightarrow x - 2y = 8$

32. (C) $\lim_{x\to2}\left[\frac{x^3-2x^2}{x^3-3x+2}\right]$ $\left[\frac{0}{0}\right]$ form

by L-Hospital's Rule

$\Rightarrow \lim_{x\to2}\frac{3x^2-4x}{3x^2-3}$

$\Rightarrow \frac{3\times2^2-4\times2}{3\times2^2-3}$

$\Rightarrow \frac{12-8}{12-3} = \frac{4}{9}$

33. (D) C.V. (Ist distribution) = 60, $\sigma_1 = 21$

C.V. (2nd distribution) = 80, $\sigma_2 = 16$

Let x_1 and x_2 be the means of Ist and 2nd distribution respectively, then

C.V. (Ist distribution) = $\frac{\sigma_1}{x_1}\times100$

$\Rightarrow 60 = \frac{21}{x_1}\times100$

$\Rightarrow x_1 = \frac{21}{60}\times100 \Rightarrow x_1 = 35$

and C.V. (2nd distribuation) = $\frac{\sigma_2}{x_2}\times100$

$\Rightarrow 80 = \frac{16}{x_2}\times100$

$\Rightarrow x_2 = \frac{16}{80}\times100 \Rightarrow x_2 = 20$

Hence means are 35 and 20.

34. (A)

35. (B) We know that

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

36. (C) $[x\ \ -2\ \ 2]\begin{bmatrix}1 & 0 & -3\\2 & -1 & 4\\3 & -2 & -1\end{bmatrix}\begin{bmatrix}-2\\3\\0\end{bmatrix} = 0$

$\Rightarrow [x\ \ -2\ \ 3]\begin{bmatrix}-2\\-7\\-12\end{bmatrix} = [0]$

$\Rightarrow [-2x + 14 - 36] = [0]$

$\Rightarrow -2x - 22 = 0 \Rightarrow x = -11$

37. (B) $\begin{bmatrix}bc & 1 & a(b+c)\\ca & 1 & b(c+a)\\ab & 1 & c(a+b)\end{bmatrix}$

$\Rightarrow \begin{bmatrix}bc & 1 & ab+ca\\ca & 1 & bc+ab\\ab & 1 & ca+bc\end{bmatrix}$

$C_3 \to C_3 + C_1$

$\Rightarrow \begin{bmatrix}bc & 1 & ab+bc+ca\\ca & 1 & ab+bc+ca\\ab & 1 & ab+bc+ca\end{bmatrix}$

$\Rightarrow (ab + bc + ca)\begin{bmatrix}bc & 1 & 1\\ca & 1 & 1\\ab & 1 & 1\end{bmatrix}$

$\Rightarrow 0$ [$\because$ Two columns are identical.]

38. (B) $A = \begin{bmatrix} -4 & 5 \\ -2 & 3 \end{bmatrix}$

$|A| = -12 + 10 = -2$

Co-factors of A–

$C_{11} = (-1)^{1+1}(3) = 3, \quad C_{12} = (-1)^{1+2}(-2) = 2$

$C_{21} = (-1)^{2+1}(5) = -5, C_{22} = (-1)^{2+2}(-4) = -4$

$C = \begin{bmatrix} 3 & 2 \\ -5 & -4 \end{bmatrix}$

$\text{AdjA} = C^T = \begin{bmatrix} 3 & -5 \\ 2 & -4 \end{bmatrix}$

$A^{-1} = \frac{\text{AdjA}}{|A|}$

$A^{-1} = \frac{\begin{bmatrix} 3 & -5 \\ 2 & -4 \end{bmatrix}}{-2}$

$-2A^{-1} = \begin{bmatrix} 3 & -5 \\ 2 & -4 \end{bmatrix}$

Now, $A + 4A^{-1} = \begin{bmatrix} -4 & 5 \\ -2 & 3 \end{bmatrix} - 2(-2A^{-1})$

$\Rightarrow A + 4A^{-1} = \begin{bmatrix} -4 & 5 \\ -2 & 3 \end{bmatrix} - 2\begin{bmatrix} 3 & -5 \\ 2 & -4 \end{bmatrix}$

$\Rightarrow A + 4A^{-1} = \begin{bmatrix} -10 & 15 \\ -6 & 11 \end{bmatrix}$

39. (B) $\cos^2 x + \sin^2 y = 1$

On differentiating both side w.r.t. 'x'

$\Rightarrow 2\cos x.(-\sin x) + 2\sin y.\cos y\frac{dy}{dx} = 0$

$\Rightarrow 2\sin y.\cos y\frac{dy}{dx} = 2\sin x.\cos x$

$\Rightarrow \sin 2y\frac{dy}{dx} = \sin 2x \Rightarrow \frac{dy}{dx} = \frac{\sin 2x}{\sin 2y}$

40. (A) $y = 3e^{2x} + 2e^{3x}$ ...(i)

On differentiating both side w.r.t 'x'

$\frac{dy}{dx} = 6e^{2x} + 6e^{3x}$ ...(ii)

Again, differentiating

$\frac{d^2y}{dx^2} = 6 \times 2e^{2x} + 6 \times 3e^{3x}$

$\frac{d^2y}{dx^2} = 12e^{2x} + 18e^{3x}$ ...(iii)

Now, $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} = 12e^{2x} + 18e^{3x} - 5(6e^{2x} + 6e^{3x})$

$\Rightarrow \frac{d^2y}{dx^2} - 5\frac{dy}{dx} = 12e^{2x} + 18e^{3x} - 30e^{2x} - 30e^{3x}$

$\Rightarrow \frac{d^2y}{dx^2} - 5\frac{dy}{dx} = -18e^{2x} - 12e^{3x}$

$\Rightarrow \frac{d^2y}{dx^2} - 5\frac{dy}{dx} = -6(3e^{2x} + 2e^{3x})$

$\Rightarrow \frac{d^2y}{dx^2} - 5\frac{dy}{dx} = -6y$ [from eq.(i)]

41. (D) $y = \sqrt{e^{\sqrt{x}}}$

On differentiating both side w.r.t. 'x'

$\frac{dy}{dx} = \frac{1}{2}\left(e^{\sqrt{x}}\right)^{-1/2} \times e^{\sqrt{x}} \times \frac{1}{2}(x)^{-1/2}$

$\frac{dy}{dx} = \frac{1}{4} \times \frac{e^{\sqrt{x}}}{\sqrt{x}.\sqrt{e^{\sqrt{x}}}}$

and $z = e^x$

$\frac{dz}{dx} = e^x$

Now, $\frac{dy}{dz} = \frac{dy}{dx} \times \frac{dx}{dz}$

$\Rightarrow \frac{dy}{dz} = \frac{1}{4} \times \frac{e^{\sqrt{x}}}{\sqrt{x}.\sqrt{e^{\sqrt{x}}}} \times \frac{1}{e^x}$

$\Rightarrow \frac{dy}{dz} = \frac{\sqrt{e^{\sqrt{x}}}}{4\sqrt{x}.e^x}$

42. (B) $I = \int \frac{3 - 2\sin x}{\cos^2 x}dx$

$I = \int \left(3\sec^2 x - 2\sec x.\tan x\right)dx$

$I = 3\tan x - 2\sec x + c$

43. (A) Equation $ax^2 + bx + c = 0$

$\alpha + \beta = \frac{-b}{a}$ and $\alpha\beta = \frac{c}{a}$

Now, $\alpha^2\beta + \alpha\beta^2 = \alpha\beta(\alpha + \beta)$

$= \frac{c}{a}\left(\frac{-b}{a}\right) = \frac{-bc}{a^2}$

and $\alpha^2\beta.\alpha\beta^2 = (\alpha\beta)^3 = \left(\frac{c}{a}\right)^3 = \frac{c^3}{a^3}$

The required equation

$x^2 - (\alpha^2\beta + \alpha\beta^2)x + \alpha^2\beta.\alpha\beta^2 = 0$

$\Rightarrow x^2 + \frac{bc}{a^2}x + \frac{c^3}{a^3} = 0$

$\Rightarrow a^3 + abcx + c^3 = 0$

44. (B) Line $\frac{x-1}{3} = \frac{y+2}{-4} = \frac{z-1}{5}$

Direction cosines =

$$\left\langle \frac{3}{\sqrt{3^2+(-4)^2+5^2}}, \frac{-4}{\sqrt{3^2+(-4)^2+5^2}}, \frac{5}{\sqrt{3^2+(-4)^2+5^2}} \right\rangle$$

$$= \left\langle \frac{3}{5\sqrt{2}}, \frac{-4}{5\sqrt{2}}, \frac{5}{5\sqrt{2}} \right\rangle = \left\langle \frac{3}{5\sqrt{2}}, \frac{-2\sqrt{2}}{5}, \frac{1}{\sqrt{2}} \right\rangle$$

45. (B) Differential equation

$$x.\log x \frac{dy}{dx} + y = \frac{2}{x}\log x$$

$$\Rightarrow \frac{dy}{dx} + \frac{y}{x\log x} = \frac{2}{x^2}$$

here, $P = \frac{1}{x\log x}$ $\quad Q = \frac{2}{x^2}$

$\text{I. F.} = e^{\int P\,dx}$

$\text{I. F.} = e^{\int \frac{1}{x\log x}dx}$

We know that $\int \frac{1}{x\log x}dx = \log(\log x) + c$

$\text{I. F.} = e^{\log(\log x)} = \log x$

Solution of the differential equation

$y \times \text{I. F.} = \int Q \times \text{I.F.}\ dx$

$\Rightarrow y \times \log x = \int \frac{2}{x^2} \times \log x\ dx$

Let $\log x = t \Rightarrow x = e^t \Rightarrow \frac{1}{x}dx = dt$

$\Rightarrow y\log x = 2\int t.e^{-t}\,dt$

$\Rightarrow y\log x = 2\left[t\int e^{-t}dt - \int\left\{\frac{d}{dt}(t).\int e^{-t}dt\right\}dt\right]$

$\Rightarrow y\log x = 2\left[-t.e^{-t} - \int 1.\left(-e^{-t}\right)dt\right]$

$\Rightarrow y\log x = 2\left[-t.e^{-t} - e^{-t}\right] + c$

$\Rightarrow y\log x = 2\left[-(\log x).\frac{1}{x} - \frac{1}{x}\right] + c$

$\Rightarrow y\log x = -2\left[\frac{1+\log x}{x}\right] + c$

46. (C) In the expansion of $\left(2\sqrt{x} - \frac{1}{2\sqrt{x}}\right)^8$

Middle term $= \left(\frac{8}{2}+1\right)^{th} = 5^{th}$

$T_5 = T_{4+1} = {}^8C_4\left(2\sqrt{x}\right)^4\left(\frac{-1}{2\sqrt{x}}\right)^4$

$= 70 \times 1 = 70$

47. (B) $\vec{a} = 3\hat{i} - 4\hat{j} + 5\hat{k}$ and $\vec{b} = 2\hat{i} + \hat{j} - 2\hat{k}$

Projection of $\vec{a}$ on $\vec{b} = \left|\frac{\vec{a}.\vec{b}}{|\vec{b}|}\right|$

$= \left|\frac{3\times2 - 4\times1 + 5\times(-2)}{\sqrt{2^2+1^2+(-2)^2}}\right|$

$= \left|\frac{6-4-10)}{\sqrt{9}}\right| = \frac{8}{3}$

48. (C) Let $y = 11^{33}$

Taking log both side

$\log_{10}y = 22\log_{10}11$

$\log_{10}y = 33 \times 1.0414$

$\log_{10}y = 34.3662$

The required number = 34 + 1 = 35

49. (D) Plane $\vec{r}.(3\hat{i} - 6\hat{j} - 2\hat{k}) = 7$

and point (–1 , 2, – 4)

The required distance

$= \frac{\left|(3\hat{i}-6\hat{j}-2\hat{k}).(-\hat{i}+2\hat{j}-4\hat{k})-7\right|}{3^2+(-6)^2+(-2)^2}$

$= \frac{|-3-12+8-7|}{\sqrt{9+36+4}}$

$= \frac{14}{7} = 2$

50. (B) $4^{\frac{1}{2}} \times 4^{\frac{1}{4}} \times 4^{\frac{1}{8}} \times ....\infty$

$\Rightarrow 4^{\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+.........\infty\right)}$

$\Rightarrow 4^{\frac{\frac{1}{2}}{1-\frac{1}{2}}} = 4$

51. (B) $\begin{vmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{vmatrix}$

$\Rightarrow \cos^2\theta + \sin^2\theta = 1$

52. (D) Equation of circle

$x^2 + y^2 + 2gx + 2fy + c = 0$ …(i)

it passes through the points (– 1, 2)

$1 + 4 - 2g + 4f + c = 0$

$\Rightarrow -2g + 4f + c = -5$ …(ii)

it passes through the points (– 3, 1)

$9 + 1 - 6g + 2f + c = 0$

$\Rightarrow -6g + 2f + c = -10$ …(iii)

it passes through the points (0, 4)

$0 + 16 + 0 + 8f + c = 0$

$\Rightarrow 8f + c = -16$ …(iv)

On solving eq(ii), (iii) and (iv)

$g = \frac{7}{2}, f = \frac{-9}{2}, c = 20$

from eq(i)

$x^2 + y^2 + 2 \times \frac{7}{2}x + 2 \times \left(\frac{-9}{2}\right)y + 20 = 0$

$\Rightarrow x^2 + y^2 + 7x - 9y + 20 = 0$

53. (B) $x = (\sin y)^{(\sin y)^{(\sin y).......\infty}}$

$x = (\sin y)^x$

taking log both side

$\Rightarrow \log x = x \log(\sin y)$

On differentiating both side w.r.t. 'x'

$\Rightarrow \frac{1}{x} = x \times \frac{\cos y}{\sin y}\frac{dy}{dx} + \log(\sin y).1$

$\Rightarrow \frac{1}{x} - \log \sin y = x \cot y \frac{dy}{dx}$

$\Rightarrow \frac{1 - x\log\sin y}{x} = x \cot y \frac{dy}{dx}$

$\Rightarrow \frac{dy}{dx} = \frac{1 - x\log\sin y}{x^2\cot y}$

54. (C) tan13 – tan26 – cot77 + cot64

$\Rightarrow$ tan13 – tan26 – cot(90 –13) + cot(90 –26)

$\Rightarrow$ tan13 – tan26 – tan13 + tan26 = 0

55. (B) $I = \int \frac{x^4 - x - 1}{x^2+1}dx$

$I = \int \left(x^2 - 1 - \frac{x}{x^2+1}\right)dx$

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

$I = \frac{x^3}{3} - x - \frac{1}{2}\log(x^2+1) + c$

$I = \frac{x^3}{3} - x - \log\sqrt{x^2+1} + c$

56. (B) The required Probability = $\frac{1}{52}$

57. (C) $y\,dx - x\,dy = x^2 y\,dy$

$\Rightarrow \frac{y\,dx - x\,dy}{x^2} = y\,dy$

$\Rightarrow -\frac{x\,dy - y\,dx}{x^2} = y\,dy$

$\Rightarrow -d\left(\frac{y}{x}\right) = y\,dy$

On integrating

$\Rightarrow -\int d\left(\frac{y}{x}\right) = \int y\,dy$

$\Rightarrow -\frac{y}{x} = \frac{y^2}{2} - \frac{c}{2}$

$\Rightarrow -\frac{2y}{x} = y^2 - c$

$\Rightarrow y^2 + \frac{2y}{x} = c$ ....(i)

Given that $y(-1) = 3$

$(3)^2 + \frac{2\times3}{-1} = c \Rightarrow c = 3$

from eq(i)

$y^2 + \frac{2y}{x} = 3$

On puting $x = 1$

$\Rightarrow y^2 + \frac{2y}{1} = 3$

$\Rightarrow y^2 + 2y - 3 = 0$

$\Rightarrow y^2 + 3y - y - 3 = 0$

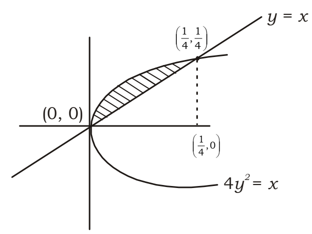
$\Rightarrow y(y + 3) -1(y + 3) = 0$

$\Rightarrow (y - 1)(y + 3) = 0$

$y = 1, -3$

Hence $y(1) = 1$ or $y(1) = -3$

58. (B)



$y_1 \Rightarrow 4y^2 = x$ and $y_2 \Rightarrow y = x$

Area = $\int_0^{1/4}(y_1 - y_2)\,dx$

Area = $\int_0^{1/4}\left(\frac{\sqrt{x}}{2} - x\right)dx$

Area = $\frac{1}{2}\left[\frac{x^{3/2}}{3/2}\right]_0^{1/4} - \left[\frac{x^2}{2}\right]_0^{1/4}$

Area = $\frac{1}{2}\times\frac{2}{3}\left[\left(\frac{1}{4}\right)^{3/2} - 0\right] - \frac{1}{2}\left[\left(\frac{1}{4}\right)^2 - 0\right]$

Area = $\frac{1}{3}\left[\frac{1}{8}\right] - \frac{1}{2}\left[\frac{1}{16}\right]$

Area = $\frac{1}{24} - \frac{1}{32} = \frac{1}{96}$ sq.unit

59. (B)

class	x	f	f×x
0-20	10	60	600
20-40	30	62	1860
40-60	50	58	2900
60-80	70	64	4480
80-100	90	56	5040
		$\sum f = 300$	14880

Mean = $\frac{\sum f\times x}{\sum f}$

Mean = $\frac{14880}{300} = 49.6$

60. (C) ${}^{37}C_{r+7} = {}^{37}C_{3r+2}$
Now, $r + 7 + 3r + 2 = 37$
$\Rightarrow 4r + 9 = 37 \Rightarrow r = 7$

61. (B) $I = \int \log(x+2)\,dx$
Let $x + 2 = t \Rightarrow dx = dt$
$I = \int \log t\,dt$
$I = \log t \int 1 . dt - \int\left\{\frac{d}{dt}(\log t).\int 1dt\right\}dt$
$I = (\log t).t - \int \frac{1}{t}.t\,dt$
$I = t\log t - t + c$
$I = (x + 2)\log(x + 2) - (x + 2) + c$
$I = (x + 2)\log(x + 2) - x + c$

62. (C) $\sin^{-1}(0.5) = \sin^{-1}\left(\frac{1}{2}\right)$
$\Rightarrow \sin^{-1}(0.5) = \sin^{-1}\left(\sin\frac{\pi}{6}\right) = \frac{\pi}{6}$

63. (B) $y = (1 + x^8)(1 + x^4)(1 + x^2)(1 - x^2)$
$y = (1 + x^8)(1 + x^4)(1 - x^4)$
$y = (1 + x^8)(1 - x^8)$
$y = 1 - x^{16}$
On differentiating both side w.r.t. 'x'
$\frac{dy}{dx} = 0 - 16x^{15}$
Again, differentiating
$\frac{d^2y}{dx^2} = -16 \times 15x^{14} = -240x^{14}$

64. (B)

7	7	6	5	4

$= 7 \times 7 \times 6 \times 5 \times 4 = 5880$
'0' can not put here

65. (C) $f(x) = \begin{cases} x^2 - 1, & x \ge 2 \\ 5 + \lambda x, & x < 2 \end{cases}$ is continuous
at $x = 2$,
then $\lim_{x\to 2^-} f(x) = \lim_{x\to 2^+} f(x)$
$\Rightarrow \lim_{x\to 2^-}(5 + \lambda x) = \lim_{x\to 2^+}(x^2 - 1)$
$\Rightarrow 5 + \lambda \times 2 = 2^2 - 1$
$\Rightarrow 5 + 2\lambda = 3 \Rightarrow \lambda = -1$

66. (D) A' = cofactor of A
$|A'| = |\text{cofactor of A}|$
$|A'| = (A)^{5-1}$ [$\because$ order = 5]
$|A'| = A^4$

67. (B) Equation $ax^2 + bx + c = 0$
roots = α and $\frac{1}{\alpha}$
Now, $\alpha.\frac{1}{\alpha} = \frac{c}{a}$
$\Rightarrow 1 = \frac{c}{a} \Rightarrow c = a$

68. (A) Let x and y are two persons and they hit a larget with the probability A and B respectively.
$\therefore P(A) = \frac{1}{5}$ and $P(B) = \frac{1}{4}$
P (Probability of hitting the larget by any one x or y)
$\Rightarrow P(A \cap \overline{B}) + P(\overline{A} \cap B)$
$\Rightarrow P(A) . P(\overline{B}) + P(\overline{A}).P(B)$
$\Rightarrow \frac{1}{5}\times\frac{3}{4} + \frac{4}{5}\times\frac{1}{4}$
$\Rightarrow \frac{3}{20} + \frac{4}{20} = \frac{7}{20}$

69. (A) $x^3 - 1 = (x - 1)(x^2 + x + 1)$
$x^3 - 1 = (x - 1)(x - \omega)(x - \omega^2)$

70. (D) In ΔABC, $\overrightarrow{AB} = 3\hat{i} + \hat{j} - \hat{k}$, $\overrightarrow{AC} = 3\hat{i} - 2\hat{j} + 5\hat{k}$
Now, $\overrightarrow{AB} \times \overrightarrow{AC} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 1 & -1 \\ 3 & -2 & 5 \end{vmatrix}$
$\Rightarrow \overrightarrow{AB} \times \overrightarrow{AC} = \hat{i}(5 - 2) - \hat{j}(15+3) + \hat{k}(-6-3)$
$\Rightarrow \overrightarrow{AB} \times \overrightarrow{AC} = 3\hat{i} - 18\hat{j} - 9\hat{k}$
Area of $\Delta ABC = \frac{1}{2}\left|\overrightarrow{AB} \times \overrightarrow{AC}\right|$
$= \frac{1}{2}\sqrt{3^2 + (-18)^2 + (-9)^2}$
$= \frac{1}{2}\sqrt{9 + 324 + 81}$
$= \frac{1}{2}\sqrt{414}$
$= \frac{1}{2} \times 3\sqrt{46} = \frac{3}{2}\sqrt{46}$

71. (B) $3^c = \left(3 \times \frac{180}{\pi}\right)^0$
$= \left(\frac{540 \times 7}{22}\right)^0$
$= \left(\frac{1890}{11}\right)^0 = 171^\circ\ 49'\ 5''$

72. (A) We know that

minimum value of $\left(ax^2 + \frac{b}{x^2}\right) = 2\sqrt{ab}$

So minimum value of ($27 \sin^2\theta + 12 \operatorname{cosec}^2\theta$)

$= 2\sqrt{27 \times 12}$

$= 2\sqrt{9 \times 3 \times 3 \times 4}$

$= 2 \times 3 \times 3 \times 2 = 36$

73. (C) Differential equation

$\frac{dy}{dx} + \frac{\sqrt{1-y^2}}{1-x^2} = 0$

$\Rightarrow \frac{dy}{dx} = -\frac{\sqrt{1-y^2}}{1-x^2}$

$\Rightarrow \frac{dy}{\sqrt{1-y^2}} = \frac{-dx}{\sqrt{1-x^2}}$

On integrating

$\Rightarrow \sin^{-1} y = \cos^{-1} x + c$

$\Rightarrow \sin^{-1} y - \cos^{-1} x = c$

74. (C) $\frac{1+\cos\theta}{1-\cos\theta} = 3$

$\Rightarrow 1 + \cos\theta = 3 - 3\cos\theta$

$\Rightarrow 4\cos\theta = 2$

$\Rightarrow \cos\theta = \frac{1}{2}$

$\Rightarrow \cos\theta = \cos\frac{\pi}{3}$

$\Rightarrow \theta = 2n\pi \pm \frac{\pi}{3}$

75. (D) $\int_0^{\pi} |\cos x|\, dx = 2\int_0^{\pi/2} \cos x \, dx$

$= 2\,[\sin x]_0^{\pi/2}$

$= 2\left[\sin\frac{\pi}{2} - \sin 0\right]$

$= 2\,[1 - 0] = 2$

76. (D) $\begin{vmatrix} 6i & 2i & 3 \\ 4 & -2i & -i \\ 5 & -6 & -2 \end{vmatrix} = x + iy$

$\Rightarrow 6i(4i - 6i) - 2i(-8 + 5i) + 3(-24 + 10i) = x + iy$

$\Rightarrow 6i(-2i) + 16i - 10i^2 - 72 + 30i = x + iy$

$\Rightarrow -12i^2 + 46i + 10 - 72 = x + iy$

$\Rightarrow 12 + 46i - 62 = x + iy$

$\Rightarrow -50 + 46i = x + iy$

On comparing

$x = -50$ and $y = 46$

77. (A) A.T.Q.

$m[a + (m-1)d] = n[a + (n-1)d]$

$\Rightarrow am + (m^2 - m)\, d = an + (n^2 - n)d$

$\Rightarrow a(m - n) = d(n^2 - n - m^2 + m)$

$\Rightarrow a(m - n) = (m - n)(1 - m - n)$

$\Rightarrow a(m - n) - d(m - n)(1 - m - n) = 0$

$\Rightarrow (m - n)[a + (m + n - 1)d] = 0$

$m - n \neq 0,\ a + (m + n - 1)d = 0$

Hence $(m + n)^{th}$ term = 0

78. (B) $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$ is an elementary matrix

Because its value = 1

79. (C) $(1 - \cos A + \sin A)^2 = 1 + \cos^2 A + \sin^2 A - 2\cos A - 2\sin A.\cos A + 2\sin A$

$\Rightarrow (1 - \cos A + \sin A)^2 = 2 - 2\cos A - 2\sin A.\cos A + 2\sin A$

$\Rightarrow (1 - \cos A + \sin A)^2 = 2(1 - \cos A) + 2\sin A(1 - \cos A)$

$\Rightarrow (1 - \cos A + \sin A)^2 = 2(1 - \cos A)(1 + \sin A)$

80. (D) $\frac{\theta^{\circ}}{\theta^{c}} = \frac{180}{\pi}$ ...(i)

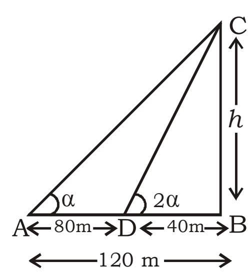
and $\theta^{\circ} \times \theta^{c} = \frac{80\pi}{9}$ ...(ii)

From eq(i) and (ii)

$\frac{\theta^{\circ}}{\theta^{c}} \times \theta^{\circ} \times \theta^{c} = \frac{180}{\pi} \times \frac{80\pi}{9}$

$(\theta^{\circ})^2 = 1600 \Rightarrow \theta^{\circ} = 40^{\circ}$

81. (C)



Let $\angle BAC = \alpha$, BC = h m

then $\angle BDC = 2\alpha$

In ΔABC

$\tan\alpha = \frac{BC}{AB}$

$\Rightarrow \tan\alpha = \frac{h}{120}$ ...(i)

In Δ**DBC**

$\tan 2\alpha = \frac{BC}{BD}$

$\Rightarrow \dfrac{2\tan\alpha}{1-\tan^2\alpha} = \dfrac{h}{40}$

$\Rightarrow \dfrac{2\times\dfrac{h}{120}}{1-\dfrac{h^2}{14400}} = \dfrac{h}{40}$

$\Rightarrow \dfrac{2\times 120}{14400-h^2} = \dfrac{1}{40}$

$\Rightarrow 14000 - h^2 = 9600$

$\Rightarrow h^2 = 4800 \Rightarrow h = 40\sqrt{3}$

Height of the tower = BC = $40\sqrt{3}$ m

82. (B) Given that

$\int x^3 \ln x\, dx = \dfrac{x^4}{a} \ln x + \dfrac{x^4}{b} + c$ ...(i)

Let I = $\int x^3 \ln x\, dx$

I = $\ln x . \int x^3\, dx - \int\left\{\dfrac{d}{dx}(\ln x)\int x^3 dx\right\} dx$

I = $(\ln x).\dfrac{x^4}{4} - \int \dfrac{1}{x}\times\dfrac{x^4}{4}\, dx$

I = $\dfrac{x^4}{4}\ln x - \dfrac{1}{4}\times\dfrac{1}{4}x^4 + c$

I = $\dfrac{x^4}{4}\ln x + \dfrac{x^4}{(-16)} + c$

On comparing with eq(i)

$a = 4$ and $b = -16$

83. (D) Given that $f(x) = \dfrac{2x}{1-x}$

then $f(f(x)) = f\left[\dfrac{2x}{1-x}\right]$

$\Rightarrow f(f(x)) = \dfrac{2\left(\dfrac{2x}{1-x}\right)}{1-\dfrac{2x}{1-x}}$

$\Rightarrow f(f(x)) = \dfrac{\dfrac{4x}{1-x}}{\dfrac{1-x-2x}{1-x}} = \dfrac{4x}{1-3x}$

84. (D) $\tan^{-1}\left(\tan\dfrac{5\pi}{6}\right)$

$\Rightarrow \tan^{-1}\left[\tan\left(\pi-\dfrac{\pi}{6}\right)\right]$

$\Rightarrow \tan^{-1}\left[-\tan\left(\dfrac{\pi}{6}\right)\right]$

$\Rightarrow \tan^{-1}\left[\tan\left(\dfrac{-\pi}{6}\right)\right] = \dfrac{-\pi}{6}$

85. (C) We know that

$C_0 + C_1x + C_2x^2 + \ldots\ldots C_nx^n = (1+x)^n$

On putting $x = 1$

$\Rightarrow C_0 + C_1 + C_2 \ldots\ldots\ldots + C_n = (1+1)^n = 2^n$

86. (B) $f(x) = \dfrac{\sqrt{\log_e(3x^2-5x+1)}}{x^2+4x-12}$

Now, $\log_e(3x^2 - 5x + 1) \geq 0$

$\Rightarrow 3x^2 - 5x + 1 \geq 1$

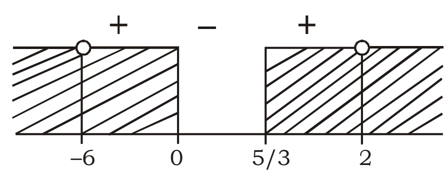
$\Rightarrow 3x^2 - 5x \geq 0$

$\Rightarrow x \leq 0,\ x \geq \dfrac{5}{3}$

and, $x^2 + 4x - 12 \neq 0$

$\Rightarrow (x+6)(x-2) \neq 0$

$\Rightarrow x \neq -6, 2$



Domain = $\left[(-\infty,0]\cup\left[\dfrac{5}{3},\infty\right)\right] - \{-6,2\}$

87. (A) I = $\int e^x \sin x\, dx$ ...(i)

I = $\sin x . \int e^x\, dx - \int\left\{\dfrac{d}{dx}(\sin x).\int e^x dx\right\} dx$

I = $(\sin x).e^x - \int \cos x . e^x dx$

I = $e^x.\sin x - \left[\cos x.\int e^x dx - \int\left\{\dfrac{d}{dx}(\cos x).\int e^x dx\right\}dx\right]$

I = $e^x.\sin x - \left[\cos x.e^x - \int(-\sin x)e^x dx\right] + 2c$

I = $e^x.\sin x - \cos x.e^x - \int \sin x.e^x + 2c$

I = $e^x.\sin x - \cos x.e^x - I + 2c$ [from eq(i)]

$2I = e^x(\sin x - \cos x) + 2c$

I = $\dfrac{(\sin x - \cos x)e^x}{2} + c$

88. (B) $y = \text{cosec}(\cot^{-1}x)$ ...(i)

On differentiating both side w.r.t. 'x'

$$\Rightarrow \frac{dy}{dx} = -\text{cosec}(\cot^{-1}x).\cot(\cot^{-1}x)\left(\frac{-1}{1+x^2}\right)$$

$$\Rightarrow \frac{dy}{dx} = \frac{y.x}{1+x^2} \quad \text{[from eq i)]}$$

$$\Rightarrow (1+x^2)\frac{dy}{dx} = xy$$

89. (A) $x = a\sin\theta.\cos\theta$

On differentiating both side w.r.t. 'θ'

$$\frac{dx}{d\theta} = a\sin\theta.(-\sin\theta) + a\cos\theta.\cos\theta$$

$$\frac{dx}{d\theta} = a(\cos^2\theta - \sin^2\theta)$$

$$\frac{dx}{d\theta} = a\cos 2\theta$$

and $y = a\theta.\cos\theta$

On differentiating both side w.r.t. 'θ'

$$\frac{dy}{d\theta} = a\,\theta.(-\sin\theta) + a\cos\theta.1$$

$$\frac{dy}{d\theta} = a(\cos\theta - \theta\sin\theta)$$

Now, $\frac{dy}{dx} = \frac{dy}{d\theta} \times \frac{d\theta}{dx}$

$$\Rightarrow \frac{dy}{dx} = a(\cos\theta - \theta\sin\theta) \times \frac{1}{a\cos 2\theta}$$

$$\Rightarrow \frac{dy}{dx} = \frac{\cos\theta - \theta\sin\theta}{\cos 2\theta}$$

90. (C) Equation $x^2 - 5x + 14 = 0$

Now, $B^2 - 4AC = (-5)^2 - 4\times1\times14$

$\Rightarrow B^2 - 4AC = 25 - 56$

$\Rightarrow B^2 - 4AC = -31 < 0$

Hence roots are imaginary.

91. (C) $\begin{vmatrix} 1/x & yz & x^2 \\ 1/y & xz & y^2 \\ 1/z & xy & z^2 \end{vmatrix}$

$$\Rightarrow \frac{xyz}{xyz}\begin{vmatrix} 1/x & yz & x^2 \\ 1/y & xz & y^2 \\ 1/z & xy & z^2 \end{vmatrix}$$

$$\Rightarrow \frac{1}{xyz}\begin{vmatrix} 1 & xyz & x^3 \\ 1 & xyz & y^3 \\ 1 & xyz & z^3 \end{vmatrix}$$

$$\Rightarrow \frac{xyz}{xyz}\begin{vmatrix} 1 & 1 & x^3 \\ 1 & 1 & y^3 \\ 1 & 1 & z^3 \end{vmatrix}$$

$= 0$ [$\because$ Two columns are identical.]

92. (C) $u^2 + v^2 + w^2 > d$

93. (D) $\sec\theta + \tan\theta = 4$ ...(i)

$\sec\theta - \tan\theta = \frac{1}{4}$

...(ii)

From eq(i) and eq(ii)

$2\tan\theta = 4 - \frac{1}{4}$

$\Rightarrow 2\tan\theta = \frac{15}{4} \Rightarrow \tan\theta = \frac{15}{8}$

94. (B) Given that $\sin\theta = \cos^2\theta$ ...(i)

$\Rightarrow \sin\theta = 1 - \sin^2\theta$

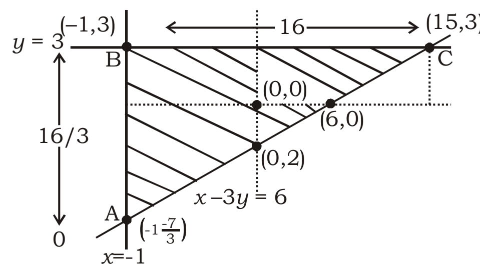
$\Rightarrow \sin\theta + \sin^2\theta = 1$

$\Rightarrow \sin\theta(1 + \sin\theta) = 1$

$\Rightarrow \cos^2\theta(1 + \cos^2\theta) = 1$ [from eq(i)]

95. (B)

96. (C)



Area of $\Delta ABC = \frac{1}{2} \times AB \times BC$

Area of $\Delta ABC = \frac{1}{2} \times \frac{16}{3} \times 16 = \frac{128}{3}$ sq. unit

97. (C) $y = 1 + \left(\frac{x}{3}\right) + \left(\frac{x}{3}\right)^2 + \left(\frac{x}{3}\right)^3 + \ldots\ldots\ldots\ldots$

$$\Rightarrow y = \frac{1}{1 - \frac{x}{3}}$$

$$\Rightarrow 1 - \frac{x}{3} = \frac{1}{y}$$

$$\Rightarrow \frac{x}{3} = 1 - \frac{1}{y} \Rightarrow x = 3\left(1 - \frac{1}{y}\right)$$

98. (B) $P(26, 18) = k.C(26, 8)$

$$\Rightarrow \frac{26!}{(26-18)!} = k.\frac{26!}{8!(26-8)!}$$

$$\Rightarrow \frac{1}{8!} = k \times \frac{1}{8! \times 18!} \Rightarrow k = 18!$$

99. (B) A.T.Q.

$2a = 3 \times 2b$

$\Rightarrow a = 3b$

Now, $b^2 = a^2(1 - e^2)$

$\Rightarrow b^2 = 9b^2(1 - e^2)$

$\Rightarrow \frac{1}{9} = 1 - e^2$

$\Rightarrow e^2 = \frac{8}{9} \Rightarrow e = \frac{2\sqrt{2}}{3}$

100. (A) Class size = 14 – 11.5 = 2.5

101. (B) $\lim_{n\to\infty} \frac{1^2 + 2^2 + 3^2 + \ldots\ldots + n^2}{1^3 + 2^3 + 3^3 + \ldots\ldots + n^3}$

$\Rightarrow \lim_{n\to\infty} \frac{\frac{n}{6}(n+1)(2n+1)}{\frac{n^2(n+1)^2}{4}}$

$\Rightarrow \lim_{n\to\infty} \frac{2(2n+1)}{3n(n+1)}$

$\Rightarrow \lim_{n\to\infty} \frac{2 \times n\left(2 + \frac{1}{n}\right)}{3n^2\left(1 + \frac{1}{n}\right)}$

$\Rightarrow \lim_{n\to\infty} \frac{2\left(2 + \frac{1}{n}\right)}{3n\left(1 + \frac{1}{n}\right)} = \frac{1}{\infty} = 0$

102. (C) Differential quation

$\sin\left(\frac{dy}{dx}\right) = x$

$\Rightarrow \frac{dy}{dx} = \sin^{-1}x$

$\Rightarrow dy = \sin^{-1} x\, dx$

On integrating

$\Rightarrow \int dy = \int \sin^{-1} x \; dx$

$y = \sin^{-1}x. \int 1dx - \int \left\{\frac{d}{dx}\left(\sin^{-1} x\right).\int 1.dx\right\} dx$

$y = (\sin^{-1} x).\ x - \int \frac{1}{\sqrt{1-x^2}} \times x\, dx$

$y = x.\ \sin^{-1}x + \frac{1}{2} \int \frac{-2x}{\sqrt{1-x^2}}\ dx$

$y = x.\ \sin^{-1}x + \frac{1}{2} \times \frac{\left(1-x^2\right)^{\frac{-1}{2}+1}}{-\frac{1}{2}+1} + c$

$y = x.\ \sin^{-1}x + \sqrt{1-x^2} + c$

103. (D) Given that $|\vec{a}| = 3$, $|\vec{b}| = 5$

and $\left(\vec{a} \times \vec{b}\right) = 12$

$\Rightarrow |\vec{a}|\,|\vec{b}| \sin\theta = 12$

$\Rightarrow 3 \times 5 \sin\theta = 12$

$\Rightarrow \sin\theta = \frac{4}{5} \Rightarrow \cos\theta = \frac{3}{5}$

Now, $\vec{a}\cdot\vec{b} = |\vec{a}|\,|\vec{b}| \cos\theta$

$\Rightarrow \vec{a}\cdot\vec{b} = 3 \times 5 \times \frac{3}{5} = 9$

104. (B) Given that $\vec{a} = -\hat{i} - 2\hat{j} - \hat{k}$, $\vec{b} = -\hat{i} + \hat{j} + 2\hat{k}$

From option (B)

Let $\vec{c} = -\hat{i} + \hat{j} - \hat{k}$

$\vec{a}\cdot\vec{c} = -1\times(-1) - 2\times1 - 1\times(-1)$

$\vec{a}\cdot\vec{c} = 1 - 2 + 1 = 0$

and $\vec{b}\cdot\vec{c} = -1\times(-1) + 1\times1 + 2\times(-1)$

$\vec{b}\cdot\vec{c} = 1 + 1 - 2 = 0$

Hence vector $-\hat{i} + \hat{j} - \hat{k}$ perpendicular to the given vectors.

105. (D) $\tan^{-1}\left(\frac{b}{a}\right) + \cot^{-1}\left(\frac{a+b}{a-b}\right)$

$\Rightarrow \tan^{-1}\left(\frac{b}{a}\right) + \tan^{-1}\left(\frac{a-b}{a+b}\right)$

$\Rightarrow \tan^{-1}\left[\frac{\frac{b}{a} + \frac{a-b}{a+b}}{1 - \frac{b}{a} \times \frac{a-b}{a+b}}\right]$

$\Rightarrow \tan^{-1}\left[\frac{ab + b^2 + a^2 - ab}{a^2 + ab - ab + b^2}\right]$

$\Rightarrow \tan^{-1}\left[\frac{a^2+b^2}{a^2+b^2}\right]$

$\Rightarrow \tan^{-1}1 = \frac{\pi}{4}$

106. (B) $\cos\left(\tan^{-1}\left(\tan\left(\sin^{-1}\left(-\frac{1}{2}\right)\right)\right)\right)$

$\Rightarrow \cos\left(\tan^{-1}\left(\tan\left(\sin^{-1}\left(\sin\left(-\frac{\pi}{6}\right)\right)\right)\right)\right)$

$\Rightarrow \cos\left(\tan^{-1}\left(\tan\left(-\frac{\pi}{6}\right)\right)\right)$

$\Rightarrow \cos\left(-\frac{\pi}{6}\right)$

$\Rightarrow \cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$

107. (C) 0.7 ×2 = [1].4 ×2 = [0].8 ×2 = [1].6 ×2 = [1].2 ×2 = [0].4 ×2 = [0].8 ×2 = [1].6

Hence $(0.7)_{10} = (0.1011001......)_2$

108. (B) (p, q) is the point on the y – axis, *i.e*
$p = 0$
A.T.Q.

$$\sqrt{(p+1)^2+(q-3)^2} = \sqrt{(p+3)^2+(q-2)^2}$$

$$\Rightarrow \sqrt{(0+1)^2+q^2+9-6q} = \sqrt{(0+3)^2+q^2+4-4q}$$

$\Rightarrow 1 + q^2 + 9 - 6q = 9 + q^2 + 4 - 4q$

$\Rightarrow 10 - 13 = 6q - 4q$

$\Rightarrow -3 = 2q \Rightarrow q = -\dfrac{3}{2}$

Hence $p = 0,\ q = -\dfrac{3}{2}$

109. (B) $C(n, r+1) + 2\,C(n, r) + C(n, r-1)$

$\Rightarrow {}^nC_{r+1} + {}^nC_r + {}^nC_r + {}^nC_{r-1}$

$$\Rightarrow \frac{n!}{(r+1)!(n-r-1)!}+\frac{n!}{r!(n-r)!}+\frac{n!}{r!(n-r)!}+\frac{n!}{(r-1)!(n-r+1)!}$$

$$\Rightarrow \frac{n!}{(r+1)r!(n-r-1)!}+\frac{n!}{r!(n-r)(n-r-1)!}+\frac{n!}{r(r-1)!(n-r)!}+\frac{n!}{(r-1)!(n-r+1)(n-r)!}$$

$$\Rightarrow \frac{n!}{r!(n-r-1)!}\left[\frac{1}{r+1}+\frac{1}{n-r}\right]+\frac{n!}{(r-1)!(n-r)!}\left[\frac{1}{r}+\frac{1}{n-r+1}\right]$$

$$\Rightarrow \frac{n!}{r!(n-r-1)!}\times\frac{n-r+r+1}{(r+1)(n-r)}+\frac{n!}{(r-1)!(n-r)!}\times\frac{n-r+1+r}{r(n-r+1)}$$

$$\Rightarrow \frac{n!(n+1)}{r!(n-r-1)!(r+1)(n-r)}+\frac{n!(n+1)}{r(r-1)!(n-r)!(n-r+1)}$$

$$\Rightarrow \frac{(n+1)!}{(r+1)r!(n-r)!}+\frac{(n+1)!}{r!(n-r+1)(n-r)!}$$

$$\Rightarrow \frac{(n+1)!}{r!(n-r)!}\left[\frac{1}{r+1}+\frac{1}{n-r+1}\right]$$

$$\Rightarrow \frac{(n+1)!}{r!(n-r)!}\times\frac{n-r+1+r+1}{(r+1)(n-r+1)}$$

$$\Rightarrow \frac{(n+1)!(n+2)}{(r+1)!(n-r+1)!}$$

$$\Rightarrow \frac{(n+2)!}{(r+1)!(n-r+1)!} = {}^{n+2}C_{r+1} = C(n+2, r+1)$$

110. (D) Given that $a = 3$, $b = 2$ and $\sin B = 2/3$
Sine Rule

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Now, $\dfrac{\sin A}{a} = \dfrac{\sin B}{b}$

$\Rightarrow \dfrac{\sin A}{3} = \dfrac{2/3}{2}$

$\Rightarrow \sin A = 1$

$\Rightarrow \sin A = \sin\dfrac{\pi}{2} \Rightarrow A = \dfrac{\pi}{2}$

111. (D) Given that $2\vec{a} + \vec{b} - 5\vec{c} = \vec{0}$

$\Rightarrow \vec{b} = 5\vec{c} - 2\vec{a}$

Now, $\vec{a}\times\vec{b} + \vec{b}\times\vec{c} + \vec{c}\times\vec{a} = \lambda\left(\vec{a}\times\vec{c}\right)$

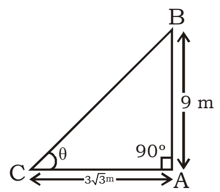
$\Rightarrow \vec{a}\times(5\vec{c}-2\vec{a}) + (5\vec{c}-2\vec{a})\times\vec{c} - \vec{a}\times\vec{c} = \lambda\left(\vec{a}\times\vec{c}\right)$

$\Rightarrow 5\vec{a}\times\vec{c} - 0 + 0 - 2\vec{a}\times\vec{c} - \vec{a}\times\vec{c} = \lambda\left(\vec{a}\times\vec{c}\right)$

$\Rightarrow 2\left(\vec{a}\times\vec{c}\right) = \lambda\left(\vec{a}\times\vec{c}\right)$

On comparing
$\lambda = 2$

112. (B)



Let ∠ACB = θ

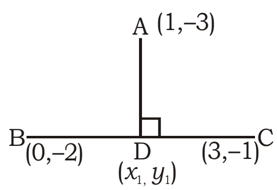
In ΔABC

$\tan\theta = \dfrac{AB}{AC}$

$\Rightarrow \tan\theta = \dfrac{9}{3\sqrt{3}}$

$\Rightarrow \tan\theta = \sqrt{3} \Rightarrow \theta = \dfrac{\pi}{3}$

113. (A)



Let D = (x_1, y_1)

Slope of BC(m_1) = $\dfrac{-1+2}{3-0} = \dfrac{1}{3}$

Slope of AD(m_2) = $\dfrac{y_1+3}{x_1-1}$

Slope of DC = $\dfrac{-1-y_1}{3-x_1}$

A.T.Q.

$m_1.m_2 = -1$

$\Rightarrow \dfrac{1}{3} \times \dfrac{y_1+3}{x_1-1} = -1$

$\Rightarrow y_1 + 3 = -3x + 3$

$\Rightarrow 3x_1 + y_1 = 0$ ...(i)

and $\dfrac{-1-y_1}{3-x_1} = \dfrac{1}{3}$

$\Rightarrow -3 - 3y_1 = 3 - x_1$

$\Rightarrow x_1 - 3y_1 = 6$

...(ii)

From eq(i) and eq(ii)

$x_1 = \dfrac{3}{5}$ and $y_1 = \dfrac{-9}{5}$

Hence co-ordinate of D = $\left(\dfrac{3}{5}, \dfrac{-9}{5}\right)$

114. (B) Let $y = 8\sin\theta + 6\sin^2\theta$

$y = 6\left(\sin^2\theta + \dfrac{4}{3}\sin\theta\right)$

$y = 6\left(\sin^2\theta + 2\times\dfrac{2}{3}\sin\theta + \left(\dfrac{2}{3}\right)^2 - \left(\dfrac{2}{3}\right)^2\right)$

$y = 6\left(\sin\theta + \dfrac{2}{3}\right)^2 - 6\times\dfrac{4}{9}$

$y = 6\left(\sin\theta + \dfrac{2}{3}\right)^2 - \dfrac{8}{3}$

For maximum value $\sin\theta = 1$

Maximum value of $y = 6\left(1+\dfrac{2}{3}\right)^2 - \dfrac{8}{3}$

$= 6 \times \left(\dfrac{5}{3}\right)^2 - \dfrac{8}{3} = 6 \times \dfrac{25}{9} - \dfrac{8}{3} = \dfrac{42}{3}$

115. (B) $\lim\limits_{x\to 0} \dfrac{5^x - 6^x}{\sin x}$ $\left[\dfrac{0}{0}\right]$ form

by L-Hospital's Rule

$\Rightarrow \lim\limits_{x\to 0} \dfrac{5^x \ln 5 - 6^x \ln 6}{\cos x}$

$\Rightarrow \dfrac{5^0 \ln 5 - 6^0 \ln 6}{\cos 0}$

$\Rightarrow \ln 5 - \ln 6 \Rightarrow \ln\left(\dfrac{5}{6}\right)$

116. (C) Differential equation

$\left(\dfrac{dy}{dx}\right)^{3/2} + \left(\dfrac{d^2y}{dx^2}\right)^{1/3} = y^2$

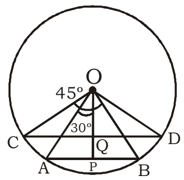
$\Rightarrow \left(\dfrac{dy}{dx}\right)^{3/2} - y^2 = \left(\dfrac{d^2y}{dx^2}\right)^{1/3}$

$\Rightarrow \left[\left(\dfrac{dy}{dx}\right)^{2/3} - y^2\right]^6 = \left[\left(\dfrac{d^2y}{dx^2}\right)^{1/3}\right]^6$

$\Rightarrow \left[\left(\dfrac{dy}{dx}\right)^{3/2} - y^2\right]^6 = \left(\dfrac{d^2y}{dx^2}\right)^2$

Order = 2, Degree = 2

117 . (B)



Given that

radius of circle = OA = OC = 30 cm

$\angle$AOB = 60° and $\angle$COD 90°

then $\angle$AOP = 30° and $\angle$COQ = 45°

In ΔCOQ

$$\cos 45° = \frac{OQ}{OC}$$

$$\Rightarrow \frac{1}{\sqrt{2}} = \frac{OQ}{30} \Rightarrow OQ = \frac{30}{\sqrt{2}}$$

In ΔAOP

$$\cos 30° = \frac{PO}{OA}$$

$$\Rightarrow \frac{\sqrt{3}}{2} = \frac{PO}{30} \Rightarrow PO = 15\sqrt{3}$$

Now, PQ = PO – OP

$$\Rightarrow PQ = 15\sqrt{3} - \frac{30}{\sqrt{2}}$$

$$\Rightarrow PQ = \frac{15\sqrt{6} - 30}{\sqrt{2}}$$

$$\Rightarrow PQ = \frac{15}{\sqrt{2}}\left(\sqrt{6} - 2\right) \text{ cm}$$

The required distance = $\frac{15}{\sqrt{2}}\left(\sqrt{6} - 2\right)$ cm

118. (B) Given that $x = a(y + z)$, $y = b(z + x)$, $z = c(x + y)$

Now, $x = a(y + z)$

$$\Rightarrow a = \frac{x}{y + z}$$

$$\Rightarrow a + 1 = \frac{x + y + z}{y + z}$$

Similarly $b + 1 = \frac{x + y + z}{x + z}$, $c + 1 = \frac{x + y + z}{x + y}$

Now, $\frac{1}{1 + a} + \frac{1}{1 + b} + \frac{1}{1 + c}$

$$\Rightarrow \frac{y + z}{x + y + z} + \frac{x + z}{x + y + z} + \frac{x + y}{x + y + z}$$

$$\Rightarrow \frac{2(x + y + z)}{x + y + z} = 2$$

119. (C) In ΔABC, A(–1, 2), B (–2, 5), C(– 4, 6)

$$\text{centroid} = \left(\frac{-1 - 2 - 4}{3}, \frac{2 + 5 + 6}{3}\right)$$

$$= \left(\frac{-7}{3}, \frac{13}{3}\right)$$

120. (B) $y = \log_a x + \log_x a + \log_x x + \log_a a$

$$y = \frac{\log_e x}{\log_e a} + \frac{\log_e a}{\log_e x} + 1 + 1$$

On differentiating both side w.r.t. 'x'

$$\frac{dy}{dx} = \frac{1}{\log_e a} \times \frac{1}{x} + \log_e a \left[\frac{-1}{(\log_e x)^2}\right] \times \frac{1}{x}$$

$$\frac{dy}{dx} = \frac{1}{x \log_e a} - \frac{\log_e a}{x.(\log_e x)^2}$$

NDA (MATHS) MOCK TEST - 148 (Answer Key)

1. (B)	21. (B)	41. (D)	61. (B)	81. (C)	101. (B)
2. (A)	22. (C)	42. (B)	62. (C)	82. (B)	102. (C)
3. (D)	23. (B)	43. (A)	63. (B)	83. (D)	103. (D)
4. (C)	24. (C)	44. (B)	64. (B)	84. (D)	104. (B)
5. (A)	25. (B)	45. (B)	65. (C)	85. (C)	105. (D)
6. (B)	26. (B)	46. (C)	66. (D)	86. (B)	106. (B)
7. (C)	27. (C)	47. (B)	67. (B)	87. (A)	107. (C)
8. (C)	28. (D)	48. (C)	68. (A)	88. (B)	108. (B)
9. (A)	29. (C)	49. (D)	69. (A)	89. (A)	109. (B)
10. (D)	30. (B)	50. (B)	70. (D)	90. (C)	110. (D)
11. (C)	31. (C)	51. (B)	71. (B)	91. (C)	111. (D)
12. (B)	32. (C)	52. (D)	72. (A)	92. (C)	112. (B)
13. (A)	33. (D)	53. (B)	73. (C)	93. (D)	113. (A)
14. (B)	34. (A)	54. (C)	74. (C)	94. (B)	114. (B)
15. (C)	35. (B)	55. (B)	75. (D)	95. (B)	115. (B)
16. (B)	36. (C)	56. (B)	76. (D)	96. (C)	116. (C)
17. (B)	37. (B)	57. (C)	77. (A)	97. (C)	117 . (B)
18. (B)	38. (B)	58. (B)	78. (B)	98. (B)	118. (B)
19. (C)	39. (B)	59. (B)	79. (C)	99. (B)	119. (C)
20. (B)	40. (A)	60. (C)	80. (D)	100. (A)	120. (B)

Note:- If your opinion differs regarding any answer, please message the mock test and question number to 8860330003

Note:- Whatsapp with Mock Test No. and Question No. at 7053606571 for any of the doubts, also share your suggestions and experience of Sunday Mock

Note:- If you face any problem regarding result or marks scored, please contact 9313111777