

Name of the Student:

Roll No:

Department:

Class:

EMPLOYABILITY TEST 5

**I. Choose the correct alternative:**

1. Which of the following statements is not correct? [      ]

a.  $\log_{10} 10 = 1$     b.  $\log (2 + 3) = \log (2 \times 3)$     c.  $\log_{10} 1 = 0$     d.  $\log (1 + 2 + 3) = \log 1 + \log 2 + \log 3$

2. If  $\log 27 = 1.431$ , then the value of  $\log 9$  is: [      ]

a. 0.934                      b. 0.945                      c. 0.954                      d. 0.958

3. If  $\log \frac{a}{b} + \log \frac{b}{a} = \log (a + b)$ , then: [      ]

a.  $a + b = 1$                       b.  $a - b = 1$                       c.  $a = b$                       d.  $a^2 - b^2 = 1$

4. If  $\log_{10} 7 = a$ , then  $\log_{10} \left(\frac{1}{70}\right)$  is equal to: [      ]

a.  $-(1 + a)$                       b.  $(1 + a)^{-1}$                       c.  $\frac{a}{10}$                       d.  $\frac{a}{10a}$

5. If  $\log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + 1$ , then  $x$  is equal to: [      ]

a. 1                                      b. 3                                      c. 5                                      d. 10

6. The value of  $\left[\frac{1}{\log_3 60} + \frac{1}{\log_4 60} + \frac{1}{\log_5 60}\right]$  is: [      ]

a. 0                                      b. 1                                      c. 5                                      d. 60

7. If  $\log 2 = 0.30103$ , the number of digits in  $2^{64}$  is: [      ]

a. 18                                      b. 19                                      c. 20                                      d. 21

8. If  $\log_x y = 100$  and  $\log_2 x = 10$ , then the value of  $y$  is: [      ]

a.  $2^{10}$                                       b.  $2^{100}$                                       c.  $2^{1000}$                                       d.  $2^{10000}$

9. A vessel is filled with liquid, 3 parts of which are water and 5 parts syrup. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half syrup? [      ]

a.  $\frac{1}{3}$                                       b.  $\frac{1}{4}$                                       c.  $\frac{1}{5}$                                       d.  $\frac{1}{7}$

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**10.** In what ratio must a grocer mix two varieties of pulses costing Rs. 15 and Rs. 20 per kg respectively so as to get a mixture worth Rs. 16.50 kg? [ ]

- a.** 3 : 7                      **b.** 5 : 7                      **c.** 7 : 3                      **d.** 7 : 5

**11.** A container contains 40 litres of milk. From this container 4 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container? [ ]

- a.** 26.34 litres              **b.** 27.36 litres              **c.** 28 litres                      **d.** 29.16 litres

**12.** The angle of elevation of a ladder leaning against a wall is  $60^\circ$  and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is: [ ]

- a.** 2.3 m                      **b.** 4.6 m                      **c.** 7.8 m                      **d.** 9.2 m

**13.** From a point P on a level ground, the angle of elevation of the top tower is  $30^\circ$ . If the tower is 100 m high, the distance of point P from the foot of the tower is: [ ]

- a.** 149 m                      **b.** 156 m                      **c.** 173 m                      **d.** 200 m

**TRUE/FALSE**

**14.**  $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$ . [ ]

**15.**  $\log_x x = 0$  [ ]

**16.**  $\log_a (x^n) = n(\log_a x)$  [ ]

**17.**  $\log_a 1 = 1$  [ ]

**18.** Suppose a container contains  $x$  of liquid from which  $y$  units are taken out and replaced by water.

After  $n$  operations, the quantity of pure liquid =  $\left[ X \left( 1 - \frac{Y}{X} \right)^n \right]$  units. [ ]

**19.** The cost of a unit quantity of the mixture is called the mean price. [ ]

**20.**  $\log_a \frac{X}{Y} = \log_a X - \log_a Y$  [ ]

**ET 5\_Evaluators**

**1. Explanation:**

$$(b) \log (2 + 3) = \log 5 \text{ and } \log (2 \times 3) = \log 6 = \log 2 + \log 3$$

$$\therefore \log (2 + 3) \neq \log (2 \times 3)$$

**2. Explanation:**

$$\log 27 = 1.431$$

$$\Rightarrow \log (3^3) = 1.431$$

$$\Rightarrow 3 \log 3 = 1.431$$

$$\Rightarrow \log 3 = 0.477$$

$$\therefore \log 9 = \log (3^2) = 2 \log 3 = (2 \times 0.477) = 0.954.$$

**3. Explanation:**

$$\log \frac{a}{b} + \log \frac{b}{a} = \log (a + b)$$

$$\Rightarrow \log (a + b) = \log \left( \frac{a}{b} \times \frac{b}{a} \right) = \log 1.$$

$$\text{So, } a + b = 1.$$

**4. Explanation:**

$$\log_{10} \left( \frac{1}{70} \right) = \log_{10} 1 - \log_{10} 70$$

$$= - \log_{10} (7 \times 10)$$

$$= - (\log_{10} 7 + \log_{10} 10)$$

$$= - (a + 1).$$

**5. Explanation:**

$$\log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + 1$$

$$\Rightarrow \log_{10} 5 + \log_{10} (5x + 1) = \log_{10} (x + 5) + \log_{10} 10$$

$$\Rightarrow \log_{10} [5 (5x + 1)] = \log_{10} [10(x + 5)]$$

$$\Rightarrow 5(5x + 1) = 10(x + 5)$$

$$\Rightarrow 5x + 1 = 2x + 10$$

$$\Rightarrow 3x = 9$$

$$\Rightarrow x = 3.$$

**6.Explanation:**

$$\begin{aligned} \text{Given expression} &= \log_{60} 3 + \log_{60} 4 + \log_{60} 5 \\ &= \log_{60} (3 \times 4 \times 5) \\ &= \log_{60} 60 \\ &= 1. \end{aligned}$$

**7.Explanation:**

$$\begin{aligned} \log (2^{64}) &= 64 \times \log 2 \\ &= (64 \times 0.30103) \\ &= 19.26592 \end{aligned}$$

Its characteristic is 19.

Hence, then number of digits in  $2^{64}$  is 20.

**8. Explanation:**

$$\log_2 x = 10 \quad \Rightarrow \quad x = 2^{10}.$$

$$\therefore \log_x y = 100$$

$$\Rightarrow y = x^{100}$$

$$\Rightarrow y = (2^{10})^{100} \quad [\text{put value of } x]$$

$$\Rightarrow y = 2^{1000}.$$

**9. Explanation:**

Suppose the vessel initially contains 8 litres of liquid.

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Let x litres of this liquid be replaced with water.

$$\text{Quantity of water in new mixture} = \left( 3 - \frac{3x}{8} + x \right) \text{ litres}$$

$$\text{Quantity of syrup in new mixture} = \left( 5 - \frac{5x}{8} \right) \text{ litres}$$

$$\therefore \left( 3 - \frac{3x}{8} + x \right) = \left( 5 - \frac{5x}{8} \right)$$

$$\Rightarrow 5x + 24 = 40 - 5x$$

$$\Rightarrow 10x = 16$$

$$\Rightarrow x = \frac{8}{5}$$

$$\text{So, part of the mixture replaced} = \left( \frac{8}{5} \times \frac{1}{8} \right) = \frac{1}{5}$$

### 10. Explanation:

By the rule of alligation:

|   |              |   |
|---|--------------|---|
| Cost of 1 kg pulses of 1 <sup>st</sup> kind |              | Cost of 1 kg pulses of 2 <sup>nd</sup> kind |
| Rs. 15                                      | (Mean Price) | Rs. 20                                      |
| 3.50  | (Rs. 16.50)  | 1.50  |

$$\therefore \text{Required rate} = 3.50 : 1.50 = 7 : 3.$$

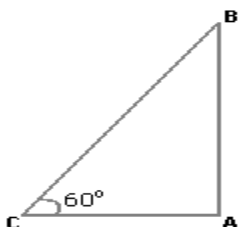
### 11. Explanation:

$$\text{Amount of milk left after 3 operations} = \left[ 40 \left( 1 - \frac{4}{40} \right)^3 \right] \text{ liters.}$$

$$= \left[ 40 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} \right] = 29.16 \text{ liters.}$$

### 12. Explanation:

Let AB be the wall and BC be the ladder.

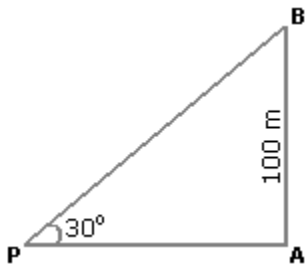


Then,  $\angle ACB = 60^\circ$  and  $AC = 4.6$  m.

$$\begin{aligned}\frac{AC}{BC} &= \cos 60^\circ = \frac{1}{2} \\ \Rightarrow BC &= 2 \times AC \\ &= (2 \times 4.6) \text{ m} \\ &= 9.2 \text{ m.}\end{aligned}$$

### 13. Explanation:

Let AB be the tower.



Then,  $\angle APB = 30^\circ$  and  $AB = 100$  m.

$$\begin{aligned}\frac{AB}{AP} &= \tan 30^\circ = \frac{1}{\sqrt{3}} \\ \Rightarrow AP &= (AB \times \sqrt{3}) \text{ m} \\ &= 100\sqrt{3} \text{ m} \\ &= (100 \times 1.73) \text{ m} \\ &= 173 \text{ m.}\end{aligned}$$

**14.T 15.F 16.T 17.F 18.T 19.T 20.T**