

**BHU-2019**

- A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3 cm longer than the shortest and third length is to be twice as long as the shortest. What are the possible lengths for the shortest board if third piece is to be at least 5 cm longer than the second ?  
(a) More than 8 cm but less than 21 cm  
(b)  $8 \leq x \leq 22$ ,  $x$  is the length of shortest piece in cm  
(c) More than 8 cm and less than 20 cm  
(d) More than 6 cm but less than 20 cm
- The value of determinant  $\begin{vmatrix} \log_3 512 & \log_4 3 \\ \log_3 8 & \log_4 9 \end{vmatrix}$  is  
(a) 8  
(b)  $\frac{15}{2}$   
(c)  $\frac{17}{2}$   
(d)  $3\log_3 2$
- Evaluate  $\int \sec^4 x \tan x \, dx$   
(a)  $\tan x + \sec^2 x \tan x + c$   
(b)  $\frac{1}{2} \tan^2 x + \frac{1}{4} \tan^4 x + c$   
(c)  $\tan^2 x - \tan^4 x + c$   
(d)  $\tan^2 x + \tan^4 x + c$
- A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20% ?  
(a) 3  
(b) 5  
(c) 6  
(d) 4
- By reduction of Rs. 1 per kg in the price of sugar Mohan can buy one kg sugar more for Rs. 56. The original price of sugar per kg is :  
(a) Rs. 6 per kg  
(b) Rs. 8 per kg  
(c) Rs. 10 per kg  
(d) Rs. 7 per kg
- If A has more money than B has, but it is less than C has. D has lesser money than E has but more than A has. If C has lesser money than D has, who is richest among these five persons ?  
(a) C  
(b) B  
(c) D  
(d) E
- The solution of set of  $\left|x + \frac{1}{x}\right| > 2, x \neq 0$   
(a)  $\{1, 0, 2\}$   
(b)  $R - \{1, 0, 2\}$   
(c)  $R - \{-1, 0, 1\}$   
(d)  $\{-1, 0, 1\}$
- If  $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right), x \in (-1, 1)$ , then  $\frac{dy}{dx}$  is equal to  
(a)  $\frac{1}{1+x^2}$   
(b)  $\frac{1-x^2}{(1+x^2)^2}$   
(c)  $\frac{1}{2(1+x^2)}$   
(d)  $\frac{2}{1+x^2}$
- The first, second and last term of an A.P. are  $a, b, c$  respectively. The sum of A.P. is  
(a)  $\frac{(a+c)(b+c-2a)}{2(b-a)}$   
(b)  $\frac{(a-c)(b-c+2a)}{2(b-a)}$   
(c)  $\frac{(a-c)(b+c+2a)}{(a-b)}$   
(d)  $\frac{(a+c)(b+c+2a)}{(b-a)}$
- The value of  $\int \frac{1+\sin x}{1-\sin x} dx$  is :  
(a)  $\sec x \cdot \tan x + \tan x + c$   
(b)  $2 \tan x + x + \sec x + c$   
(c)  $2 \tan x - x + 2 \sec x + c$   
(d)  $\tan x - x + \sec^2 x + c$
- One year ago, a man was 8 times as old as his son. Now, his age is equal to the square of his son's age. The present age of the man is  
(a) 48 years  
(b) 49 years  
(c) 50 years  
(d) 36 years
- A watch which gains uniformly is 2 minutes slow at noon on Monday and is 4 min 48 sec fast at 2 p.m. on the following Monday. When was it correct  
(a) 1 p.m. on Friday  
(b) 2 p.m. on Wednesday  
(c) 2 p.m. on Tuesday  
(d) 3 p.m. on Thursday
- A bag contains 4 white and 5 black balls. Another bag contains 6 white and 7 black balls. A ball is transferred from first bag to second bag and then a ball is drawn from the second bag. What is the probability that the ball drawn is white ?  
(a)  $\frac{9}{21}$   
(b)  $\frac{10}{63}$   
(c)  $\frac{29}{63}$   
(d)  $\frac{25}{126}$
- If the sum of  $n$  terms of an A.P. is  $3n^2 + 5n$  and its  $m$ th terms is 164, then value of  $m$  is  
(a)  $m = 28$   
(b)  $m = 25$   
(c)  $m = 26$   
(d)  $m = 27$
- Solution of differential equation  $x \frac{dy}{dx} - y = \log x$  is  
(a)  $y = (\log x + 1) + c$   
(b)  $y = \log x + c$   
(c)  $y = c.x - (\log x + 1)$   
(d)  $y = + (1 - \log x)$
- If  $\frac{\log_e a}{b-c} = \frac{\log_e b}{c-a} = \frac{\log_e c}{a-b}$  then value of  $a^{b+c} \times b^{c+a} \times c^{a+b}$  is equal to :  
(a) 1  
(b) 3  
(c) 2  
(d) 0

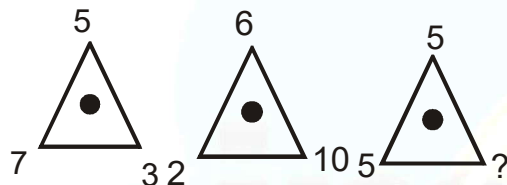
17. The value of  $\log_{16} 512$  is :  
(a)  $\frac{9}{4}$  (b) 32 (c)  $\frac{9}{2}$  (d) 16
18. It is required to seat 5 men and 4 women in a row so that the women occupy the even places. How many such arrangements are possible ?  
(a)  $\frac{1}{2}(9!)$  (b) 1240  
(c)  $5 \times 4!$  (d) 2880
19. The sum of two numbers is 15. If the sum of their reciprocals  $\frac{3}{10}$  is then the smallest number is :  
(a) 6 (b) 5  
(c) 4 (d) 3
20. Let  $A = \{1, 2, 3\}$ . The number of equivalence relations containing  $(1, 2)$  is  
(a) 4 (b) 1  
(c) 2 (d) 3
21. Let  $A = \{1, 2, 3\}$  and  $B = \{(1, 2), (2, 3), (1, 3)\}$  be a relation on A, then the relation B is :  
(a) Transitive  
(b) Neither reflexive nor transitive  
(c) Neither symmetric nor transitive  
(d) Reflexive
22. If  $x, y, z$  are different and  $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$  then  $xyz$  is equal to  
(a)  $xyz = -2$  (b)  $xyz = -1$   
(c)  $xyz = 1$  (d)  $xyz = 2$
23. Which of the following is not a leap year ?  
(a) 1200 (b) 700  
(c) 2000 (d) 800
24. The matrix  $A = \begin{bmatrix} 0 & 5 & 7 \\ -5 & 0 & 11 \\ 7 & -11 & 0 \end{bmatrix}$  is  
(a) Symmetric matrix  
(b) An upper triangular matrix  
(c) a diagonal matrix  
(d) Skew-symmetric matrix
25. The average of 50 numbers is 28. If two numbers, namely 25 and 35 are discarded then the average of the remaining numbers is nearly :  
(a) 29.72 (b) 29.27
- (c) 27.92 (d) 27.29
26. If  $y = 3 \cos(\log x) + 4 \sin(\log x)$ , then  $(x^2 y_2 + x y_1 + y)$  is then to :  
(a) -1 (b) 0  
(c) 1 (d) 2
27. Sum of  $n$  terms of the series  $\frac{1^3}{1} + \frac{1^3 + 2^3}{1+3} + \frac{1^3 + 2^3 + 3^3}{1+3+5} + \dots n$  terms is  
(a)  $\frac{n}{12}(n^2 + 9n + 17)$   
(b)  $\frac{n}{24}(n^2 + 9n + 10)$   
(c)  $\frac{3n^2 + 9n + 13}{24}$   
(d)  $\frac{n}{24}(2n^2 + 9n + 13)$
28. A bag contains 5 brown and 4 white socks. A man pulls out two socks. The probability that these are of the same colour is :  
(a)  $\frac{5}{18}$  (b)  $\frac{5}{103}$   
(c)  $\frac{1}{6}$  (d)  $\frac{4}{9}$
29. The value of 'a' such that  $x^2 - 11x + a = 0$  and  $x^2 - 14x + 2a = 0$  may have a common root. is  
(a) 32 (b) 12  
(c) 24 (d) 16
30. Find the odd man out from following :  
3, 5, 7, 12, 17, 19  
(a) 12 (b) 5  
(c) 17 (d) 19
31. The value of  $x$  in the inequation  $\frac{5x-2}{3} - \frac{7x-3}{5} > \frac{x}{4}$  is  
(a)  $x \in [-4, 4)$  (b)  $x \in (0, 4)$   
(c)  $x \in (-\infty, 4)$  (d)  $x \in (4, \infty)$
32. The total number of ways of answering 5 objective type questions, each question having 4 choice, is  
(a)  $5^4$  (b) 20  
(c) 480 (d) 1024
33. Find the odd man out from the following :  
8, 27, 64, 100, 125, 216, 343  
(a) 27 (b) 343  
(c) 100 (d) 123

34. If 5 boys write 5 pages in 5 minutes, then 3 boys will write 3 pages in  
(a) 1 minute (b) 3 minute  
(c) 9 minute (d) 5 minute
35. If  $2 \begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$ , then value of x and y are  
(a)  $x = 1, y = 2$  (b)  $x = 1, y = 5$   
(c)  $x = 2, y = 1$  (d)  $x = 3, y = 3$
36. If the coefficient of three consecutive terms in the expansion of  $(1+x)^n$  are in ratio 1 : 7 : 42, then the value of n is  
(a)  $n = 53$  (b)  $n = 52$   
(c)  $n = 50$  (d)  $n = 55$
37. The polar form of:  $z = \frac{1+3i}{1-2i}$  is  
(a)  $z = \sqrt{2} \left( \cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$   
(b)  $z = \sqrt{2} \left( \cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right)$   
(c)  $z = 2 \left( \cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$   
(d)  $z = 2 \left( \cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right)$
38. If  $a_1, a_2, a_3, \dots$  are an A.P. of non-zero terms, then  
 $\frac{1}{a_1 a_2} + \frac{1}{a_2 a_3} + \frac{1}{a_3 a_4} + \dots + \frac{1}{a_{n-1} a_n}$  is equal to  
(a)  $\frac{n-1}{a_1 a_n}$  (b)  $\frac{n(n+1)}{2a_1 a_n}$   
(c)  $\frac{n}{a_1 a_n}$  (d)  $\frac{n+1}{a_1 a_n}$
39. If  $y = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots \infty$  then value of x in term of y, is  
(a)  $x = y + y^2 + y^3 + \dots \infty$   
(b)  $x = 1 + ey$   
(c)  $x = e^y - 1$   
(d)  $x = y - \frac{y^2}{2} + \frac{y^3}{3} + \dots \infty$
40. The amplitude of  $\frac{1+i\sqrt{3}}{\sqrt{3}+i}$  is  
(a)  $-\frac{\pi}{3}$  (b)  $\frac{\pi}{6}$   
(c)  $-\frac{\pi}{6}$  (d)  $\frac{\pi}{3}$
41. Arrange words given below in alphabetical order as they would appear in dictionary and find out the one that comes last :  
(a) Achieve (b) Accumulate  
(c) Acquite (d) Actuate
42. The last value in the sequence  $9^{1/3}, 9^{1/9}, 9^{1/27}, \dots$  up to infinity, is  
(a) 3 (b) 1  
(c) 2 (d) 4
43. In a certain code language,  
'134' means 'good and tasty'  
'478' means 'see good pictures' and  
'729' means 'pictures are faint'  
Which of the following digits stands for 'see. ?  
(a) 2 (b) 8  
(c) 9 (d) 1
44. Pointing to a man in a photograph, a woman said, "His brother's father is only son of my grandfather". How is the woman related to the man in the photograph ?  
(a) Aunt (b) Sister  
(c) Daughter (d) Mother
45. A man walks 5 km towards south and then turns of the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place ?  
(a) West (b) North - East  
(c) South - West (d) South
46. The value of  $\int_{\pi/5}^{3\pi/10} \frac{\sin x}{(\sin x + \cos x)} dx$ , is  
(a)  $\frac{3\pi}{10}$  (b)  $\frac{\pi}{20}$   
(c)  $\frac{\pi}{10}$  (d)  $\frac{3\pi}{20}$
47. Given sequence : NOPQYBZARHIJKLMTUVGFEXDC  
What will come in place of (?) in the following series :  
NDP, QWB, ZFR, ?  
(a) SVI (b) SFA  
(c) IVS (d) AFS
48. What number of nearest to 99547 which is divisible by 687 ?  
(a) 98928 (b) 99479  
(c) 100166 (d) 99615

49. The smallest positive integral value of for which  $\frac{(1+i)^n}{(1-i)^{n-2}}$  is real number is  $(1-i)$ "

(a)  $n=2$  (b)  $n=0$   
(c)  $n=4$  (d)  $n=1$

50. Which number replaces the (?) in the following diagram ?



(a) 5 (b) 4  
(c) 2 (d) 3

51. Preeti has a son, named Arun. Ram is Preeti's brother. Neeta too has a daughter named Reena. Neeta is Ram's sister. What is Arun's relationship with Reena ?

(a) Cousin (b) Uncle  
(c) Nephew (d) Brother

52. The equation of the normal to the curve  $y = 2x^2 + 3\sin x$  at  $x = 0$ , is

(a)  $x - 3y = 0$  (b)  $3x - y = 0$   
(c)  $x + 3y = 0$  (d)  $3x + y = 0$

53. January 1, 2007 was Monday. What day of the week lies on January 1, 2008 ?

(a) Sunday (b) Monday  
(c) Wednesday (d) Tuesday

54. Three positive integers are chosen at random without repetition from the first 20 positive integers. The probability that their product is even is :

(a)  $\frac{13}{19}$  (b)  $\frac{17}{19}$   
(c)  $\frac{4}{19}$  (d)  $\frac{2}{19}$

55. The speed of a boat in still water is 11 km/hr. It can go 12 km upstream and return downstream in the original point in 2 hours 45 minutes. The speed of the stream is

(a) 6 km/hr (b) 10 km/hr  
(c) 4 km/hr (d) 5 km/hr

56. Focus of the parabola  $4y^2 + 12x - 12y + 39 = 0$ , is

(a)  $\left(-\frac{13}{4}, \frac{3}{2}\right)$  (b)  $\left(-\frac{5}{2}, \frac{3}{2}\right)$   
(c)  $\left(-\frac{13}{4}, 0\right)$  (d)  $\left(-\frac{5}{2}, 0\right)$

57. A manufacturer has 600 litres of a 12% solution of acid. If  $x$  litres of a 30% acid solution to be added in the solution of 12% acid so that acid content in the resulting mixture will be more than 15% less than 18%, the volume of added solution ( $x$  litre) is

(a)  $150 < x < 200$  litres (b)  $250 < x < 300$  litres  
(c)  $200 < x < 250$  litres (d)  $120 < x < 300$  litres

58. If 'A \$ B' means 'A is brother of B', 'A © B' means 'A is wife of B', 'A # B' means 'A is daughter of B' and 'A & B' means 'A is father of B'. then which of the following expression indicates the relationship 'K' is father-in-law of H ?

(a) H@J\$L#P&K  
(b) H@J\$L#K&P  
(c) H@J\$P&L#K  
(d) H@P\$J&L#K

59. If  $\log_x a$ ,  $a^{x/2}$  and  $\log_b x$  are in G.P., then value of  $x$  is

(a)  $\log_a x$  (b)  $\log_a (\log_b n)$   
(c)  $\log_b a$  (d)  $\log_a b$

60. It was Sunday on Jan 1, 2006. What was the day of week Jan 1, 2010 ?

(a) Wednesday (b) Saturday  
(c) Friday (d) Sunday

61. The average age of 40 students of a class is 15 years. When 10 new students are admitted, the average age is increased by 0.2 years. The average of the new students is

(a) 15.2 years (b) 16.2 years  
(c) 16 years (d) 16.4 years

62. The first three of four given numbers are in G.P. and their last three are in A.P. with common difference 6. If the first and fourth numbers are equal, then the first number is :

(a) 6 (b) 2  
(c) 4 (d) 8

63. If  $\theta$  is a real number and  $0 < \theta < 2\pi$ , then  $\theta$  is equal to :

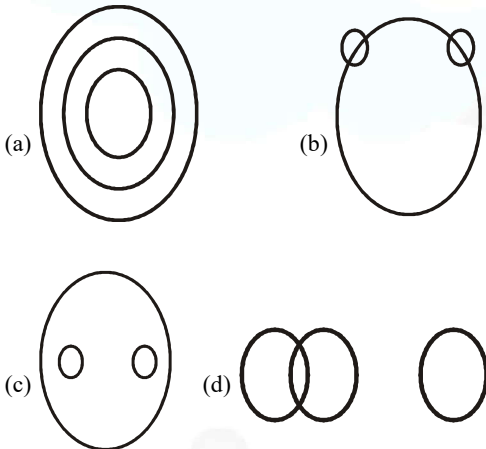
(a)  $\pi$  (b)  $\frac{\pi}{2}$   
(c)  $\frac{\pi}{3}$  (d)  $\frac{\pi}{6}$

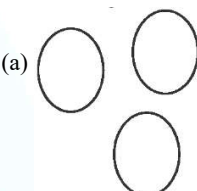
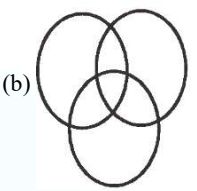
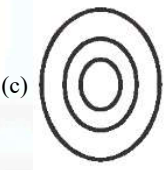
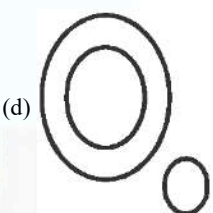
64. The middle term in the expansion of  $\left(\frac{2x^2}{3} + \frac{3}{2x^2}\right)^{10}$  is

(a) 251 (b) 250  
(c) 252 (d) 254

65. If  $\sin y = x \cos(a+y)$ , then  $\frac{dy}{dx}$  is equal to

(a)  $\frac{\sin^2 y}{\sin a}$  (b)  $\frac{\cos a}{\cos^2(a+y)}$   
(c)  $\frac{\cos a}{\sin^2 y}$  (d)  $\frac{\cos^2(a+y)}{\cos a}$

66. If  $\log_{10} 2 = a$  and  $\log_{10} 3 = b$ , then value of  $\log_{10} \left( \frac{160}{729} \right)$  is  
 (a)  $4a + 6b + 1$  (b)  $4a - 6b + 1$   
 (c)  $2a + 3b + 2$  (d)  $2a - 3b + 2$
67. A and B each have certain number of orange A says to B "If you give me 10 of your oranges. I will have twice the number of oranges left with you, "B replies, if you give" me 10 of your oranges. I will have the same number of oranges as left with you "The number of oranges with A, is :  
 (a) 80 oranges (b) 75 oranges  
 (c) 70 oranges (d) 60 oranges
68. The value of  $\int_0^{\frac{\pi}{2}} (\sqrt{\tan x} + \sqrt{\cot x}) dx$  is  
 (a)  $\frac{\pi}{2}$  (b)  $2\pi$   
 (c)  $\sqrt{2}\pi$  (d)  $\pi$
69. Which of the following Venn-diagram correctly illustrates the relationship among the classes : Carrot, Food, Vegetable  

70. **Statement :**  
 (A) All books are pencils.  
 (B) All pencil are pens.  
**Inference :**  
 (i) All books are pens.  
 (ii) Some pencils are not books  
 (a) Inference (ii) is true  
 (b) Inference (i) is true  
 (c) Inference (i) and (ii) are true  
 (d) Neither of the inference are true
71. How many times in a day, the hands of a clock are straight ?  
 (a) 48 (b) 24  
 (c) 44 (d) 22
72. The calendar for the year 2007 will be the same for the year :  
 (a) 2018 (b) 2016  
 (c) 2014 (d) 2017
73. In the following five names, which name will come in the last in a telephone directory ?  
 (a) Mahender (b) Mahendra  
 (c) Mahinder (d) Mahindra
74. 8 men and 12 boys can do a piece of work in 10 days while 6 men and 8 boys can do the same work in 14 days. The time taken by a single man to do the same work, is  
 (a) 140 days (b) 150 days  
 (c) 130 days (d) 120 days
75. If  $\log_{2\sqrt{3}} x = 6$ , then the value of x is :  
 (a) 3456 (b) 1728  
 (c) 864 (d) 512
76. Distance between the lines  $5x + 3y - 7 = 0$  and  $15x + 9y + 14 = 0$  is .  
 (a)  $\frac{7}{3\sqrt{34}}$  (b)  $\frac{35}{3\sqrt{34}}$   
 (c)  $\frac{10}{3\sqrt{34}}$  (d)  $\frac{35}{\sqrt{34}}$
77. If  $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$ , then  $A^{-1}$  is  
 (a)  $\frac{1}{17} \begin{bmatrix} 4 & 3 \\ -3 & 2 \end{bmatrix}$  (b)  $\frac{1}{17} \begin{bmatrix} 1 & 3 \\ -3 & -4 \end{bmatrix}$   
 (c)  $\frac{1}{17} \begin{bmatrix} 4 & 2 \\ 3 & 3 \end{bmatrix}$  (d)  $\frac{1}{17} \begin{bmatrix} 2 & 3 \\ 3 & -4 \end{bmatrix}$
78. Rs. 395 are divided among A, B and C in such a manner that B gets 25% more than A and 20% more than C. The share of A is:  
 (a) 195 (b) 198  
 (c) 180 (d) 120
79. Equation of the circle throgh origin and cuts intercepts of length a and b from the axes, is :  
 (a)  $x^2 + y^2 + ax + by + a^2 + b^2 = 0$   
 (b)  $x^2 + y^2 - ax - by + ab = 0$   
 (c)  $x^2 + y^2 - ax - by = 0$   
 (d)  $x^2 + y^2 + ax + by = 0$
80. Identify missing letters to be filled up in the blank spaces provided in the following series :  
 a \_ bba \_ cab \_ ac \_ ab \_ ac  
 (a) b, c, a, c, b (b) a, b, c, b, c  
 (c) b, c, b, c, c (d) a, c, b, c, b

81. If  $a, b, c$  are in A.P., then value of  $\begin{vmatrix} 2y+4 & 5y+7 & 8y+a \\ 3y+5 & 6y+8 & 9y+b \\ 4y+6 & 7y+9 & 10y+c \end{vmatrix}$  is
- (a)  $y^2 + 3y + abc$  (b)  $10y^3$   
(c)  $x + y + z + 2abc$  (d) 0
82. In how many ways can 9 examination papers be arranged so that the best and worst papers are never together ?
- (a)  $9! - 8!$  (b)  $8 \times 9!$   
(c) 141120 (d)  $9! - (8! \times 2)$
83. If the code DELHI is HIPLM, then QEHVEW would be the code of :
- (a) JAIPUR (b) NAGPUR  
(c) MUMBAI (d) MADRAS
84. The equation of an ellipse whose axes are along the coordinate axes, vertices are  $(0, \pm 10)$  and eccentricity  $e = \frac{4}{5}$  is
- (a)  $\frac{x^2}{25} + \frac{y^2}{100} = 1$  (b)  $\frac{x^2}{100} + \frac{y^2}{36} = 1$   
(c)  $\frac{x^2}{36} + \frac{y^2}{100} = 1$  (d)  $\frac{x^2}{25} + \frac{y^2}{36} = 1$
85. If  $g(x) = x^2 + x - 2$  and  $\frac{1}{2}(g \circ f)(x) = 2x^2 - 5x + 2$  then  $f(x)$  is equal to
- (a)  $2x^2 - 3x + 1$  (b)  $2x + 3$   
(c)  $2x^2 + 3x + 1$  (d)  $2x - 3$
86. One morning Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing ?
- (a) South - East (b) South  
(c) North (d) None of these
87. The value of  $\begin{vmatrix} x+y & x & x \\ 5x+4y & 4x & 2x \\ 10x+8y & 8x & 3x \end{vmatrix}$  is
- (a)  $x^2 + y^2 + xy$  (b)  $3x^2y + yx + x^2$   
(c)  $3xy$  (d)  $x^3$
88. If  $a, b, c$  are in G.P. and  $a^{1/x} = b^{1/y} = c^{1/z}$ , then  $x, y, z$  are in :
- (a) H.P. (b) Special Sequence  
(c) A.P. (d) G.P.
89. Select from four alternative diagrams, the one that best illustrates the relationship among the three classes : Pigeons, Birds, Dogs
- (a)  (b)   
(c)  (d) 
90. The least integral value of  $k$  which makes the roots of the equation  $x^2 + 5x + k = 0$  imaginary, is :
- (a) 6 (b) 7  
(c) 5 (d) 4
91. A box contains 5 different red and 6 different White balls. In how many ways can 6 balls be selected so that there are at least two balls to each colour ?
- (a)  ${}^{11}C_6$  (b) 360  
(c) 425 (d) 420
92. Q is the father of R, P is the son of Q, T is the brother of S, S is the daughter of R. Who are the cousins of P ?
- (a) R and Q (b) S and Q  
(c) S and T (d) R and T
93. The value of  $\int_0^{\sqrt{2}} \sqrt{2-x^2} dx$  is
- (a) 2 (b) 0  
(c)  $\sqrt{2}$  (d)  $\frac{\pi}{2}$
94. A is the son of B. C. B's sister has a son D and a daughter E. F is the maternal uncle of D. How many nephews does F have ?
- (a) 2 (b) 1  
(c) 0 (d) 3
95. Three of the following four are alike in a certain way and hence form a group. Which is the one that does not belong to that group ?
- (a) Cobbler (b) Ring  
(c) Shoe (d) Shirt
96. If the A.M. of two positive number  $a$  and  $b$  ( $a > b$ ) is twice their G.M., then  $a : b$  is
- (a)  $a : b = \sqrt{2} : \sqrt{3}$  (b)  $a : b = (2 - \sqrt{3}) : (4 + \sqrt{3})$   
(c)  $a : b = (2 + \sqrt{3}) : (2 - \sqrt{3})$  (d)  $a : b = (2 + \sqrt{3}) : \sqrt{3}$



97. How many five - letter words containing 3 vowels and two consonants can be formed using the letters of the word "EQUATION" so that the two consonants occur together ?

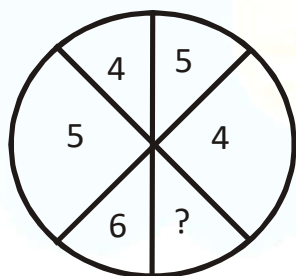
(a) 1440 (b)  ${}^5C_3 \times {}^3C_2$   
(c) 720 (d)  ${}^5C_3 \times {}^3C_2 \times 4! \times 3!$

98. The real valued function

$f(x) = \begin{cases} kx^2, & \text{if } x \leq 2 \\ 3, & \text{if } x > 2 \end{cases}$  is continuous at  $x = 2$ . Then the value of 'k' is

(a) 1 (b)  $\frac{1}{4}$   
(c)  $\frac{1}{2}$  (d)  $k = \frac{3}{4}$

99. Which number replaces the (?) in the following diagram



(a) 3 (b) 2  
(c) 5 (d) 1

100. Choose the number pair/group which is different from others ?

(a) 7 : 22 (b) 8 : 33  
(c) 15 : 46 (d) 12 : 37

101. If f and g be real functions, defined by  $f(x) = \frac{x}{x+1}$  and

$g(x) = \frac{1}{x+3}$  Domain of the function (fog) is

(a)  $R - \{0\}$  (b)  $R - \{-1, -3\}$   
(c)  $R - \{-1\}$  (d)  $R - \{-3, -4\}$

102. If the coefficient of x in  $\left(x^2 + \frac{\lambda}{x}\right)^5$  is 270, then  $\lambda$ , is equal to

(a) 5 (b) 4  
(c) 3 (d) 6

103. Out of 120 students in a school, 5% can play all the three games Cricket, Chess and Carroms. If so happens that the number of players who can play any and only two games is 30. The number of students who can play the Cricket alone is 40. What is the total number of those who can play Chess alone or Carroms alone ?

(a) 24 (b) 44  
(c) 45 (d) 46

104. Constant term in the expansion of  $\left(x - \frac{1}{x}\right)^{10}$  is

(a) -252 (b) -152  
(c) 132 (d) 252

105. The area of the region  $\{(x, y) : x^2 + y^2 \leq 1 \leq x + y\}$ , is

(a)  $\frac{\pi}{4}$  sq.units (b)  $\left(\frac{\pi}{2} + \frac{1}{4}\right)$  sq. units  
(c)  $\left(\frac{\pi}{4} - \frac{1}{2}\right)$  sq. units (d)  $\left(\frac{\pi}{2} - \frac{1}{4}\right)$  sq. units

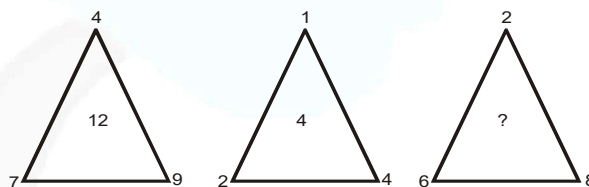
106. The value of  $(0.2) \log_{\sqrt{5}} \left(\frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots + \infty\right)$  is

(a) 1 (b) 2  
(c) 4 (d) 3

107. A man 2m high walks at a uniform speed of 6m per seconds away from a lamp post, 5 m high. What is the rate at which the length of his shadow increases ?

(a) 5m/sec (b) 3 m/sec  
(c) 3.5 m/sec (d) 4 m/sec

108. Which number replaces the (?) in the following diagram



(a) 8 (b) 6  
(c) 9 (d) 5

109. The product of the matrices  $\begin{bmatrix} 2 & 0 & 7 \\ 0 & 1 & 0 \\ 1 & -2 & 1 \end{bmatrix}$  and

$\begin{bmatrix} -x & 14x & 7x \\ 0 & 1 & 0 \\ x & -4x & -2x \end{bmatrix}$  is an identity matrix. Then the value of x is

(a)  $x = \frac{1}{5}$  (b)  $x = \frac{3}{5}$   
(c)  $x = -\frac{1}{5}$  (d)  $x = -\frac{2}{3}$

110. A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

In above series which letter is in the middle between the ninth letter from the right and eighth letter from the left in the given alphabets ?

(a) M (b) N  
(c) O (d) L

111. 10th term in the binomial expansion of  $\left(2x^2 + \frac{1}{x}\right)^{12}$  is
- (a)  $\frac{760}{x}$  (b)  $\frac{760}{x^3}$   
(c)  $\frac{1660}{x^3}$  (d)  $\frac{1760}{x^3}$
112. If  $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$  may be the geometric mean between a and b, then value of n is
- (a)  $n = -\frac{1}{2}$  (b)  $n = -\frac{1}{4}$   
(c)  $n = \frac{1}{4}$  (d)  $n = \frac{1}{2}$
113. Eccentricity of a hyperbola  $x^2 - 2y^2 - 2x + 8y - 1 = 0$  is
- (a)  $\sqrt{3}$  (b)  $2\sqrt{\frac{2}{3}}$   
(c) 3 (d)  $2\sqrt{3}$
114. If  $x + iy = (1 + i)(1 + 2i)(1 + 3i)$ , then value of  $x^2 + y^2$ , is
- (a) 25 (b) 0  
(c) 50 (d) 100
115. If A is to South of B, C is to East to B, then in what direction is A with respect to C ?
- (a) North - West (b) North - East  
(c) South - East (d) South - West
116. The value of :  $(i^{77} + i^{70} + i^{87} + i^{414})^3$ , is
- (a) -8 (b) -1  
(c) 8 (d) 1
117. If 'a' and 'b' are roots of the equation  $x^2 - x + 1 = 0$ , then the value of  $a^2 + b^2$  is
- (a) -3 (b) 3  
(c) -1 (d) 1
118. Statements :
- (A) Some ministers are teachers.  
(B) All teachers are scholar
- Inferences :
- (i) Some minister are scholar  
(ii) All scholars are teachers
- (a) Neither of the inferences are true  
(b) Inference (i) and (ii) are true  
(c) Inference (ii) is true  
(d) Inference (i) is true
119. If  $y = \log \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$  then  $\frac{dy}{dx}$  is equal to
- (a)  $\sec^2\left(\frac{\pi}{4} + \frac{x}{2}\right)$  (b)  $\frac{1}{\tan\left(\frac{\pi}{4} + \frac{x}{2}\right)}$   
(c)  $\sec x$  (d)  $\frac{1}{2 \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)}$
120. If A and B are two events such that  $P(A) = 0.25$  and  $P(B) = 0.50$ . The probability of both happening together is 0.14. The probability of happening of neither A nor B is :
- (a) 0.39 (b) 0.11  
(c) 0.86 (d) 0.23



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1. (b)	2. (b)	3. (b)	4. (b)	5. (b)	6. (d)	7. (c)	8. (d)	9. (a)	10. (c)
11. (b)	12. (b)	13. (c)	14. (d)	15. (c)	16. (a)	17. (a)	18. (d)	19. (b)	20. (c)
21. (a)	22. (b)	23. (b)	24. (d)	25. (c)	26. (b)	27. (d)	28. (d)	29. (c)	30. (a)
31. (d)	32. (d)	33. (c)	34. (d)	35. (d)	36. (d)	37. (b)	38. (a)	39. (c)	40. (b)
41. (d)	42. (a)	43. (b)	44. (b)	45. (c)	46. (b)	47. (a)	48. (d)	49. (d)	50. (a)
51. (a)	52. (c)	53. (d)	54. (b)	55. (d)	56. (a)	57. (d)	58. (b)	59. (b)	60. (c)
61. (c)	62. (d)	63. (a)	64. (a)	65. (d)	66. (b)	67. (c)	68. (c)	69. (a)	70. (b)
71. (c)	72. (a)	73. (d)	74. (a)	75. (a)	76. (b)	77. (a)	78. (d)	79. (c)	80. (d)
81. (d)	82. (d)	83. (d)	84. (c)	85. (d)	86. (a)	87. (d)	88. (c)	89. (d)	90. (b)
91. (c)	92. (d)	93. (d)	94. (a)	95. (a)	96. (c)	97. (a)	98. (d)	99. (a)	100. (b)
101. (d)	102. (b)	103. (b)	104. (a)	105. (c)	106. (c)	107. (d)	108. (c)	109. (a)	110. (a)
111. (d)	112. (a)	113. (a)	114. (c)	115. (d)	116. (a)	117. (c)	118. (d)	119. (c)	120. (a)

**GURUKUL**