

**PAPER 3 : QUANTITATIVE APTITUDE**

1. The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half – yearly is
  - (a) 6.06%
  - (b) 6.07%
  - (c) 6.08%
  - (d) 6.09%
2. What is the present value of Rs. 1 to be received after two years compounded annually at 10% interest rate ?
  - (a) 0.73
  - (b) 0.60
  - (c) 0.90
  - (d) 0.83
3. Find the next term of the series BKS, DJT, FIU, HHV, ?
  - (a) GWJ
  - (b) JGW
  - (c) GJW
  - (d) None
4. A man goes 3 km east from point A and then takes a right turn from point B to move 4 km to point C. What is the minimum distance between point A and point C ?
  - (a)  $2\sqrt{2}km$
  - (b)  $5km$
  - (c)  $7km$
  - (d)  $6km$
5. Which of the following is odd one :-
  - (a) CEHL
  - (b) KMPT
  - (c) OQTX
  - (d) NPSV
6. If PLAY is coded as 8123 and RHYME is coded as 49367. What will be code of MALE ?
  - (a) 6217
  - (b) 6198
  - (c) 6395
  - (d) 6285
7. P, T, V, R, M, D, K and W are sitting around a circular table facing the centre. V is second to the left of T. T is fourth to the right of M. D and P are not immediate neighbours of T. D is third to the right of P. W is not an immediate neighbor of P. P is to the immediate left of K.  
What is R's position with respect to V ?
  - (a) Third to the right

- (b) Fifth to the right  
(c) Third to the left  
(d) Second to the left
8. If ROSE is written as TQUG, how BISCUIT can be written in that code?  
(a) DKUEWKV  
(b) CJTDVJU  
(c) DKVEWKV  
(d) DKUEWKY
9. Madhuri moved a distance of 75 meters toward north. She then turned to the left and walking for about 25m, turned left again and walks 80m, finally she turned to the right at an angle of  $45^\circ$ . In which direction was she moving finally?  
(a) South – East  
(b) South – West  
(c) North – west  
(d) North – East
10. The population of a village increase by 2% per year, if current population is 50,000 then find the population of village after 2 years:-  
(a) 52,020  
(b) 52,000  
(c) 51,980  
(d) 52,100
11. If in two years time a principal of Rs. 100 amounts to Rs. 121 when the interest at the rate of r% is compounded annually, then the value of r will be :  
(a) 10.5  
(b) 10  
(c) 15  
(d) 14
12. A sum of money amounts to Rs. 5,200 in 5 years and to Rs. 5,680 in 7 years at simple interest. The rate of interest per annum is :-  
(a) 3%  
(b) 4%  
(c) 5%  
(d) 6%
13. Two equal sums of money were lent at simple interest at 11 p.a. for  $3\frac{1}{2}$  years and  $4\frac{1}{2}$  years respectively. If the difference in interests for two periods was Rs. 825 then each sum is :  
(a) Rs. 8,250  
(b) Rs. 8,500  
(c) Rs. 7,500  
(d) Rs. 9,250

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14. Link relative index number is expressed for period n is
- $\frac{P_n}{P_{n+1}}$
  - $\frac{P_0}{P_{n-1}}$
  - $\frac{P_n}{P_{n-1}} \times 100$
  - None of these.
15. The probability that a number selected from [1,2,3,4,....., 100] is a perfect cube is
- $\frac{1}{10}$
  - $\frac{1}{25}$
  - $\frac{1}{20}$
  - $\frac{3}{100}$
16. Out of the following which is a positional average -
- Arithmetic mean
  - Geocentric mean
  - Median
  - Harmonic mean
17. Which one of the following cannot be determined by graphic method-
- Mean
  - Median
  - Quartiles
  - Mode
18. Consecutive rectangles in a Histogram have no space in between
- true
  - false
  - both
  - none
19.  $\sqrt{2+\sqrt{2+\sqrt{2+\dots}}}$  equals to
- 1
  - 2
  - a & b
  - None of these

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20. The length of a rectangle is 4cm more than the breadth and the perimeter is 11cm more than the breadth. The length of the rectangle is :  
 (a) 5 cm  
 (b) 7 cm  
 (c) 9 cm  
 (d) none of these
21. A car that costs Rs. 6,00,000 is bought by paying Rs. 1,00,000 as down-payment and equal annual payments for three-years. What is the annual installment if the interest is paid at 8% on the remaining amount compounded annually?  
 (a) Rs. 1,94,016.75  
 (b) Rs. 2,94,016.75  
 (c) Rs. 1,61,013.75  
 (d) Rs. 1,74,016.75
22. There are 15 points in a plane, out of there 6 are collinear. The number of straight lines formed by joining these points is:-  
 (a) 90  
 (b) 91  
 (c) 45  
 (d) 51
23. The number of arrangements of the letters of the word "SALOON" if the two O's do not come together is :-  
 (a) 360  
 (b) 720  
 (c) 240  
 (d) 120
24. In how many ways a committee of 5 members can be selected from 6 men and 5 women, consisting of 3 men and 2 women?  
 (a) 108  
 (b) 300  
 (c) 140  
 (d) 200
25. How many different words can be formed with the letters of the word 'MISSISSIPPI'?  
 (a) 36450  
 (b) 35460  
 (c) 34560  
 (d) 34650
26. If  ${}^nP_5 = 20 {}^nP_3$  then n is equal to :-  
 (a) 7  
 (b) 6  
 (c) 8  
 (d) 5
27. Insert 4 GM's between 9 and 288 :-  
 (a) 27, 54, 108, 144  
 (b) 18, 36, 72, 144  
 (c) 36, 72, 144, 208  
 (d) 18, 27, 54, 108

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28. If  $\log_{10} 2 = x$  and  $\log_{10} 4 = y$ , then  $\log_{10} 80$  is equal to:

- (a)  $x - y + 1$
- (b)  $x + y + 1$
- (c)  $x - y - 1$
- (d)  $2x - y + 1$

29. If  $\log_3 [\log_2 (\log_3 x)] = 1$  then  $x$  is equal to:-

- (a) 8
- (b) 18
- (c) 81
- (d) 6561

30.  $\frac{2^{n+3} - 10 \times 2^{n+1}}{2^{n+1} \times 6}$  is equal to:-

- (a) -1
- (b) 1
- (c) 0
- (d) 2

31. Suppose the revenues of a company for five years:-

| Year     | 2013 | 2014 | 2015 | 2016 | 2017 |
|----------|------|------|------|------|------|
| Revenues | 100  | 120  | 160  | 210  | 260  |

Calculate compound annual growth rate.

- (a) 26.98%
- (b) 27.74%
- (c) 25.96%
- (d) 29.01%

32. In a class of 120 students, 35% students can play only cricket, 45% students can play only table tennis and the remaining students can play both the games. In all how many students can play cricket?

- (a) 55
- (b) 66
- (c) 60
- (d) 70

33.  $\int \frac{dx}{x + \sqrt{x^2 - 1}}$

- (a)  $\frac{x^2}{2} - \frac{x}{2} \sqrt{x^2 + 1} + \frac{1}{2} \log (x + \sqrt{x^2 - 1}) + C$
- (b)  $x - \frac{x}{2} \sqrt{x^2 - 1} - \frac{1}{2} \log (x + \sqrt{x^2 - 1}) + C$
- (c)  $\frac{x^2}{2} + \frac{x}{2} \sqrt{x^2 - 1} + \frac{1}{2} \log (x + \sqrt{x^2 - 1}) + C$
- (d)  $\frac{x^2}{2} - \frac{x}{2} \sqrt{x^2 - 1} + \frac{1}{2} \log (x + \sqrt{x^2 - 1}) + C$

34.  $\int_1^2 (x^2 - 5x + 2) dx$
- (a)  $-\frac{6}{19}$
- (b)  $\frac{19}{6}$
- (c)  $-\frac{19}{6}$
- (d) 19
35. The derivative of  $x^2 \log x$  is : –
- (a)  $1 + 2 \log x$
- (b)  $2 \log x$
- (c)  $x(1 + 2 \log x)$
- (d) None
36. If the plotted points in a scatter diagram lie from upper left to lower right, then correlation is:
- (a) Positive
- (b) Zero
- (c) Negative
- (d) None of these
37. Co-variance may be positive, negative or zero:
- (a) True
- (b) False
- (c) Both
- (d) None
38. The difference between the observed value and the estimated value in regression analysis is known as:
- (a) Error
- (b) Residue
- (c) Deviation
- (d) (a) or (b)
39. The two lines of regression meet at:
- (a)  $(\bar{x}, \bar{y})$
- (b)  $(\sigma_x, \sigma_y)$
- (c)  $(\sigma_x^2, \sigma_y^2)$
- (d)  $(x, y)$

40. Two lines of regression are given by  $5x+7y-22=0$  and  $6x+2y-22=0$ . If the variance of  $y$  is 15 find the standard deviation of  $x$ .
  - (a) 2.646
  - (b) 6.246
  - (c) 7.612
  - (d) 3.646
41. If the regression coefficient of  $y$  on  $x$ , the coefficient of correlation between  $x$  and  $y$  and variance of  $y$  are  $-3/4$ ,  $-\sqrt{3}/2$  and 4 respectively, what is the variance of  $x$ ?
  - (a)  $2/\sqrt{3}/2$
  - (b)  $16/3$
  - (c)  $4/3$
  - (d) 4
42. Two dice with face marked 1, 2, 3, 4, 5, 6 are thrown simultaneously and the points on the dice are multiplied together. The probability that product is 12 is:
  - (a)  $4/36$
  - (b)  $5/36$
  - (c)  $12/36$
  - (d) None
43. A box contains 5 white and 7 black balls. Two successive draws of 3 balls are made (i) with replacement (ii) without replacement. The probability that the first draw would produce white balls and the second draw would produce black balls are respectively:
  - (a)  $6/321$  and  $3/926$
  - (b)  $1/20$  and  $1/30$
  - (c)  $35/144$  and  $35/108$
  - (d)  $7/968$  and  $5/264$
44. Standard normal distribution have inflexion points:
  - (a)  $\mu$  &  $\sigma$
  - (b)  $\mu - \sigma$  &  $\mu + \sigma$
  - (c)  $-1$  &  $+1$
  - (d) None of these
45. The probability that A speaks truth is  $4/5$ , while the probability for B is  $3/4$ . The probability that they contradict each other when asked to speak on a fact is:
  - (a)  $3/20$
  - (b)  $1/5$
  - (c)  $7/20$
  - (d)  $4/5$
46. What is the probability that a leap year selected at random would contain 53 Saturdays?
  - (a)  $1/7$
  - (b)  $2/7$
  - (c)  $1/12$
  - (d)  $1/4$

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47. Variance of a random variable  $x$  is given by:
  - (a)  $E(x - \mu)^2$
  - (b)  $E[x - E(x)]^2$
  - (c)  $E(x^2 - \mu)$
  - (d) (a) or (b)
48. A Binomial distribution is \_\_\_\_\_. The parameter(s) are:
  - (a) Biparametric,  $n$  and  $q$
  - (b) Biparametric,  $n$  and  $p$
  - (c) Uniparametric,  $p$
  - (d) Uniparametric,  $q$
49. What is the no. of trials of a binomial distribution having mean and SD as 3 and 1.5 respectively?
  - (a) 2
  - (b) 4
  - (c) 8
  - (d) 12
50. In Binomial Distribution,  $\mu = 4$ ,  $\sigma^2 = 3$ , then mode =
  - (a) 4
  - (b) 4.25
  - (c) 4.5
  - (d) 4.1
51. The cost of living index numbers in years 2015 and 2018 were 97.5 and 115 respectively. The salary of a worker in 2015 was Rs. 19500. How much additional salary was required for him in 2018 to maintain the same statement of living as in 2015?
  - (a) Rs. 3,000
  - (b) Rs. 4,000
  - (c) Rs. 3,500
  - (d) Rs. 4,500
52. Which is called an ideal index number?
  - (a) Laspayer's index number
  - (b) Pasche's index number
  - (c) Fisher's index number
  - (d) Marshall Edgeworth index number
53. The no. of observations falling within a class is called
  - (a) density
  - (b) frequency
  - (c) both
  - (d) none
54. Frequencies are also called weights.
  - (a) True
  - (b) false
  - (c) both
  - (d) none

55. The value exactly at the middle of a class interval is called  
 (a) class mark  
 (b) mid value  
 (c) both  
 (d) none
56. G.M. of a set of n observations is the root of their product.  
 (a) nth  
 (b) (n+1)th  
 (c)  $n^2$ th  
 (d) (n-1)th
57. The average rainfall for a week excluding Sunday was 10 cms. Due to heavy rainfall on Sunday, the average rainfall for the week rose to 15 cms. How much rainfall was there on Sunday?  
 (a) 40 cm  
 (b) 45 cm  
 (c) 50 cm  
 (d) 165 cm
58. The mean salary paid per week to 1,000 employees of an establishment was found to be Rs. 900. Later on, it was discovered that the salaries of two employees were wrongly recorded as Rs. 750 and Rs. 365 instead of Rs. 570 and Rs. 635. Find the corrected mean salary.  
 (a) 280  
 (b) 1000  
 (c) 900.09  
 (d) 800.09

59. In following data-

|              | Male | Female |
|--------------|------|--------|
| Observations | 2    | 2      |
| GM           | 4    | 25     |

then find combined geometric mean-

- (a) 9  
 (b) 6.11  
 (c) 10  
 (d) None of these
60. Which is always true for distinct observations-
- (a) Standard Deviation =  $\sqrt{\frac{\sum x^2}{n}}$   
 (b) Standard Deviation =  $\sum x^2 + n^2$   
 (c)  $\sum x^2 = n(\sigma^2 + \bar{x}^2)$   
 (d)  $\bar{x}^2 = \sigma^2 + n^2$

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61. Standard Deviation is independent of change of \_\_\_\_\_.  
 (a) Origin  
 (b) Scale  
 (c) Both  
 (d) None of these.
62. To check the consistency of two data which measure of dispersion will be used-  
 (a) QD  
 (b) SD  
 (c) CV  
 (d) None of these.
63. For the distribution
- |   |   |   |    |    |    |   |
|---|---|---|----|----|----|---|
| X | 1 | 2 | 3  | 4  | 5  | 6 |
| F | 6 | 9 | 10 | 14 | 12 | 8 |
- The value of median is  
 (a) 3.5  
 (b) 3  
 (c) 4  
 (d) None of these
64. The Q.D. of 6 numbers 15, 8, 36, 40, 38, 41 is equal to  
 (a) 12.5  
 (b) 25  
 (c) 13.5  
 (d) 37
65. The prices and quantities of 3 commodities in base and current years are as follows:
- |                |                |                |                |
|----------------|----------------|----------------|----------------|
| P <sub>0</sub> | P <sub>1</sub> | q <sub>0</sub> | q <sub>1</sub> |
| 12             | 14             | 10             | 20             |
| 10             | 8              | 20             | 30             |
| 8              | 10             | 30             | 10             |
- The Laspayer price index is  
 (a) 118.13  
 (b) 107.14  
 (c) 120.10  
 (d) None
66. Coefficient of quartile deviation is  $\frac{1}{4}$  then Q<sub>3</sub>/Q<sub>1</sub> is  
 (a)  $\frac{5}{3}$   
 (b)  $\frac{4}{3}$   
 (c)  $\frac{3}{4}$   
 (d)  $\frac{3}{5}$
67. For a symmetric distribution  
 (a) Mean = Median = Mode  
 (b) Mode = 3 Median - 2 Mean  
 (c) Mode =  $\frac{1}{3}$  Median =  $\frac{1}{2}$   
 (d) None

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68. Which number should be subtracted from 23, 30, 57 and 78 so that remaining numbers are in proportion?  
 (a) 4  
 (b) 5  
 (c) 6  
 (d) 7
69. A sum was invested for 3 years as per C.I and the rate of interest for first year is 9%, 2<sup>nd</sup> year is 6% and 3<sup>rd</sup> year is 3% p.a. respectively. Find the sum if the amount in three years is Rs. 550?  
 (a) Rs. 250  
 (b) Rs. 300  
 (c) Rs. 462.16  
 (d) Rs. 350
70. A man deposited Rs. 8,000 in a bank for 3 years at 5% per annum compound interest, after 3 years he will get :  
 (a) Rs. 8,800  
 (b) Rs. 9,261  
 (c) Rs. 9,200  
 (d) Rs. 9,000
71. A man tosses a fair coin 10 times, the probability that he has heads on the five tosses is:  
 (a)  ${}^{10}C_5 \left(\frac{1}{2}\right)^{10}$   
 (b)  $\left(\frac{1}{2}\right)^{10}$   
 (c)  ${}^5C_1 \left(\frac{1}{2}\right)^{10}$   
 (d)  $\left(\frac{1}{2}\right)^5$
72. 6 coins are tossed 512 times. Also, compute the mean and SD of the number of heads:  
 (a) 2 and 1.33  
 (b) 3 and 1.22  
 (c) 4 and 1.55  
 (d) 2 and 1.11

**Directions (Q.73-75) : Read the following information carefully and answer the questions, given below :-**

- (i) 'P ÷ Q' means P, is Son of Q  
 (ii) 'P x Q' means P, is Sister of Q  
 (iii) 'P + Q' means P, is Brother of Q  
 (iv) 'P - Q' means P, is Mother of Q

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73. How is T related to S in the expression?  
 $'T \times R + V \div S'$  ?  
 (a) Sister  
 (b) Mother  
 (c) Aunt  
 (d) Daughter
74. How is T related to S in the expression?  
 $'T \times R \div V - S'$  ?  
 (a) Father  
 (b) Sister  
 (c) Daughter  
 (d) Aunt
75. How is V related to T in the expression?  
 $'T \div R + V \times S'$  ?  
 (a) Aunt  
 (b) Nephew  
 (c) Niece  
 (d) Uncle
76. One evening, Raja started to walk toward the Sun. After walking a while, he turned to his right and again to his right. After walking a while, he again turned right. In which direction is he facing ?  
 (a) South  
 (b) East  
 (c) West  
 (d) North
77. "The less than Ogive" is a:  
 (a) U-shaped curve  
 (b) J-shaped curve  
 (c) S-shaped curve  
 (d) Bell-shaped curve
78. The most stable measure of central tendency is:  
 (a) Mode  
 (b) Median  
 (c) Mean  
 (d) G.M.
79. Compute AM, GM and HM FOR 6, 8, 12, 36  
 (a) 15.50, 12, 9.93  
 (b) 9.93, 15, 8.65  
 (c) 9.52, 14.35, 8.65  
 (d) 18.25, 19, 7.54
80. If the standard deviation of x is 3, what is the variance of  $(5-2x)$ ?  
 (a) 36  
 (b) 6  
 (c) 1  
 (d) 9

81. If  $f(x) = {}^x c_2$ , then  $f^1(3)$  is equal to:-
- $-\frac{5}{2}$
  - $-\frac{2}{5}$
  - $\frac{5}{2}$
  - $\frac{2}{5}$
82. If  $f(x) = \frac{x-1}{x}$  and  $g(x) = \frac{1}{1-x}$  then fog (x) is equal to:-
- x-1
  - x
  - 1-x
  - x
83. If a Relation  $R = \{(1, 1), (2, 2), (1, 2), (2, 1)\}$  on  $A = \{1, 2, 3\}$ , then R is:
- Reflexive, Symmetric and Transitive
  - Reflexive and Symmetric
  - Reflexive and Transitive
  - Symmetric and Transitive
84. The difference between the roots of the equation  $x^2 - 7x - 9 = 0$  is:
- 7
  - $\sqrt{85}$
  - 9
  - $2\sqrt{85}$
85. Let  $E_1$  and  $E_2$  one two linear equations in two variables x and y. (0,1) is a solution of both equations  $E_1$  and  $E_2$ . (2,-1) is a solution of equation  $E_1$  only and (-2,-1) is solution of  $E_2$  only then  $E_1$  and  $E_2$  are:-
- $x=0, y=1$
  - $2x-y=-1, 4x+y=1$
  - $x+y=1, x-y=-1$
  - $x+2y=2, x+y=1$
86. If one root of the equation is  $2 - \sqrt{3}$ , form the equation.
- $x^2 - 2x + 2 = 0$
  - $x^2 - 3x + 1 = 0$
  - $x^2 - 5x + 5 = 0$
  - $x^2 - 4x + 1 = 0$
87. Solve  $x^3 - 7x + 6 = 0$
- $x = -4, -2, -3$
  - $x = 1, 2, -3$
  - $x = 5, 6, -1$
  - $x = 7, 2, -5$

88. Two machines (I and II) produce two grades of plywood, Grade A and Grade B. In one hour of operation, machine I produces 2 units of Grade A and one unit of Grade B, while machine II, in one hour of operation produces 3 units of grade A and four units of grade B. The machines are required to meet a production schedule of atleast 14 units of grade A and 12 units of grade B. Express this using linear inequalities.
- (a)  $2x+3y \geq 14, x+4y \geq 12, x \geq 0, y \geq 0$   
(b)  $2x+3y \leq 14, x+4y \geq 12, x \geq 0, y > 0$   
(c)  $2x+3y \leq 14, x+4y \leq 12, x \geq 0, y \geq 0$   
(d)  $2x+3y \geq 14, x+4y \leq 12, x \geq 0, y \geq 0$
89. The numbers a, X, c are in A.P. if  $X = 25$  and a, Y, c are in G.P. if  $Y = 7$ , then the value of (a, c) are:
- (a) 1, 16  
(b) 1, 25  
(c) 1, 36  
(d) 1, 49
90. A person received the salary for the 1<sup>st</sup> Year is Rs. 5,00,000 per year and he received an increment of Rs. 15,000 per year then the sum of the salary he taken in 10 years.
- (a) Rs. 56,75,000  
(b) Rs. 72,75,000  
(c) Rs. 63,75,000  
(d) None
91. The value of  $A^{\frac{1}{2}} \times A^{\frac{1}{4}} \times A^{\frac{1}{8}} \dots \infty$
- (a) zero  
(b) Infinity  
(c)  $\frac{1}{2}$   
(d) A
92. In a certain code 256 means 'Red Colour Chalk', 589 means 'Green Colour Flower' and 245 means 'White Colour Chalk'. What digit in the code means 'White'?
- (a) 2  
(b) 4  
(c) 5  
(d) None of these
93. Arun started from point A and walked 10 km East to point B, then turned to North and walked 3 km to point C and then turned West and walked 12 kms to point D, then again turned South and walked 3 kms to point E. In which direction is he from his straight point ?
- (a) East  
(b) South  
(c) West  
(d) North

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94. If the rate of interests are 6%, 8% and 10% yearly for first, second and third year respectively, then the compound interest for 3 years on the amount Rs. 60,000 will be:-  
 (a) Rs. 19,446  
 (b) Rs. 15,556.80  
 (c) Rs. 16,602  
 (d) Rs. 75,556.80
95. A certain sum of money triples itself in 8 years with simple rate of annual interest. In how many years it will be five times of itself?  
 (a) 16 years  
 (b) 18 years  
 (c) 20 years  
 (d) None of these
96. A bag contains coins of Rs. 1, 50 paisa and 25 paisa in the ratio 4:5:6. If the total amount in the bag is Rs. 120, then the number of coins of 25 paisa, is :-  
 (a) 60  
 (b) 75  
 (c) 90  
 (d) 96
97. A, B, C, D are four quantities of the same kind such that A:B=4:5, B:C=7:8, C:D=12:13, then A:B:C is :-  
 (a) 4:35:104  
 (b) 4:35:84  
 (c) 28:35:40  
 (d) 30:40:45
98. If set  $A = \{1, 2, 3\}$ , then what is the power set of A ?  
 (a)  $\{\{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$   
 (b)  $\{\phi, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}\}$   
 (c)  $\{\phi, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$   
 (d) None
99. The value of  $\frac{1}{1+a^{x-y}} + \frac{1}{1+a^{y-x}}$  is equal to :  
 (a) 1  
 (b) 0  
 (c) 2  
 (d)  $a^{x+y+z}$
100. Find the present value of Rs. 2000 to be received after 4 years if the interest rate is 8% per annum compounded annually ?  
 (a) Rs. 1170.06  
 (b) Rs. 1470.06  
 (c) Rs. 1570.06  
 (d) Rs. 1180.06

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