

1. The global maximum value of function  $f(x) = \sin x + \cos x$ ,  $x \in [0, \pi] =$  \_\_\_\_\_.

Ans.  $\sqrt{2}$

2. If the value of  $\cos \alpha$  is \_\_\_\_\_, then  $A + A' = I$ . where  $A = [(\sin \alpha - \cos \alpha), (\cos \alpha \sin \alpha)]$

Ans.  $\sqrt{3}/2$

3. If  $x + y \leq 55$  and  $x + y \geq 10$ ,  $x \geq 0$ ,  $y \geq 0$  the minimum value of the objective function  $z = 7x + 3y$

Ans. The solution region is not feasible, so not been found.

4. Which of the following carboxylic acid has least  $pK_a$  value among all?

Ans.  $\text{HCOOH}$

5. Which is the correct order of the basic strength of a given amino?

Ans.  $(\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2$

6. Which diazonium salt is water-insoluble and stable at room temperature?

Ans.  $\text{C}_6\text{H}_5\text{N}_2\text{BF}_4$

7. Lactose is compound of which units?

Ans. B-D-Galactose and B-D-Glucose

8. A short bar magnet placed with its axis at  $30^\circ$  and a uniform external magnetic field of 0.5T experiences a torque of magnitude equal to  $4.5 \times 10^{-2}$  J Then the magnitude of the magnetic moment of the magnet will be \_\_\_\_\_.

Ans.  $36 \times 10^{-2}$  JT-1

9. The SI unit of the current density is \_\_\_\_\_.

Ans.  $\text{Am}^{-2}$

10. A coil has  $N$  turns and current passes through it is  $I$  ampere then we obtain  $L$  Henry of self inductance. Now if the current change to  $5I$ , then the new self-inductance will be \_\_\_\_\_ H.

Ans.  $L$