# SOLUTIONS

# WEEKLY TEST-11

## GZRA-1901, GZR-1901($\alpha$)

## GZRS-1901

## (JEE ADVANCED PATTERN)

## Test Date: 03-09-2017

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# CHEMISTRY

**1.** **(B)**

Chromium

**2.** **(C)**

$PV_1 = n_1RT$

$PV_2 = n_2RT$

or, $P(V_2 - V_1) = (n_2 - n_1)RT$

or, $\frac{0.0821 \times 50}{1000} = (n_2 - n_1) \times 0.0821 \times 350$

or, $n_2 - n_1 = \frac{1}{7000}\text{mole} = \frac{1}{7}\text{m.mole}$

**3.** **(B)**

$\frac{1}{2}mv^2 = \frac{KQ_1Q_2}{x}$

or, $x \propto \frac{Q_2}{V^2}$

So, $\frac{x_1}{x_2} = \frac{40 \times 4V^2}{V^2 \times 80} = 2:1$

**4.** **(C)**

$Z_{eff} \propto \frac{1}{\text{size}}$

**5.** **(A)**

$V_2O_5 + 2HNO_3 \longrightarrow 2VO_2NO_3 + H_2O$

$V_2O_5 + 6NaOH \longrightarrow 2Na_3VO_4 + 3H_2O$

Amphoteric oxide can react with both acid and base.

**6.** **(D)**

Enthalpy of dissociation is endothermic process.

**7.** **(D)**

Initially, $P_{Ne} = \frac{3}{5} \times 200 = 120\,\text{torr}$

In final condition, gases present are Ne and $H_2O(g)$

$P_{Ne}$ = 120 × 2 = 240 torr [ $P \propto \frac{1}{V}$, n, T constant]

$P_{H_2O(g)} = 50$ torr [Aqueous tension]

$P_{total}$ = 290 torr

**8.** **(A), (C)**

(B) $F^-_{(aq.)} < Cl^-_{(aq.)} < Br^-_{(aq.)} < I^-_{(aq.)}$ : Electrical conductance

(D) Cl > F > Br > I : Electron affinity

**9.** **(A), (B), (C)**

Elements (a), (b) and (c) are correct. Statement (d) is incorrect as in any period, the atomic radius of the noble gas is largest.

**10.** **(B), (C)**

$$\frac{hc}{\lambda} = \phi + eV$$

V does not depend on intensity.

**11.** **(B), (C), (D)**

Aqueous tension depends only on T.

**12.** **(D)**

$$n \propto \frac{V}{T}$$

$$n_A : n_B = \frac{1}{2} : 2 = 1 : 4$$

$$n_B = \frac{4}{5} \times 15 = 12$$

**13.** **(B)**

$n_A$ = 3 mole

$n_B : n_C$ = 2 : 1

$$n_B = \frac{2}{3} \times 12 = 8 \text{mole}$$

Now, $P \propto \frac{nT}{V}$

$$P_A : P_B = \frac{3 \times 2T}{V} : \frac{8 \times T}{2V} = \frac{3}{2}$$

**14. (B)**

N > C > P > Si

**15. (D)**

K > Mg > Al > B

**16. (B)**

- $X(g) \longrightarrow X^{+}(g) + 1e^{-}$

  $\frac{3N_0}{2}$ $\quad E_1$

  $$\text{After loss of 1 electron} = \frac{E_1}{\frac{3N_0}{2}} = \frac{2E_1}{3N_0}$$

- $X(g) + 1e^{-} \longrightarrow X^{-}(g)$

  $\frac{2N_0}{3}$ $\quad E_2$

  $$\text{After gain of 1 electron} = \frac{E_2}{\frac{2N_0}{3}} = \frac{3E_2}{2N_0}$$

**17. (3)**

$$\frac{V_1}{V_2} = \frac{K_1}{K_2} = \frac{\frac{hc}{50} - \frac{hc}{200}}{\frac{hc}{100} - \frac{hc}{200}} = \frac{3}{1} = 3$$

**18. (4)**

Automic size

(1) Kr > Ne (2) $Na > Na^{+}$

(3) $I^{-} > Cl^{-}$ (4) $Li^{+}_{(aq)} > Na^{+}_{(a)}$

**19. (2)**

$K.E_{\alpha} = 2\,eV,\ m_{\alpha} = 4\,unit$

$K.E_{P} = 32\,eV,\ m_{P} = 1\,unit$

$\lambda \alpha \frac{1}{\sqrt{km}}$

$\frac{\lambda_\alpha}{\lambda_P} = \sqrt{\frac{32}{8}} = 2$

**20. (5)**

6th excited state is 3d.

**21. (4)**

$T_A = T$

$T_B = 20\ T$ (T$\alpha$ V, n, p constant)

$T_C = 4T$ (T$\alpha$ P, n, v constant)

**22. (2)**

Total Correct = 4 and

Total Incorrect = 2

So, Total = |4 – 2| = 2

**23. (2)**

(v) Li < $Li^+$ and (viii) Ba < Sr

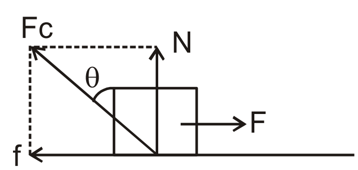
# PHYSICS

**24. (A)**

Block will start slipping when $F = \mu mg$

$2t = 0.5 \times 20 = 10$

t = 5 s




for $t \le 5s$, $\tan\theta = \frac{f}{N} = \frac{2t}{20} = \frac{t}{10}$

$\text{Sec}^2\theta \frac{d\theta}{dt} = \frac{1}{10}, \frac{d\theta}{dt} = \frac{\cos^2\theta}{10}$

At $t = 2s$, $\tan\theta = \frac{1}{5}$

$\cos\theta = \frac{5}{\sqrt{26}}$

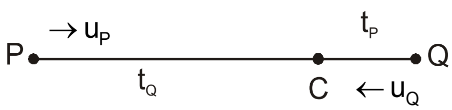
$$\frac{d\theta}{dt} = \frac{25}{260} = \frac{5}{52} \text{ rad/s}$$

**25. (B)**

$T_1 = \dfrac{mg}{\cos\theta}$, $T_2 = mg\cos\theta$

$$\frac{T_1}{T_2} = \sec^2\theta = 4$$

**26. (A)**




Point C is point of crossing of buses.

Buses start from P and Q take same time to reach point C. Let this time is equal to 't'

$u_P t = u_Q t_Q$ ... (i)

$u_Q t = u_P t_P$ ... (ii)

Dividing (i) & (ii)

$$\frac{u_P}{u_Q} = \frac{u_Q}{u_P} \cdot \frac{t_Q}{t_P}$$

$$\frac{u_P^2}{u_Q^2} = \frac{t_Q}{t_P}$$

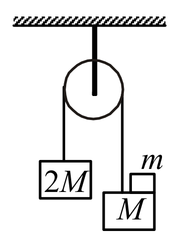
$$\therefore \quad \frac{u_P}{u_Q} = \sqrt{\frac{t_Q}{t_P}}$$

**27.** Acceleration of blocks = $\dfrac{(2M - m - M)g}{3M + m} = \dfrac{(M - m)g}{3M + m}$

Considering free body diagram of block *m* only ,

mg + ma = N

$N = m\,(g+a) = m\left[g + \dfrac{(M-m)g}{3M+m}\right]$




$$= m\frac{[3Mg + mg + Mg - mg]}{3M + m} = \frac{4Mmg}{3M + m}$$

$\therefore$ **(B)**

**28. (D)**

Let N be the normal reaction between m and M,

Equilibrium of M

N sin 37º = kx … (i)

Equilibrium of m in vertical direction gives

N cos 37º = mg … (ii)

From Eqs. (i) and (ii), we get

$$\tan 37^\circ = \frac{kx}{mg}$$

$$\frac{3}{4} = \frac{kx}{mg}$$

$$x = \frac{3mg}{4k}$$

**29. (C)**

Given that : $\left|\vec{a}_1 + \vec{a}_2\right| = \sqrt{3}$

$$1 + 1 + 2\cos\theta = \left(\sqrt{3}\right)^2$$

$$2\cos\theta = (3-2) = 1$$

$$\therefore \quad \cos\theta = \frac{1}{2} \quad \Rightarrow \boxed{\theta = 60^\circ}$$

$$\left(\vec{a}_1 - 2\vec{a}_2\right).\vec{a}_1 = a_1^2 - 2\vec{a}_1.\vec{a}_2$$

As $\vec{a}_1$ and $\vec{a}_2$ are unit vectors. Then, $\left(\vec{a}_1 - 2\vec{a}_2\right).\vec{a}_1 = a_1^2 - 2\vec{a}_1.\vec{a}_2$

$$= 1 - 2\times 1 \times 1\cos\theta$$

$$= 1 - 2\cos\theta = 1 - 1 = 0 \cdot$$

**30. (A)**

Let $\vec{b} = b_x\hat{i} + b_y\hat{j} + b_z\hat{k}$.

As $\vec{a}$ and $\vec{b}$ are collinear

So, $\frac{b_x}{2} = \frac{b_y}{1} = \frac{b_z}{-1} = k(\text{Say})$

$b_x = 2k, b_y = k, b_z = -k$.

As, $\vec{a}.\vec{b} = 3 \quad \Rightarrow (2k \times 2) + (k) + k = 3 \quad \Rightarrow \quad 6k = 3, \quad \therefore k = ½$

Hence, $\vec{b}$ is $(1, ½, -½)$

**31. (A,B,C)**

T = 2g = 20 N

frictional force = 0

$\therefore$ contact force = N

$= 40\frac{\sqrt{3}}{2}$

$= 20\sqrt{3}$ N

normal to the inclined surface.

**32. (A), (D)**

Tension in $S_1$ before cutting

T = 2 mg Sin 30° = mg

So, Spring force $F_s = 2T = 2mg$

just affter cutting spring force will be same.

So, $a_A = \frac{F_s}{m} = 2g$

$a_0 = g\sin 30^o = \frac{g}{2}$

**33.** Maximum acceleration of block $A = \frac{0.5mg}{m} = \frac{g}{2}$

So, if $M = 2m$, $a_A = a_B = \frac{2mg}{4m} = \frac{g}{2}$ and friction force is $\frac{1}{2}mg$.

$\therefore$ **(A), (B), (C)**

**34.** As $\theta_1 = \tan^{-1}(\mu_1)$ and $\theta_2 = \tan^{-1}(\mu_2)$ = 45°= 30°

$\therefore$ If $\theta$ < 30°, there is no contact force between them.

For motion to start  2 *mg* sin $\theta$ = ($\mu_1$ + $\mu_2$) *mg* cos$\theta$

$\therefore \quad \tan\theta = \frac{\mu_1 + \mu_2}{2}$

**(A), (C), (D)**

**35. (B)**

to go up, $t = \frac{60}{10} = 6\,s$

to come down, t = 6 s

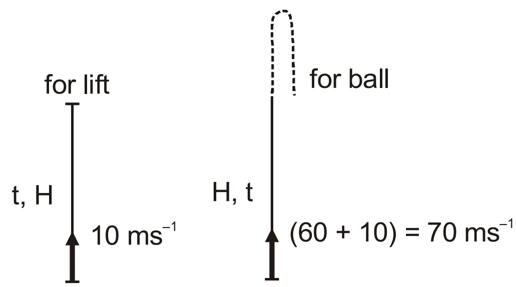
$\therefore T = 12\,s$

**36. (A)**

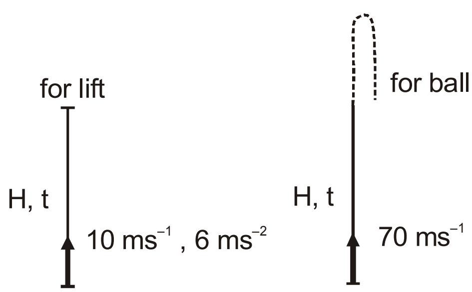
$\therefore 10t = 70t - \frac{1}{2} \times 10t^2$

$\therefore 5t^2 = 60t$

$\therefore t = 12\,s$




**37. (C)**

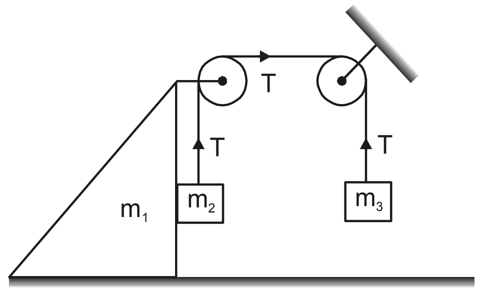



$10t + \frac{1}{2} \times 6t^2 = 70t - \frac{1}{2} \times 10t^2$

$8t^2 = 60t \quad \Rightarrow \quad t = \frac{60}{8} = 7.5$ sec.

**38.** **(A)**

**39.** **(B)**




**From constraint relation ;**

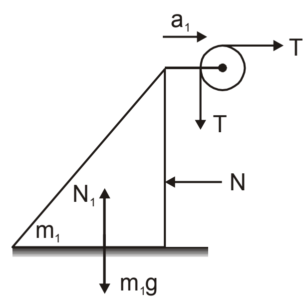
$Tx_1 + Tx_2 + Tx_3 = 0$

by double diff$^{n.}$

$Ta_1 + Ta_2 + Ta_3 = 0$

$\therefore \quad a_1 + a_2 + a_3 = 0$ ...(A)

**F.B.D. of wedge of mass $m_1$ ;**




$T - N = m_1 a_1$

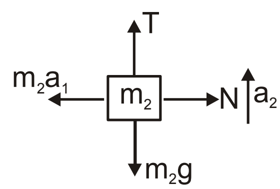
$N = m_2 a_1$

$\therefore \; T = m_1 a_1 + m_2 a_1$

$= a_1(1+2) = 3a_1$

$T = 3a_1$ ...(i)

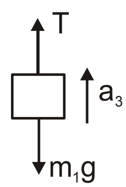
**F.B.D. mass $m_2$ ;**




$T - m_2 g = m_2 a_2$

$T - 2g = 2a_2$ ...(ii)

**F.B.D. of mass $m_3$ ;**




$T - m_3 g = m_3 a_3$

$T - 3g = 3a_3$ ...(iii)

**From (i) , (ii) & (iii) and putting in equation (A)**

$$\frac{T}{3} + \frac{T}{2} - g + \frac{T}{3} - g = 0$$

$$\frac{2T}{3} + \frac{T}{2} = 2g \;\Rightarrow \frac{4T + 3T}{6} = 2g$$

$$\Rightarrow \quad T = \frac{6\times2\times10}{7} = \frac{120}{7}N$$

$$a_1 = \frac{T}{3} = \frac{40}{7}\ ms^{-2}$$

$$a_2 = \frac{T}{2} - g = \frac{60}{7} - 10 = \frac{-10}{7}ms^{-2}$$

so, acc$^n$ of mass $m_2$;

$$\sqrt{a_2^2 + a_1^2} = \sqrt{\left(\frac{40}{7}\right)^2 + \left(\frac{10}{7}\right)^2}$$

$$= \frac{10}{7}\sqrt{16+1} = \frac{\sqrt{17}}{7}g\ ms^{-2}$$

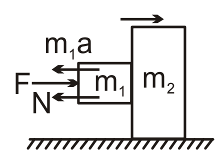
acc$^n$ of mass $m_3$;

$$a_3 = \frac{T}{3} - g = \frac{40}{7} - 10$$

$$= -\frac{30}{7}ms^{-2}$$

**40. (5)**

$$a = \left(\frac{F}{m_1 + m_2}\right)$$



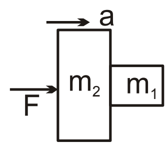

$$N + m_1 a = F \qquad N = F - \frac{m_1 F}{m_1 + m_2}$$

$$N = \frac{m_2 F}{m_1 + m_2}$$

$$m_1 g = \frac{\mu m_2 F}{m_1 + m_2} \therefore \frac{m_1(m_1+m_2)g}{\mu m_2} = F_{min}$$

for fig. (i)

and $a = \dfrac{F}{m_1 + m_2}$




$N = m_1 a = \dfrac{m_1 F}{m_1 + m_2}$

$\therefore m_1 g = \dfrac{\mu m_1 F}{m_1 + m_2} \Rightarrow F = \dfrac{m_1(m_1 + m_2)g}{\mu m_1}$ for fig. (ii)

$$\therefore \frac{(F_{min})_{fig.1}}{(F_{min})_{fig.2}} = \frac{m_1(m_1 + m_2)g}{\mu m_2} \times \frac{\mu m_1}{m_1(m_1 + m_2)g} = \frac{m_1}{m_2} = \frac{10}{2} = 5$$

**41. (1)**

$$I = \int_{\pi/4}^{\pi/2} (\sin x + \cos x)\, dx = \left[-\cos x\right]_{\pi/4}^{\pi/2} + [\sin x]_{\pi/4}^{\pi/2} = -[\cos\frac{\pi}{2} - \cos\frac{\pi}{4}] + \left[\sin\frac{\pi}{2} - \sin\frac{\pi}{4}\right]$$

$$= \cos\frac{\pi}{4} + \sin\frac{\pi}{2} - \sin\frac{\pi}{4} = 1$$

**42. (5)**

In the frame of the lift first pulley will be stationary so velocity of second pulley will be zero & Hence in the frame of ground it moves with 5 m/s

**43. (4)**

$$T = \frac{4m_1 m_2 m_3 g}{4m_1 m_2 + m_2 m_3 + m_1 m_3}$$

**44. (6)**

Force of friction between the two will be maximum i.e., $\mu mg$.

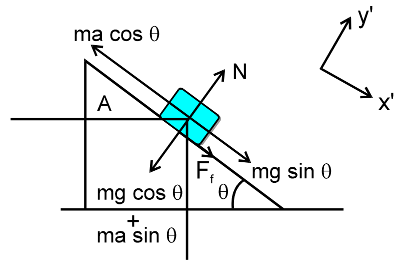
Retardation of A is $a_A = \dfrac{\mu mg}{m} = \mu g$

and acceleration of B is $a_B = \dfrac{\mu mg}{2m} = \dfrac{\mu g}{2}$

$\therefore$ Required acceleration = 6

**45. (2)**

FBD of block B w.r.t. wedge A , for maximum 'a' :




Perpendicular to wedge :

$\Sigma f_{y'}$ = (mg cos θ + m a sin θ – N) = 0.

and $\Sigma f_{x'}$ = mg sin θ + μN – ma cos θ = 0 (for maximum a)

$\Rightarrow$ mg sin θ + μ(mg cos θ + ma sin θ) – ma cos θ = 0

$$\Rightarrow a = \frac{(g\sin\theta + \mu g\cos\theta)}{\cos\theta - \mu\sin\theta}$$

for θ = 45°

$$a = g\left(\frac{\tan 45^\circ + \mu}{\cot 45^\circ - \mu}\right) \quad ; \quad a = g\left(\frac{1+\mu}{1-\mu}\right) = 30$$

hence, $\frac{60}{a} = 2$

**46. (8)**

Since mg sin 37° > μmg cos37°, the block has a tendency to slip downwards.

Let F be the minimum force applied on it, so that it does not slip. Then,

N = F + mg cos37°

$$\therefore \quad mg\sin 37^\circ = \mu N = \mu(F + mg\cos 37^\circ)$$

$$\text{or} \quad F = \frac{mg\sin 37^\circ}{\mu} - mg\cos 37^\circ$$

$$= \frac{(2)(10)(3/5)}{0.5} - (2)(10)\left(\frac{4}{5}\right) = 8N$$

# CHEMISTRY

**47. (C)**

Since $\log_x 9 = 2\log_x 3$ the equation may be written $2y^2 - 5y + 2 = 0$ where $y = \log_x 3$

By the quadratic equation $y = \frac{1}{2}$ or $y = 2$ and hence $x = 9$ or $x = \sqrt{3}$, which lies between 1 and 2.

$2(\log_x 3)^2 - 5\log_x 3 + 2 = 0 \left\langle \begin{matrix} t_1 \\ t_2 \end{matrix} \right.$

$t_1 t_2 = 1$ ; $t_1 + t_2 = \frac{5}{2}$

$\log_{x_1} 3 + \log_{x_2} 3 = \frac{5}{2}$

$\frac{1}{\log_3 x_1} + \frac{1}{\log_3 x_2} = \frac{\log_3(x_1 x_2)}{1} = \frac{5}{2} \quad \Rightarrow \quad x_1 x_2 = 9\sqrt{3}$

**48. (D)**

If exactly one – ve than E = 1

exactly two – ve then E = – 1

all three – ve then E = – 3

all three + ve then E = 3 ]

**49. (C)**

$T_r = \frac{(r-1)r(r+1)}{r^3} = \frac{r-1}{r} \cdot \frac{r+1}{r}$

$\prod_{r=2}^{n} T_r = \left(\frac{1}{2} \cdot \frac{2}{3} \cdots\cdots \frac{n-2}{n-1} \cdot \frac{n-1}{n}\right)\left(\frac{3}{2} \cdot \frac{4}{3} \cdots\cdots \frac{n}{n-1} \cdot \frac{n+1}{n}\right) = \frac{n+1}{2n}$

**50. (B)**

It is obvious

**51. (B)**

LHS= $\frac{1}{2}$[sin A + sin B + sin C + sin D] = 2 $\Rightarrow \sum \sin A = 4$

A = B = C = D = 90° $\Rightarrow$ result

**52. (B)**

Let ratio be $\lambda : 1 \Rightarrow \frac{6\lambda - 3}{\lambda + 1} = 0,\ \lambda = \frac{1}{2}$

**53. (D)**

**54. (A,B,D)**

$\frac{\log x}{\log 3 + (1/2)\log x} + \frac{(1/2)\log x}{\log 3 + \log x} = 0;$ $\quad\therefore\quad \frac{\log_3 x}{1 + (1/2)\log_3 x} + \frac{1}{2}\frac{\log_3 x}{(1 + \log_3 x)} = 0$

let $\log_3 x = y$

$\frac{y}{1 + (y/2)} + \frac{y}{2(1+y)} = 0;\ y\left(\frac{2}{2+y} + \frac{1}{2(1+y)}\right) = 0;\ y[4 + 4y + 2 + y] = 0$

$\Rightarrow$ $y = 0$ or $y = -6/5$

$\Rightarrow$ $\log_3 x = 0$ or $\log_3 x = -6/5$

$x = 1$ or $x = 3^{-6/5}$

$\Rightarrow$ A, B, D does not hold good. ]

**55. (C,D)**

**(A)** $\sin\frac{3\pi}{8}\cos\frac{3\pi}{8} = \frac{1}{2}\sin\frac{3\pi}{4} = \frac{1}{2\sqrt{2}}$ = irrational number.

**(B)** $\log_2 112 = \log_2 (2^4 \times 7) = 4 + \log_2 7$ = irrational number.

**(C)** $\log_3 2 \cdot \log_4 3 \cdot \log_8 4 = \frac{\log 2}{\log 3}\cdot\frac{\log 3}{\log 4}\cdot\frac{\log 4}{\log 8} = \log_8 2 = \frac{1}{3}$ = rational number

**(D)** $27^{-(\log_{125} 5)} = 27^{-(\log_{5^3} 5)} = 27^{-\frac{1}{3}} = \frac{1}{3}$ = rational number

$\Rightarrow$ options (C) & (D) are correct ]

**56. (A,B,D)**

(C) in 'C' if the sign is (–) ve instead of (+) ve then the answer is 1 ]

**57. (A,B,C,D)**

Equation of line through A (4, 3) is

$\frac{x-4}{\cos\theta} = \frac{y-3}{\sin\theta} = r$ .....(i)

$A \equiv (4 + r\cos\theta, 3 + r\sin\theta)$.

$4 + r\cos\theta = 8 \Rightarrow r = 4\sec\theta$.

$\therefore$ AB = 4 sec$\theta$.

Similarly AC = 3 cosec $\theta$

$$\frac{16}{AB^2}+\frac{9}{AC^2}=\cos^2\theta+\sin^2\theta=1$$

So $AB+AC=\frac{4}{\cos\theta}+\frac{3}{\sin\theta}=\frac{2(4\sin\theta+3\cos\theta)}{\sin 2\theta}$

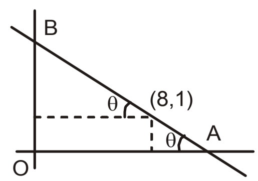
**58.** **(C)**

**59.** **(B)**

**60.** **(C)**

**61.** **(D)**

OA = 8 + cot$\theta$ ; OB = 1 + 8tan$\theta$




$\Delta = \frac{1}{2}(1 + 8\tan\theta)(8 + \cot\theta)$

$= 8 + \frac{1}{2}(64\tan\theta + \cot\theta)$

For $\Delta$ to be minimum tan$\theta$ = 1/8

$\therefore$ $\Delta_{min}$ = 16

**62.** **(A)**

z = AB = cosec$\theta$ + 8sec$\theta$ $\Rightarrow \frac{dz}{d\theta}=0$ ; cot$\theta$ = 2

$\therefore$ $AB_{min} = 5\sqrt{5}$

**63.** **(1)**

Either x = y or $x=\left|\frac{3x+4y-12}{5}\right|$ or $y=\left|\frac{3x+4y-12}{15}\right| \Rightarrow (1,1)$

**64.** **(6)**

$\log_8(kx^2 + wx + f) = 2 \Rightarrow kx^2 + wx + f = 64$

$\therefore$ $kx^2 + wx + f - 64 = 0$ ....(1)

also (1) is identical to (3x – 1)(x + 15)

$\therefore$ $kx^2 + wx + f - 64 = 3x^2 + 44x - 15$

k = 3; w = 44 and f – 64 = – 15

k = 3, w = 44 and f = 49

$\therefore$ k + w + f = 96

**65. (4)**

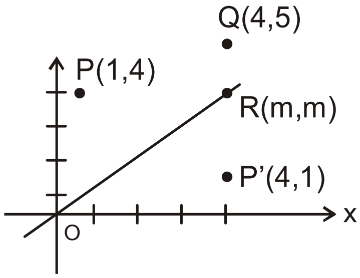
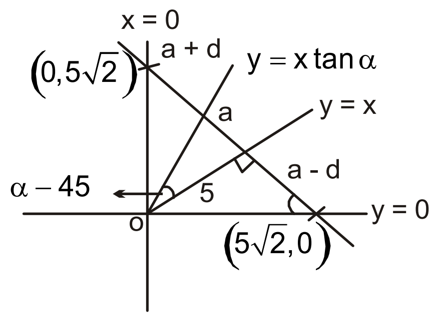



Image of (1, 4) about the line y = x is (4, 1) $\Rightarrow P'(4,1)\,Q(4,5)$ and R(m, m) are collinear.

$\Rightarrow\ m = 4$

**66. (5)**




$a - d + a + a + d = 10$

$a = \frac{10}{3}$

$\therefore\ a - d = 5$

$\tan(\alpha - 45^\circ) = \frac{a}{5}$

$\frac{\tan\alpha - 1}{\tan\alpha + 1} = \frac{2}{3} \quad \Rightarrow\ 3\tan\alpha - 3 = 2\tan\alpha + 2$

$\tan\alpha = 5$

**67. (4)**

Let $\theta = \frac{\pi}{16}$; $\qquad 8\theta = \frac{\pi}{2}$

$\therefore$ y = tan θ + tan 5θ + tan 9θ + tan 13θ

$\therefore$ y = (tan θ – cot θ) + (tan 5θ – cot 5θ)

[ tan 13θ = tan(8θ + 5θ) = – cot 5θ; tan 9θ = tan(8θ + θ) = – cot θ ]

= (tan θ – cot θ) + (cot 5θ – tan 5θ)

$= \frac{\sin^2\theta - \cos^2\theta}{\sin\theta\cos\theta} + \frac{\cos^2 5\theta - \sin^2 5\theta}{\sin 5\theta\cos 5\theta}$

$y = -2 \cdot \frac{\sin 4\theta}{\cos 2\theta \sin 2\theta} = -4$

Hence absolute value = 4 Ans.]

**68. (0)**

$$\begin{vmatrix} \lambda_1 & 2a\lambda_1 + \lambda_1^3 & 1 \\ \lambda_2 & 2a\lambda_2 + \lambda_2^3 & 1 \\ \lambda_3 & 2a\lambda_3 + \lambda_3^3 & 1 \end{vmatrix} = 0$$

$\Rightarrow a(\lambda_1 - \lambda_2)(\lambda_2 - \lambda_3)(\lambda_3 - \lambda_1)(\lambda_1 + \lambda_2 + \lambda_3) = 0$

But $a \neq 0$, $\lambda_1 \neq \lambda_2 \neq \lambda_3$

$\therefore \lambda_1 + \lambda_2 + \lambda_3 = 0.$

**69. (5)**

$$\frac{4\log_2 \sqrt{x}}{\log_2(x/2)} + \frac{2\log_2(x^2)}{\log_2(4x)} = \frac{3\log_2(x^3)}{\log_2(2x)}$$

$$\frac{4\cdot\frac{1}{2}\log_2(x)}{\log_2 x - 1} + \frac{4\log_2(x)}{2+\log_2(x)} = \frac{9\log_2(x)}{1+\log_2(x)}$$

let $\log_2 x = t$

$$\frac{2t}{t-1} + \frac{4t}{t+2} = \frac{9t}{t+1} \text{ (hence either } t = 0)$$

or $\frac{2}{t-1} + \frac{4}{t+2} = \frac{9}{t+1} \Rightarrow \frac{2t+4+4t-4}{(t-1)(t+2)} = \frac{9}{t+1} \Rightarrow 6t(t+1) = 9(t^2 + t - 2)$

$\Rightarrow 6t^2 + 6t = 9t^2 + 9t - 18 \Rightarrow 3t^2 + 3t - 18 = 0 \Rightarrow t^2 + t - 6 = 0 \Rightarrow (t+3)(t-2) = 0$

hence $t = 0$, $t = 2$ & $t = -3$,

$x = 1$, $x = 4$, $x = 1/8$ (rejected $\because$ it is not integral value)]