

### Section A [Mathematics]

1. Three numbers are in G.P., whose sum is 70, if the extremes be each multiplied by 4 and the mean by 5, they will be in A.P. The numbers are  
 (a) 10, 20, 40      (b) 10, 30, 40      (c) 20, 30, 40      (d) None of these
2. The maximum number of points of intersection of 8 straight lines is  
 (a) 56      (b) 28      (c) 16      (d) 8
3. The greatest coefficient in the expansion of  $\left(x + \frac{1}{x}\right)^{2n}$  is  
 (a)  $\frac{1 \cdot 3 \cdot 5 \dots (2n-1)^n : 2^n}{n!}$       (b)  $\frac{(2n)!}{(n!)^2}$   
 (c)  $\frac{n!}{\left[\left(\frac{n}{2}\right)!\right]^2}$       (d) None of these
4. The eccentricity of the curve represented by the equation  $x^2 + 2y^2 - 2x + 3y + 2 = 0$  is  
 (a) 0      (b)  $\frac{1}{2}$       (c)  $\frac{1}{\sqrt{2}}$       (d)  $\sqrt{2}$
5. An unbiased die is tossed until a number greater than 4 appears. The probability that an even number of tosses is needed  
 (a)  $\frac{1}{2}$       (b)  $\frac{2}{5}$       (c)  $\frac{1}{5}$       (d)  $\frac{2}{3}$
6. Let R be the relation on the set R of all real numbers defined by  $aRb$  iff  $|a - b| \leq 1$ . Then R is  
 (a) Reflexive      (b) Symmetric      (c) Transitive      (d) Anti-symmetric
7. The range of the function  $f(x) = \frac{x+2}{|x+2|}, x \neq -2$  is  
 (a)  $\{-1, 1\}$       (b)  $\{-1, 0, 1\}$       (c)  $\{1\}$       (d)  $(0, \infty)$
8.  $\cos \frac{\pi}{7} \cdot \cos \frac{2\pi}{7} \cdot \cos \frac{4\pi}{7} =$   
 (a) 0      (b)  $\frac{1}{2}$       (c)  $\frac{1}{4}$       (d)  $\frac{-1}{8}$
9. The value of  $n, 0 \leq x \leq \frac{\pi}{2}$ , which satisfy the equation  $81^{\sin^2 x} + 81^{\cos^2 x} = 30$  are  
 (a)  $\frac{\pi}{3}$       (b)  $\frac{\pi}{4}$       (c)  $\frac{\pi}{6}$       (d)  $\frac{7\pi}{18}$

10. The square roots of  $-2 + 2\sqrt{3}i$  is  
 (a)  $\pm(1 \pm \sqrt{3}i)$  (b)  $\pm(1 - \sqrt{3}i)$  (c)  $\pm(-1 + \sqrt{3}i)$  (d) None of these
11. If  $a, b, c$  are in G.P. then the ratio between the roots of the equation  $ax^2 + bx + c = 0$  is  
 (a)  $\frac{-1 + \sqrt{3}i}{2}$  (b)  $\frac{-1 - \sqrt{3}i}{2}$  (c)  $\frac{1 + \sqrt{3}i}{2}$  (d)  $\frac{1 - \sqrt{3}i}{2}$
12. If  $f(x) = \frac{\sin^{-1} x}{\sqrt{1-x^2}}$ , then  $(1-x^2)f(x) - xf'(x) =$   
 (a) 1 (b) -1 (c) 0 (d) None of these
13. For all  $n \in \mathbb{N}$ ,  $1 + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} + \dots + \frac{1}{\sqrt{n}}$   
 (a)  $> \sqrt{n}$  (b)  $< \sqrt{n}$  (c)  $\leq \sqrt{n}$  (d)  $\geq \sqrt{n}$
14. The direction cosines of any normal to the  $xv$ -plane are  
 (a) (1, 0, 0) (b) (0, 1, 0) (c) (1, 1, 0) (d) (0, 0, 1)
15. The solution of  $\log_{\sqrt{3}} x + \log_{\sqrt[4]{3}} x + \log_{\sqrt[5]{3}} x + \dots + \log_{\sqrt[15]{3}} x = 36$  is  
 (a) 3 (b)  $4\sqrt{3}$  (c) 9 (d)  $\sqrt{3}$

### Section B - [Mental Ability]

16. Find out this trend and choose alternative:  
 (a) E 10 (b) E 12 (c) S 10 (d) S 12
- |    |    |     |
|----|----|-----|
| Z4 | X3 | V9  |
| A6 | C2 | ?   |
| T5 | R4 | P15 |
17. Cobra is related to snake in the same way as Leopard is related to  
 (a) Tiger (b) Lion (c) Cat (d) Zebra.
18. Pointing out to a lady, Shyam said, "She is the daughter of the woman who is the mother of the husband of my mother" who is the lady of Shyam?  
 (a) Aunt (b) Grand daughter  
 (c) Daughter (d) Sister
19. The number of boys in a class is three times the number of girls. Which one of the following numbers cannot represent the total number of children in the class?  
 (a) 48 (b) 44 (c) 42 (d) 40
20. Choose the correct water-image of the given following word. DISC  
 (a) CSID (b)  $\text{C}^{\text{I}}\text{D}^{\text{I}}$  (c) DI2C (d) DISC