ALLEN CAREER INSTITUTE KOTA (RAJASTHAN) path to success

CLASSROOM CONTACT PROGRAMME
(Academic Session : 2016 - 2017)

LEADER & ENTHUSIAST COURSE

TARGET : JEE (MAIN) 2017

Test Type : **ALL INDIA OPEN TEST** Test Pattern : JEE-Main

TEST DATE : 29 - 01 - 2017

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	3	2	2	1	3	3	3	2	3	4	4	1	2	3	1	2	3	1	3	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	1	3	4	2	3	2	4	4	3	4	3	1	3	4	3	1	1	4	1
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	3	4	1	1	4	1	2	2	1	4	3	4	4	1	2	3	3	3	4
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans.	2	2	3	1	2	4	2	1	4	2	3	2	4	3	4	3	3	3	2	4
Que.	81	82	83	84	85	86	87	88	89	90										
Ans.	1	3	4	4	2	3	4	2	3	1										

HINT – SHEET

1. Ans. (3)

Sol. $\tau = MB\sin\theta$

$$\sin\theta = \frac{\tau}{MB} = \frac{1.2\times10^{-3}}{60\times40\times10^{-6}}$$

$$= \frac{1}{2} \Rightarrow \theta = 30°$$

2. Ans. (2)

Sol. $I = \frac{I_0}{2}\times\cos^2 30°\times\cos^2 30°$

$$= \frac{9I_0}{32}$$

3. Ans. (2)

4. Ans. (1)

Sol. $b = \frac{F}{v} = \frac{120}{1}, r = \frac{b}{2m} = \frac{60}{7000\times2}$

$$\omega = \sqrt{\omega_0^2 - r^2}$$

$kx = F$

$$k = \frac{450}{2} = 225 = \sqrt{\frac{225}{700} - \frac{60^2}{700^2}}$$

$$= \sqrt{\frac{225\times700 - 3600}{700^2}} = 0.56 \text{ rad/s}$$

5. Ans. (3)

Sol. $\lambda = \frac{1}{\sqrt{2}\pi\sigma^2 n*}$

$\lambda^2 = \lambda_x^2 + \lambda_y^2 + \lambda_z^2$

$$\lambda_x = \frac{\lambda}{\sqrt{3}}$$

6. Ans. (3)

7. Ans. (3)

8. Ans. (2)

Sol. $\Delta f = 1.5$ MHz

$f_{modulating} = 750$ kHz

9. Ans. (3)

Sol. $\mu mgR = \frac{1}{2} mR^2\alpha \Rightarrow \alpha = \frac{2\mu g}{R}$

$\mu mg = ma \Rightarrow a = \mu g$

$v = at = \mu gt$

$\omega = \omega_0 - \alpha t = \omega_0 - \frac{2\mu gt}{R}$

$v = R\omega$

$\Rightarrow \mu gt = \omega_0 R - 2\mu_g t$

$t = \frac{\omega_0}{3\mu g}R$

10. Ans. (4)

Sol. $i_E \approx i_C = 10^{-3}$ A

$v_{R_1} = 2.5V$

$v_{R_2} = 5V$

11. Ans. (4)

12. Ans. (1)

Sol. Minimum magnifying power $\Rightarrow$ Image is at ∞

$m = \frac{D}{f} = \frac{\theta}{\theta_0}$

for microscope $d_{min} = \frac{0.61\lambda}{\sin\alpha}$

$\frac{d_{min}}{D} = \theta_0 = \frac{0.61\lambda}{D\sin\alpha}$

for eye, $\theta_{min} = \frac{1.22\lambda}{d} = \theta$

$m_{min} = \frac{\frac{1.22\lambda}{d}}{\frac{0.61\lambda}{D\sin\alpha}} = \frac{2D\sin\alpha}{d} = 30$

13. Ans. (2)

Sol. $\omega = \frac{1}{\sqrt{LC}}$

$= \frac{1}{\sqrt{\mu_0 n^2 A\ell \times \frac{\epsilon_0 A_1}{d}}} = \frac{1}{\sqrt{\frac{\mu_0 N^2}{\ell} A \times \frac{\epsilon_0 A_1}{d}}}$

$\Rightarrow \omega = \frac{\omega_0}{2}$

14. Ans. (3)

Sol. $\frac{1}{2f\sqrt{\mu}} = 8\times10^{-3}$

$\frac{1}{2\times10^{-2}\times8\times10^{-3}} = f$

$f = \frac{10^5}{16} = \frac{100\times100\times10}{4\times4}$

$= 6250$ Hz

$\frac{\Delta f}{f} = \frac{1}{2}\frac{\Delta\mu}{\mu} + \frac{\Delta slope}{slope}$

$= \frac{1}{10} + \frac{0.3}{80} = \frac{11}{80}$

$\Delta f = 6250\times\frac{11}{80} = 859.8Hz$

15. Ans. (1)

Sol. $\frac{\theta}{t} = \frac{\omega+\omega_0}{2}$

$\theta = \frac{720}{2\times60}\times8 = 48$

16. Ans. (2)

Sol. $Mg - B = Mf$

$B - (M - CM)g = (M - CM)f$

$CMg = (2M - CM)f$

$Cg + Cf = 2f$

$C = \frac{2f}{g+f}$

17. Ans. (3)

Sol. $0 = 40\ S_A + 40S_P$

$S_A = -S_P = 60$ cm

$S_P = -60$ cm.

18. Ans. (1)

Sol. $v = \sqrt{\frac{B}{\rho}}$

$B = \rho v^2 = 5.4^2 \times 10^6 \times 2.7 \times 10^3$

$= 7.9 \times 10^{10}$ Pa

19. Ans. (3)

20. Ans. (1)

Sol. $f = C \times 1^2\left(\frac{1}{1^2} - \frac{1}{9}\right) = \frac{8}{9}C$

$f' = C \times 3^2\left(\frac{1}{1^2} - \frac{1}{2^2}\right) = \frac{27}{4}C = \frac{27}{4}\times\frac{9f}{8}$

21. Ans. (3)

Sol. $C_v = \dfrac{2\times\frac{3}{2}R + \frac{1}{2}\times\frac{5}{2}R}{2+\frac{1}{2}} = \dfrac{3R+\frac{5R}{4}}{\frac{5}{2}} = \dfrac{17R}{4}\times\dfrac{2}{5}$

$= \dfrac{17R}{10} = \dfrac{R}{\gamma-1}$

$\Rightarrow 17\gamma = 27$

$\gamma = \dfrac{27}{17}$

22. Ans. (1)

23. Ans. (3)

Sol. $\dfrac{1}{f} = (\mu-1)\left(\dfrac{1}{R_1} - \dfrac{1}{R_2}\right)$

$\mu_v > \mu_R$

$\Rightarrow f_v < f_R$

24. Ans. (4)

Sol. $v = -\dfrac{kQ^2}{a}\times 5 + \dfrac{kQ^2}{a}\times 7$

$-\dfrac{kQ^2}{\sqrt{2}a}\times 7 + \dfrac{kQ^2}{\sqrt{2}a}\times 5 + \dfrac{2kQq}{\frac{\sqrt{3}a}{2}}$

$= \dfrac{2kQ^2}{a} - \dfrac{2kQ^2}{\sqrt{2}a} + \dfrac{4kQq}{\sqrt{3}a}$

25. Ans. (2)

Sol. $R_1 = \dfrac{2\ell}{kA}$

$R_2 = \dfrac{3\ell}{kA}$

heat goes in inverse ratio of resistance

$i_1 = \dfrac{T_A - T_C}{R_1} = \dfrac{T_B - T_C}{R}$

$i_2 = \dfrac{T_A - T_C}{R_2} = \dfrac{T_D - T_C}{R}$

dividing, $\dfrac{R_2}{R_1} = \dfrac{T_B - T_C}{T_D - T_C}$

$3T_D - 3T_C = 2T_B - 2T_C$

$T_C = 3T_D - 2T_B$

26. Ans. (3)

Sol. $G = \dfrac{0.15}{5\times10^{-2}} = 3\Omega$

$i_g G = (i - i_g)R_S$

$50 \times 10^{-3} r^3 = (1 - 0.05) \times R$

27. Ans. (2)

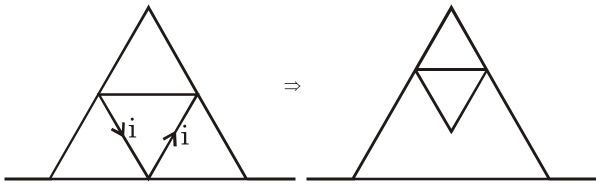
Sol. $E \times 4\pi r^2 = \dfrac{\int \rho \times 4\pi r^2 dr}{\epsilon_0}$

$4\pi\alpha r^3 = 4\pi\int \dfrac{\rho r^2}{\epsilon_0} dr = \dfrac{Q}{\epsilon_0}$

$Q = 4\pi\epsilon_0 \alpha r^3$

28. Ans. (4)

Sol.



$R_{eq} = \dfrac{\frac{5R}{2}\times 2R}{\frac{5R}{2}+2R} = \dfrac{5R}{4.5}$

29. Ans. (4)

Sol. $v = 10\left[\sin\left(\omega t + \dfrac{\pi}{6}\right)\right]$

$i = 5\sin\left(\omega t + \dfrac{\pi}{4}\right)$

$\Delta p = \dfrac{\pi}{4} - \dfrac{\pi}{6} = \dfrac{3\pi - 2\pi}{12} = \dfrac{\pi}{12}$

30. Ans. (3)

Sol. $p = \dfrac{2\pi mv\cos\theta}{qB}$

$R = \dfrac{mv\sin\theta}{qB} = \dfrac{p}{2\pi}\tan\theta$

31. Ans (4)

$U_{avg.} = \sqrt{\dfrac{8\times\pi\times10\times10^5\times8}{2\times\pi\times32\times10^{-3}}} = \sqrt{10^9}$ m/sec.

32. Ans. (3)

$(\Delta S_r)_{T_2} - (\Delta S_r)_{T_1} = (\Delta C_p)_r \ln\dfrac{T_2}{T_1}$

(A) It depends on $(\Delta C_p)_r$

(B) It depends on $(\Delta C_p)_r$

(C) $k = 4e^{-Ea/RT}$

(D) Activation energy is independent of temperature

33. Ans. (1)

34. Ans. (3)

A	B	C	D
1	3	3	8

35. Ans. (4)

contribution due to water can not be neglected

$H_2O \rightarrow H^+ + OH^-$

$x \qquad 2 \times 10^{-7} + x$

$10^{-14} = x\,[2 \times 10^{-7} + x]$

$x^2 + 2 \times 10^{-7}\,x + 10^{-14} = 0$

$$x = \frac{-2\times10^{-7}+\sqrt{4\times10^{-14}+4\times10^{-14}}}{2}$$

$= \left(\sqrt{2}-1\right)\times10^{-7}$

$= 0.414 \times 10^{-7}$

$[OH^-] = 2 \times 10^{-7} + 0.414 \times 10^{-7}$

$= 2.414 \times 10^{-7}$

$Ksp = [B^+]\,[OH^-]^2$

$= [10^{-7}]\,(2.414 \times 10^{-7})^2$

$= 5.82 \times 10^{-21}$

36. Ans. (3)

37. Ans. (1)

38. Ans.(1)

$\Delta T_b = kb \times m \times i$

$10 = 0.5 \times \frac{4}{w} \times 1000 \times 3$

W = 600 gm

Mass of water evaporated = 1400 gm

39. Ans.(4)

$$K = \frac{1}{t_{20}}\ln\frac{100}{80} = \frac{1}{t_{60}}\ln\frac{100}{40}$$

$$\frac{t_{60}}{t_{20}} = \frac{\ln 5/2}{\ln 5/4} = \frac{\log 5/2}{\log 5/4} = \frac{0.3979}{0.09691} = 4$$

40. Ans.(1)

Moles of $C_6H_{12}O_6$ required $= \frac{75000\times10\times10}{180}$

Moles of CO_2 required

$= \frac{75000\times10\times10}{180}\times 6 = 2500 \times 100 = 2.5 \times 10^5$ mol.

41. Ans. (1)

Sol. In alkalimetals down the group hardness decreases due to decrease in metallic bond strength.

42. Ans. (3)

Sol. In $[Ni(CO)_3(PMe_3)]$ extent of synergic bonding towards CO will be maximum. So C–O bond order will be minimum hence C–O bond length will be maximum.

43. Ans. (4)

Sol. Due to poor metallic bonding in Zn enthalpy of atomisation is lowest.

44. Ans. (1)

Sol. $\overset{+5}{V}O_2^{\oplus}$, $\overset{+6}{Cr_2}O_7^{2-}$, $\overset{+7}{Mn}O_4^{\ominus}$

45. Ans.(1)

Sol. (1) Monds process

46. Ans.(4)

Sol. All are soluble in aqua regia

47. Ans. (1)

Sol. $Mn(OH)_2 + H_2O_2 \rightarrow MnO(OH)_2 + H_2O$

48. Ans.(2)

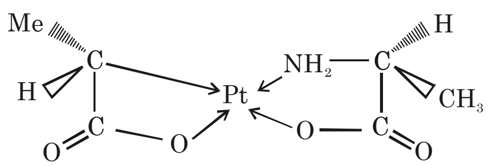
Sol. $K_4\left[\overset{+2}{Fe}(CN)_5(O_2)\right]$ is paramagnetic due to $O_2^{\ominus}$

$[NiF_6]^{2-} \rightarrow d^2sp^3$ hybridisation, diamagnetic

$[Fe(H_2O)_5(NO)]^{+2} \rightarrow$ paramagnetic

49. Ans.(2)

Sol.



is optically active due to absence of P.O.S.

50. Ans.(1)

Sol. $H_2O \rightarrow sp^3$ hybridisation, V-shape

$NH_3 \rightarrow sp^3$ hybridisation, pyramidal shpae

$Ni(CO)_4$, $[Ni(CN)_4]^{4-}$ both are sp^3 hybridised, tetrahedral in shape

$XeF_4 \rightarrow sp^3d^2$ hybridization square planar shape, $[Fe(CO)_4]^{2-} \rightarrow sp^3$ hybridization, tetrahedral slape

$SF_4 \rightarrow sp^3d$ hybridization sea saw shape, $CF_4 \rightarrow$ tetrahedral, sp^3 hybridisation

51. Ans. (4)

52. Ans. (3)

53. Ans. (4)

54. Ans. (4)

55. Ans. (1)

56. Ans. (2)

57. Ans. (3)

58. Ans. (3)

59. Ans. (3)

60. Ans. (4)

61. Ans. (2)

Using $\int_0^1 f(x)dx = \int_0^1 f(1-x)dx$

$$I = \int_0^1 \sqrt[3]{x^2(2x-3)+(1-x)}\,dx$$

$$= \int_0^1 \sqrt[3]{(1-x)^2(-1-2x)+x}\,dx$$

$$= -\int_0^1 \sqrt[3]{(x^2-2x+1)(1+2x)-x}\,dx$$

$$= -\int_0^1 \sqrt{2x^3-3x^2-x+1}\,dx = -I$$

$2I = 0 \qquad \therefore \quad I = 0$

62. Ans. (2)

Given $I = \prod_{r=1}^{59}\left(1 - \frac{\cos(60°+r°)}{\cos r°}\right)$

$$= \prod_{r=1}^{59} \frac{\sin(30°+r°)}{\cos r°}$$

$$= \frac{\sin 31°.\sin 32°......\sin 89°}{\cos 1°.\cos 2.......\cos 59°} = 1$$

63. Ans. (3)

$$\left(\frac{2\sin x - 1}{2\sin x}\right)\cos^2 2x = \frac{2\sin^2 x - 3\sin x + 1}{\sin x}$$

$$= \frac{(2\sin x - 1)(\sin x - 1)}{\sin x}$$

$\Rightarrow \quad \sin x = \frac{1}{2} \qquad$ or $\qquad \frac{1}{2}\cos^2 2x = \sin x - 1$

$\Downarrow \qquad\qquad\qquad \geq 0 \qquad \leq 0$

4 solutions $\qquad$ Hence no solution

64. Ans. (1)

$$I = \int_0^{\pi/2}\left(\frac{\sin^2 x}{1+(2017)} + \frac{\sin^2 x}{1+(2017)^{-x}}\right)dx$$

$$= \int_0^{\pi/2} \sin^2 x dx = \frac{\pi}{4}$$

65. Ans. (2)

Given : $\frac{\cos^4\alpha}{\cos^2\beta} + \frac{\sin^4\alpha}{\sin^2\beta} = 1$

Let : $\frac{\cos^2\alpha}{\cos\beta} = \cos\theta \qquad \frac{\sin^2\alpha}{\sin\beta} = \sin\theta$

$\cos^2\alpha = \cos\beta\cos\theta \qquad \sin^2\alpha = \sin\beta\sin\theta$

$1 = \cos(\beta - \theta) \quad \Rightarrow \quad \beta = \theta + 2n\pi$

$\therefore \quad \cos^2\alpha = \cos^2\beta \quad \& \quad \sin^2\alpha = \sin^2\beta$

$\therefore \quad \frac{\cos^4\beta}{\cos^2\alpha} + \frac{\sin^4\beta}{\sin^2\alpha} = \cos^2\beta + \sin^2\beta = 1$

66. Ans. (4)

$$I = \int \frac{\text{cosec}^2 x}{(\text{cosec}x + \cot x)^{9/2}}dx$$

Put cosecx + cotx = z

cosecx – cotx = $\frac{1}{z}$.

$-2\text{cosec}^2 x dx = \left(1 + \frac{1}{z^2}\right)dz$

$$\therefore \quad I = -\frac{1}{2}\int \frac{1+\frac{1}{z^2}}{z^{9/2}}dz = -\frac{1}{2}\left[\int z^{-9/2}dz + \int z^{\frac{-13}{2}}dz\right]$$

$$= -\frac{1}{2}\left[\frac{z^{-7/2}}{(-7)}2 + \frac{z^{-11/2}}{(-11)}2\right] + C$$

$$= z^{\frac{-7}{2}}\left[\frac{1}{7} + \frac{z^{-3}}{11}\right] + C$$

$$= (\text{cosec}x - \cot x)^{\frac{7}{2}}\left(\frac{1}{7} + \frac{(\text{cosec}x - \cot x)^2}{11}\right) + C$$

67. Ans. (2)

$E \to 2, A \to 2, R \to 1$

$T \to 1, H \to 1, Q \to 1, U \to 1, K \to 1$

$\boxed{\text{RAHU}}$ EEATQK

$\frac{7!}{2!}$

68. Ans. (1)

$(1 + t^2)^{10}(1 + t^{10} + t^{20} + t^{30})$

$= (1 + {}^{10}C_1 t^2 + {}^{10}C_2 t^4 + \ldots.. + {}^{10}C_{10} t^{20})$
$(1 + t^{10} + t^{20} + t^{30})$

$\therefore$ Coefficient $= {}^{10}C_{10} + {}^{10}C_5 + {}^{10}C_0 = 2 + {}^{10}C_5$

69. Ans. (4)

$P(z) = \frac{1}{6} \qquad P(\overline{z}) = \frac{5}{6}$

$\therefore$ P(2comes in even trial)

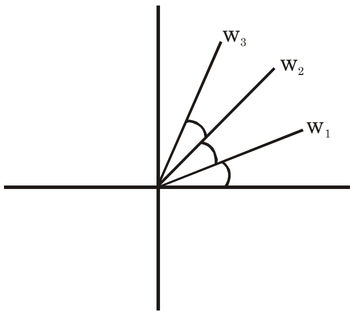
$= P(\overline{z}\,z \text{ or } \overline{z}\,\overline{z}\,\overline{z}\,z \text{ or } \ldots\ldots..\infty)$

$= \frac{5}{6} \times \frac{1}{6} + \left(\frac{5}{6}\right)^3 . \frac{1}{6} + \ldots\ldots\infty$

$= \dfrac{\frac{5}{6} \times \frac{1}{6}}{1 - \left(\frac{5}{6}\right)^2} = \frac{5}{11}$

70. Ans. (2)

$$\frac{|w_3 - w_2| + |w_5 - w_4| + |w_7 - w_6| + \ldots.. + |w_{17} - w_{16}|}{|w_2 - w_1| + |w_5 - w_9| + |w_8 - w_7| + |w_{11} - w_{10}|}$$



$\therefore \quad |w_1 - w_2| = |w_2 - w_3| = \ldots.. = a$

$\therefore \quad$ Ratio $= \frac{8a}{4a} = 2$

71. Ans. (3)

$$\sum_{n=2}^{\infty} \frac{n}{1 + n^4 - 2n^2} = \frac{1}{4} \sum_{n=2}^{\infty} \frac{(n+1)^2 - (n-1)^2}{(n+1)^2 \times (n-1)^2}$$

$$= \frac{1}{4} \sum_{n=2}^{\infty} \left(\frac{1}{(n-1)^2} - \frac{1}{(n+1)^2} \right) = \frac{5}{16}$$

72. Ans. (2)

Use A.M. $\geq$ G.M.

$$\frac{x^{2017} + y^{2017} + z^{2017} + \underbrace{1 + 1 + \ldots. + 1}_{2014 \text{ times}}}{2017}$$

$$\geq \left(z^{2017}.y^{2017}.z^{2017}.1.1\ldots.1\right)^{\frac{1}{2017}}$$

$\therefore \quad E \geq -2014$

73. Ans. (4)

Since $A^2 = A \Rightarrow A^3 = A \Rightarrow A^4 = A$

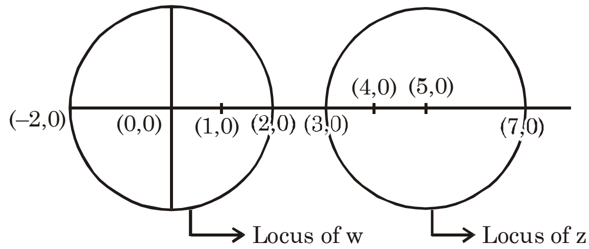
$\therefore \quad (I + A)^4$

$= {}^4C_0 I^4 + {}^4C_1 A + {}^4C_2 A^2 + {}^4C_3 A^3 + {}^4C_4 A^4$

$= I + 15A$

74. Ans. (3)

$\left|\frac{z-1}{z-4}\right| = 2$ and $\left|\frac{w-4}{w-1}\right| = 2$



$\therefore \quad |z - w|_{max} = 9, \quad |z - w|_{min} = 1$

75. Ans. (4)

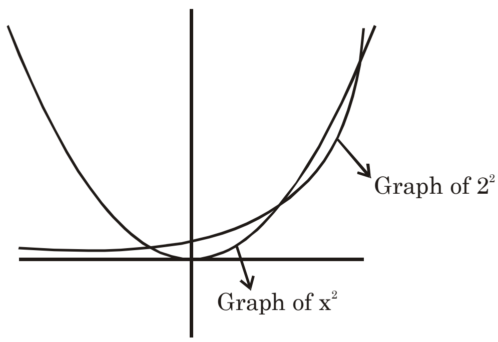
sinAcosBcosC + sinBcosCcosA + sinCcosAcosB

= cosAcosBcosC(tanA + tanB + tanC)

= cosAcosBcosC . tanA tanB tanC

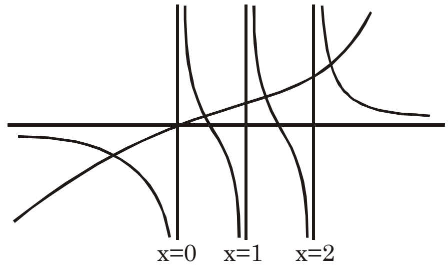
= sinAsinBsinC

76. Ans. (3)



77. Ans. (3)

Make graphs



Clearly graphs intersects at 4 points

78. Ans. (3)

Clearly $\sin^{-1}\sqrt{x} \Rightarrow x \in [0, 1]$

Also $\cos^{-1}\sqrt{x^2-1} \Rightarrow 0 \le x^2 - 1 \le 1$

$x^2 \in [1, 2]$

$\therefore$ Possible value of x = 1

$\therefore$ Equation becomes $\frac{\pi}{2}+\frac{\pi}{2}+\tan^{-1}\tan y = a$

$\therefore$ for solution $a \in \left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$

$\therefore$ integral values are 2, 3, 4

79. Ans. (2)

Line AB $\frac{x-\sqrt{3}}{\cos 60°} = \frac{y}{\sin 60°} = r$

$x = \sqrt{3} + \frac{r}{2},\ y = \frac{r\sqrt{3}}{2}$

$\therefore$ Point $\left(\sqrt{3}+\frac{r}{2}, \frac{r\sqrt{3}}{2}\right)$ lies on $2y^2 = 2x + 3$

$\therefore$ $\frac{3r^2}{2} = 2\sqrt{3} + r + 3$

$\Rightarrow 3r^2 - 2r - \left(6+4\sqrt{3}\right) = 0$

PA and –PB are roots

$\therefore$ $PA - PB = \frac{2}{3}$

$PA.PB = \frac{6+4\sqrt{3}}{3}$

80. Ans. (4)

Point P lie on director circle of given ellipse

$\frac{x^2}{16}+\frac{y^2}{9}=1$

$\therefore$ angle between tangents is $\frac{\pi}{2}$

81. Ans. (1)

Given curve is $(x - 5)(y - 7) = 35$

$\therefore$ Length of LR $= 2\sqrt{(2)(35)} = \sqrt{280}$

82. Ans. (3)

Symmetric and transitive but not reflexive

83. Ans. (4)

Use : $\sigma^2 \ge 0 \Rightarrow \frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2 \ge 0$

$\Rightarrow \frac{400}{n} - \frac{10000}{n^2} \ge 0 \Rightarrow n \ge 25$

84. Ans. (4)

$A^2 = \begin{bmatrix}1 & 0\\1 & 1\end{bmatrix}\begin{bmatrix}1 & 0\\1 & 1\end{bmatrix} = \begin{bmatrix}1 & 0\\2 & 1\end{bmatrix}$

it satisfies only option (4)

85. Ans. (2)

use $\sim(p \Rightarrow q) \equiv p \wedge (-q)$

Option (2) is correct.

86. Ans. (3)

$\lim_{x\to 1}\frac{(x-1)(x+1)}{\sin^2 x - \sin^2 1}$

$\lim_{x\to 1}\frac{(x-1)(x+1)}{\sin(x-1)\sin(x+1)}$

$\frac{2}{\sin 2}$

87. Ans. (4)

$\begin{vmatrix}1-x & 1 & 1\\1 & 1-y & 1\\1 & 1 & 1-z\end{vmatrix} = 0$

on solve we get $\frac{1}{x}+\frac{1}{y}+\frac{1}{z} = 1$

88. Ans. (2)

$\begin{vmatrix}5 & -5 & 5-a\\2 & -3 & p\\2 & 4 & 2\end{vmatrix} = 0$

$\Rightarrow 60 - 30p - 14a = 0$ .....(1)

Lines are perpendicular

$\therefore$ $4 - 12 + 2p = 0$ .....(2)

from (1) & (2)

$P = 4,\ a = \frac{-30}{7}$

89. Ans. (3)

$f'(x) = \begin{cases} e^{3x}(1+3x), & x \le 0 \\ 1+6x-3x^2, & x > 0\end{cases}$

$\therefore$ $f'(x)$ is continuous at x = 0

$f''(x) = \begin{cases} e^{3x}(6+9x), & x \le 0 \\ 6-6x, & x > 0\end{cases}$

for ↑ fn : $6 + 9x > 0$ or $6 - 6x > 0$

$x > -\frac{6}{9}$ $\quad$ $x < 1$

$\therefore$ $x \in \left(-\frac{6}{9}, 1\right)$

90. Ans. (1)

2 diff. 2 same : ${}^6C_1.{}^5C_2.2!.{}^3C_2 = 360$

2 same 2 same : ${}^6C_2.2 = 30$

Total 390