

* Choose the right answer from the given options. [1 Marks Each]

[10]

1. If $x = \sqrt{6} + \sqrt{5}$, then $x^2 + \frac{1}{x^2} - 2 =$
 (A) $2\sqrt{6}$ (B) $2\sqrt{5}$ (C) 24 (D) 20
2. If $\frac{3^{5x} \times 81^2 \times 6561}{3^{2x}}$ then $x =$
 (A) 3 (B) -3 (C) $\frac{1}{3}$ (D) $-\frac{1}{3}$
3. $\frac{1}{\sqrt{9}-\sqrt{8}}$ is equal to :
 (A) $\frac{1}{3+2\sqrt{2}}$ (B) $\frac{1}{2}(3 - 2\sqrt{2})$ (C) $3 + 2\sqrt{2}$ (D) $3 - 2\sqrt{2}$
4. $\left(\frac{125}{216}\right)^{-\frac{1}{3}} =$
 (A) $\frac{5}{6}$ (B) $\frac{6}{5}$ (C) 125 (D) 216
5. The number $0.\overline{32}$ when expressed in the form $\frac{p}{q}$ (p, q are integers and $q \neq 0$), is:
 (A) $\frac{8}{25}$ (B) $\frac{29}{90}$ (C) $\frac{32}{99}$ (D) $\frac{32}{199}$
6. If $\frac{2+\sqrt{3}}{2-\sqrt{3}} = a + b\sqrt{3}$, then,
 (A) $a = 7$ and $b = 4$ (B) $a = -7$ and $b = -4$ (C) $a = -7$ and $b = 4$ (D) $a = 7$ and $b = -4$
7. If $x = \frac{2}{3+\sqrt{7}}$, then $(x - 3)^2 =$
 (A) 1 (B) 3 (C) 6 (D) 7
8. The value of $\frac{x^{a(c-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c$ is:
 (A) 4 (B) 3 (C) 2 (D) 1
9. If $\sqrt{2} = 1.414$ then $\sqrt{\frac{(\sqrt{2}-1)}{(\sqrt{2}+1)}} = ?$
 (A) 0.207 (B) 0.414 (C) 2.414 (D) 0.621
10. If $\sqrt{2^n} = 1024$, then $3^{2\left(\frac{n}{4}-4\right)} =$
 (A) 3 (B) 9 (C) 27 (D) 81

* Answer the following short questions. [2 Marks Each]

[8]

11. Simplify:
 $3\sqrt{45} - \sqrt{125} + \sqrt{200} - \sqrt{50}$
12. If $a = 2$, $b = 3$, find the values of:
 $(a^b + b^a)^{-1}$
13. Find two rational and two irrational number between 0.5 and 0.55.
14. Simplify $\left[\left\{(256)^{-\frac{1}{2}}\right\}^{-\frac{1}{4}}\right]^2$.

* Answer the following questions. [3 Marks Each]

15. If x is a positive real number and exponents are rational numbers, simplify

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \times \left(\frac{x^c}{x^a}\right)^{c+a-b} \times \left(\frac{x^a}{x^b}\right)^{a+b-c}.$$

16. Prove that:

$$\left(\frac{64}{125}\right)^{-\frac{2}{3}} + \frac{1}{\left(\frac{256}{625}\right)^{\frac{1}{4}}} + \frac{\sqrt{25}}{\sqrt[3]{64}} = \frac{65}{16}$$

17. Prove that:

$$\left[8^{-\frac{2}{3}} \times 2^{\frac{1}{2}} \times 25^{-\frac{5}{4}}\right] \div \left[32^{-\frac{2}{5}} \times 125^{-\frac{5}{6}}\right] = \sqrt{2}$$

18. Simplify:

$$\frac{1}{\sqrt{3}+\sqrt{2}} - \frac{2}{\sqrt{5}-\sqrt{3}} - \frac{3}{\sqrt{2}-\sqrt{5}}$$
