Q.1 If $x = \log_b (7)^7$ satisfies the equation $7^{x+7} = 8^x$, then the value of b is equal to

(A) $\dfrac{15}{7}$ (B) $\dfrac{15}{8}$ (C) $\dfrac{7}{8}$ (D*) $\dfrac{8}{7}$

Q.2 Let B, C, P and L be positive real numbers such that
$\log(B \cdot L) + \log(B \cdot P) = 2; \quad \log(P \cdot L) + \log(P \cdot C) = 3; \quad \log(C \cdot B) + \log(C \cdot L) = 4$
The value of the product $(BCPL)$ equals (base of the log is 10)

(A) 10^2 (B*) 10^3 (C) 10^4 (D) 10^9

Q.3 The value of the expression $5^{\frac{\log_3 (\log_2 81)}{\log_3 5}}$ always lies between

(A) 5 and 6   (B) 7 and 8   (C*) 6 and 7   (D) 8 and 9

Q.4 If $\log_a (ab) = x$, then $\log_b (ab)$ is equal to

(A) $\dfrac{1}{x}$ (B) $\dfrac{x}{1+x}$ (C*) $\dfrac{x}{x-1}$ (D) $\dfrac{x}{1-x}$

Q.5 If x_1 and x_2 are the solution of the equation $7^{\frac{2x^2-5x-9}{2}} = (\sqrt{2})^{3\log_2 7}$, then $(x_1 x_2)$ has the value equal to

(A) $\dfrac{5}{2}$ (B) 6   (C*) -6 (D) 4

[MATCH THE COLUMN]   [3+3+3+3=12]

Q.6

Column-I		Column-II
(A) If $a = 3\left(\sqrt{8+2\sqrt{7}} - \sqrt{8-2\sqrt{7}}\right)$, $b = \sqrt{(42)(30)+36}$ then the value of $\log_a b$ is equal to	(P)	0
(B) Number of real solutions of the equation $\lvert x-1 \rvert + \lvert x-3 \rvert = \dfrac{3}{2}$ is	(Q)	1
(C) If $a = \sqrt{6+2\sqrt{5}} - \sqrt{6-2\sqrt{5}}$, $b = \sqrt[3]{17\sqrt{5}+38} - \sqrt[3]{17\sqrt{5}-38}$ then the value of $\log_a b$ is equal to	(R)	2
(D) If $\sin x + \sin^2 x = 1$ then the value of $\cos^2 x + \cos^4 x$ equals	(S)	3

[Ans. (A) R ; (B) P ; (C) R ; (D) Q]

[SUBJECTIVE / INTEGER TYPE]

Q.7 If $\sec\theta + \tan\theta = 2$, then find the value of $\sec\theta$?   [Ans. $\sec\theta = \dfrac{5}{4}$]   [5]

Q.8 Let $a = \sqrt{57+40\sqrt{2}} - \sqrt{57-40\sqrt{2}}$ and $b = \sqrt{25^{\frac{1}{\log_8 5}} + 49^{\frac{1}{\log_6 7}}}$ and c is the value of $x^3 + 3x - 14$ where $x = \sqrt[3]{7+5\sqrt{2}} - \dfrac{1}{\sqrt[3]{7+5\sqrt{2}}}$. Find the value of $(a+b+c)$.   [5]

[Ans. 20]