Systematic Studies For Professionals

(Where your quest for quality education ends)

Max Time: 1.5 Hours   **Max Marks :127**

1. If (4x + 3): (9x+10) is the triplicate ratio of 3:4, then the value of x is:

   (A)9   (B)7   (C)6   (D)5.

2. If 2s: 3t is the duplicate ratio of 2s—p: 3t—p. then
(A) p^2= 6st   (B) p = 6st   (C) 2p = 3st (D) none of these

3. If a : b = 2 : 3 and b : c = 5 : 7, find a : c & a : b : c.
   (a) (i) 10:21 (ii) 10 : 15 : 21   (b) (i) 10 : 15 (ii) 10 : 15 : 21
   (c) (i) 10 : 12 (ii) 10 : 12 : 21   (d) None

4. Divide 581 among A, B, C so that 4A = 5B = 7C.
   (a) Rs.245, 196, 140   (b)Rs.140, 160, 240

   (c) 200, 250, 280   (d) None

5. A bag contains rupee, 50 paise and 25 paise coins in the ratio 5 : 6 : 7. If the total amount is Rs.390, find the number of coins of each kind.
   (a) 200, 240, 280 (b) 200, 220, 260 (c) 200, 250, 280   (d)   None

6. In a mixture of 28 litres, the ratio of milk and water is 5 : 2. If 2 litres of water is added to the mixture, find the ratio of milk and water in the new mixture.
   (a) 3 : 1   (b) 2 : 1   (c) 3 : 2   (d) None

7. What must be added to the terms of the ratio 3 : 7 to make it equal to 3 : 4,

   (A) 7   (B) 9   (C) 15   (D) 17.

8. The number which when subtracted from each of the terms of the ratio 9:33

   reducing it to 1:4 is:

   (A) 15   (B) 5   (C) 1   (D) none of these.

9. Daily earnings of two persons are in the ratio 4 : 5 and their daily expenses are in the ratio

   7 : 9. If each saves Rs. 50 per day, their daily incomes in Rs. are:

   (A) (40, 50)   (B) (50, 40)   (C) (400, 500)   (D) none of these.

10. Two numbers are in the ratio 2: 3 such that the differences of their square is 125. The

   numbers are:

   (A) 15, 10   (B) 10, 15   (C) 2, 18   (D) 18, 12

11. The fourth proportional to 3, 5, and 21 is :

   (a) 35   (b) $\frac{7}{5}$ (c) $\frac{5}{7}$ (d) 12.6

12. Mean proportional between 7 and 28 is:
   (a) 17.5   (b) 12   (c) 14   (d) 16

13. The third proportional to 12 and 24 is:

   (A) 36   (B) 40   (C) 48   (D) 42.

14. A fraction bears the same ratio to $\frac{1}{27}$ as $\frac{3}{7}$ does to $\frac{5}{9}$. The fraction is:

    (a) $\frac{7}{45}$ (b) $\frac{1}{35}$ (c) $\frac{45}{7}$ (d) $\frac{5}{21}$

15. What should be subtracted from 6, 18, 41 and 137 so that they become proportionate to each other?

    (A) 1   (B) 1/2   (C) 2   (D) 1/3

16. If $2x = 3y = 4z$, then $x : y : z$ is :

    (a) 2 : 3 : 4   (b) 4 : 3 : 2   (c) 6 : 4 : 3   d)none of these

17. If $(a + b) : (a - b) = 1 : 5$, then $(a^2 - b^2) : (a^2 + b^2)$ equals:

    (a) 2 : 3   (b) 3 : 2   (c) 5 : 13   (d) 13 : 5

18. If $a + b : \sqrt{ab} = 4 : 1$, then $\sqrt{\dfrac{a}{b}} + \sqrt{\dfrac{b}{a}}$ is

    (a) 7 : 4   (b) 4 : 1   (c) 5 : 3   (d) None of these

19. The value of x for which $4^{2x} - 2^{2x} = 12$ holds, is:

    (a) 2   (b) 3   (c) 1   (d) –1

20. If $9^x - 10.3^x + 9 = 0$, then x is equal to :

    (a) 2 or 0   (b) 1 or 3   (c) 1 or 9   (d) 1 or –2

21. The value of $\left(\dfrac{x^a}{x^b}\right)^{(a+b)} \times \left(\dfrac{x^b}{x^c}\right)^{(b+c)} \times \left(\dfrac{x^c}{x^a}\right)^{(c+a)}$ is:

    (a) 0   (b) x^{abc} (c) x^{a+b+c} (d) 1

22. The expression:

$$\frac{1}{1+x^{(b-a)}+x^{(c-a)}} + \frac{1}{1+x^{(a-b)}+x^{(c-b)}} + \frac{1}{1+x^{(b-c)}+x^{(a-c)}}$$ is equal to:

    (a) x^{a-b-c} (b) 1   (c) 0   (d) None of these

23. If $x = y^a$, $y = z^b$ and $z = x^c$, then the value of abc is:

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

24. $\left(\dfrac{1}{1+a^{n-m}} + \dfrac{1}{1+a^{m-n}}\right)$ is equal to :

    (a) 0   (b) 1   (c) $\dfrac{1}{2}$ (d) a^{m+n}

25. The value of $\log_5\left(\dfrac{1}{625}\right)$ is :

    (a) 4   (b) $\dfrac{1}{4}$ (c) –4   (d) $-\dfrac{1}{4}$

.26. If a, b, c are three consecutive integers, then log (ac + 1) has the value

    (a) $(\log b)^2$ (b)log b   (c) 2 log b   (d) log 2b

27. A man took a loan from a bank at the rate of 12% p.a. simple interest. After 3 years he had to pay Rs. 5400 interest only for the period. The principal amount borrowed by him was: (A) Rs. 2000 (B) Rs. 10,000 (C) Rs. 15,000 (D) Rs. 20,000

28. Two equal sums of money were invested, one at 4% and the other at $4\frac{1}{2}\%$. At the end of 7 years the simple interest received from the latter exceeded that received from the former by Rs.31.50. Each sum was:

    (A) Rs. 1,000 (B) Rs. 500 (C) Rs. 750 (D) Rs. 900

29. What sum will amount to Rs. 5,200 in 3 years at the same rate of simple interest at which Rs. 3.000 will amount to Rs. 4,800 in 6 years ?

    (A) Rs.4000 (B) Rs.4500 (C) Rs.4800 (D) Rs.4900

30. Rahul invested Rs. 70000 in a bank at the rate of 6.5% p.a. simple interest rate. He received Rs. 85925 after the end of term. Find out the period for which sum was invested by Rahul.

    (A) 2.5 yrs (B) 3.5 yrs (C) 3 yrs (D) 4yrs.

31. A sum of money lent at compound interest for 2 years at 20% per annum would feRs. 482 more, if the interest was payable half-yearly than if it was payable annually . The sum is :

    (A) Rs. 10,000 (B) Rs. 20,000 (C) Rs.40,000 (D) Rs. 50,000

32. If the simple interest on a sum of money for 2 years at 5% per annum is Rs. 50, what is the compound interest on the same sum at the same rate and for the same time ?

    (A) Rs. 51.25 (B) Rs. 52 (C) Rs. 54.25 (D) Rs. 60

33. The compound interest on Rs. 16,000 at 20% per annum for 9 months, compounded quarterly is :

    (A) Rs. 2422 (B) Rs. 2522 (C) Rs. 2322 (D) Rs. 2622

34. The effective rate equivalent to nominal rate of 6% compounded monthly is :
    (A) 6.05 (B) 6.16 (C) 6.26 (D) 6.07

35. At the beginning of each period consisting of six months, Rs. 500 is deposited into savings account that pays 5% compounded half-yearly. Find the balance in the account at the end of 5 years. [Given : $(1.025)^{11} = 1.3121$]

    (a) Rs.5724 {b) Rs. 5742(c) Rs.5472 (d) Rs.5427

36. How much amount is required to be invested every year so as to accumulate Rs. 3,00,000 at the end of 10 years if interest is compounded annually at 10% ? [Given : $(I.I)^{10}$ = 2.5937]
    (a) Rs. 18,823.65 (b) Rs. 18,828.65(c) Rs. 18,832.65{d) Rs. 18,882.65

37. A company anticipates capital expenditure of Rs. 50,000 for new equipment in 10 years. How much should be deposited annually in a sinking fund earning 10% per year compounded annually to provide for the purchase ? [Given :$(1.1)^{10} = 2.5937$]

 (a) Rs. 3,871.27 {b) Rs. 3,371.27(c) Rs. 3,317.27 (d) Rs. 3,137.27

38. Rs. 5000 is paid every year for 10 years to pay off a loan. If interest rate be 14% per annum compounded annually , what is loan amount ? [Given : $(1.14)^{10} = 3.70722$]

 (a) Rs.26801 (b) Rs.26,108(c) Rs. 26,081 (d) Rs. 26,810

39. A person borrows two lakh rupees on the understanding that it is to be paid back in 6 equal instalments at intervals of six months,the first payment to be made six months after the money was borrowed. Calculate the value of each instalment if the money is worth 5% per annum. [Given: $(1.025)^6 = 1.15\ 96$]

 (a) Rs. 33,628.32 {b) Rs. 33,826.32(c) Rs. 36,238.32 (d) Rs. 36,328.32

40. An equipment costs Rs. 46,000 and its effective life is estimated to be 10 years. A sinking fund is created for replacing the equipment at the end of its effective life when it scrap realises a sum of Rs. 6,000 only. Calculate the amount which should be provided every year, for the sinking fund, if it accumulates at compound interest 7% per annum. [Given :$(1.07)^{10} = 1.9671$]

 (a) Rs. 2395.25 (fc) Rs. 2,895.25(c) Rs. 2859.25 (d) Rs. 2,359.25

41. Find the present value of an annuity due of Rs. 6000 per year for 4 years, if money is worth 4% per annum. [Given: $(1.04)^{-3} = 0.8889$].

 (a) Rs. 30,220 (b) Rs. 30,202(c) Rs. 30,022 (d) Rs. 30,000

42.. Find the present value of a sequence of annual payments of Rs. 2000 each, the first being made at the end of 4 years and the last at the end of 10 years, if money is worth 6% compounded annually. [Given : $(1.06)^7 = 1.5036$]

 (a) Rs. 9,221 (b) Rs. 9,212 (c) Rs. 9,122 (d) Rs. 9,206

43.. An overdraft of Rs. 50,000 is to be paid back in equal annual instalments over a period of 20 years. Find the value of the instalment, if interest is compounded annually at 14% per annum. [Given : $(1.14)^{"20} = 0.072762$] [C.A.P.E.-I (Nov.) 2002]

 (a) Rs. 7,975.30 (b) Rs. 7,459.30 (c) Rs. 7,547.30 (d) Rs. 7,549.30

44. A loan of Rs. 1,000 to be paid in 5 equal annual payments, interest being at 6% p.a. compounded annually and first payment being made after a year. Find the value of the instalment. [Given: $(1.06)^5 = 1.3382$]

 {a) Rs. 239.40 {b) Rs. 237.40 (c) Rs. 237.20 (d) Rs. 235.40

45. The present value of Rs.10000 due in 2 years at 5% p.a. compound interest when the interest is paid on yearly basis is:

(A) Rs. 9070   (B) Rs. 9069 (C) Rs. 9061   (D) Rs. 9060

46. The present value of Rs.10000 due in 2 years at 5% p.a. compound interest when the interest is paid on half-yearly basis is:

(A) Rs.9070   (B) Rs.9069 (C) Rs.9061   (D) Rs.9060

47. Johnson left Rs.100000 with the direction that it should be divided in such a way that his minor sons Tom Dick and Harry aged 9 12 and 15 years should each receive equally after attaining the age 25 years. The rate of interest being 3.5% how mush each son receive after getting 25 years old?

(A) 50000   (B) 51994   (C) 51894   (D) 51794

48. In how many years will a sum of money double at 5% p.a. compound interest?

(A) 15 years 3 months   (B) 14 years 2 months

(C) 14 years 3 months   (D) 15 years 2 months

49. A machine costs Rs.520000 with an estimated life of 25 years. A sinking fund is created to replace it by a new model at 25% higher cost after 25 years with a scrap value realization of Rs.25000. what amount should set aside every year if the sinking fund investments accumulate at 3.5% compound interest p.a.?

(A) 16000   (B) 16500   (C) 16050   (D)16005

50. . Raja aged 40 wishes his wife Rani to have Rs.40 lakhs at his death. If his expectation of life is another 30 years and he starts making equal annual investments commencing now at 3% compound interest p.a. how much should he invest annually?

(A) 84448   (B) 84450   (C) 84449   (D) 84447

51. Appu retires at 60 years receiving a pension of 14400 a year paid in half-yearly installments for rest of his life after reckoning his life expectation to be 13 years and that interest at 4% p.a. is payable half yearly. What single sum is equivalent to his pension?

(A) 145000   (B) 144900   (C) 144800   (D) 144700

52. The letters of the words CALCUTTA and AMERICA are arranged in all possible ways. The ratio of the number of there arrangements is:
(a) 1:2   (b) 2:1   (c) 2:2   (d) N.O.T

53. The number of arrangements in which the letters of the word MONDAY be arranged so that the words thus formed begin with M and do not end with N is:
(a) 720   (b) 120   (c) 96   (d) N.O.T

54. The number of ways in which 8 mangoes of different sizes among 8 persons of different ages so that the largest mango always goes to be younger assuming that each one of then gets a mango is
(a) 8!   (b) 5040   (c) 5039   (d) N.O.T

55. The total number of 9 digit numbers of different digits is:
    (a) 10(9!)   (b) 9(9!)   (c) 8(9!)   (d) N.O.T
56. The number of arrangements of 10 different things taken 4 at a time in which one thing always occurs is
    (a) 2015   (b) 2016   (c) 2014   (d) none

57. The number of permutations of 10 different things taken 4 at a time in which one thing never occurs is
    (a) 3020   (b) 3025   (c) 3024   (d) none
58. The number of ways in which 8 different beads be strung on a necklace is:
    (a) 2500   (b) 2520   (c) 2250   (d) N.O.T

59. The total number of ways in which six '+' and four '—' signs can be arranged in a line such that no two '—' signs occur together is
    (a) 7!/3!   (b) (6! X 7!)/3!   (c) 35   (d) N.O.T
60. The number of straight lines obtained by joining 16 points on a plane, no twice of them being on the same lie is:
    (a) 120   (b) 110   (c) 210   (d) N.O.T

61. At an election there are 5 candidates and 3 members are to be elected. A voter is entitled to vote for any number of candidates not greater than the number to be elected. The number of ways a voter choose to vote is:
    (a) 20   (b) 22   (c) 25   (d) N.O.T

62. Every person shakes hands with each other in a party and the total number of hand shakes is 66. The number of guests in the party is
    (a) 11   (b) 12   (c) 13   (d) 14

63. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is:
    (a) 6   (b) 18   (c) 12   (d) 9

64. 8 points are marked on the circumference of a circle. The number of chords obtained by joining these in pairs is:
    (a) 25   (b) 27   (c) 28   (d) N.O.T

65. How many 4-digit numbers can be formed with no digit repeated by using the digits 3, 4, 5, 6, 7, 8 and 0 ?
    (a)280   (b) 720   (c) 840   (d) 660

66. How many 3-digit even numbers can be formed with no digit repeated, by using the digits, 0, 1, 2, 3, 4 and 5?
    (a)48 (b)   50 (c)   52 (d)   56

67. The number of positive integers greater than 6000 and less than 7000 which are divisible by 5, with no digit repeated, is:

    (a) 28   (b) 56   (c) 112   (d) 84

68. How many words beginning with T and ending with E can be made (with no letter repeated) out of the letters of the word 'TRIANGLE'?

    (a) $^8P_6$ (b) 720   (c) 1440   (d) 722

69. There are 6 English, 4 Sanskrit and 5 Hindi books. In how many ways can they be arranged on a shelf so as to keep all the books of the same language together?

    (a) 720   (b) 120

    (c) 870   (d) (6 × 720 × 24 × 120)

70. In how many ways can the letters of the word 'MACHINE' be arranged so that the vowels may occupy only odd positions?

    (a) $(4 \times 7!)$ (b) 576   (c) 288   (d) None

71. How many words can be formed using the letters A thrice, the letter B twice and the letter C once?

    (a) 60 (b)   120   (c) 90   (d) 6

72. How many 4 digit numbers can be formed by using the digits 1, 2, 3, 4, 5, 6 when a digit may be repeated any number of times in each number?

    (a) 4^6 (b) 6^4 (c)   720   (d) 1440

73. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

    (a) 1050   (b) 330   (C) 25200   (d) 6300

74. How many diagonals are the there in a polygon of n sides?

    (a) $\frac{1}{2}n (n - 1)$ (b) $\frac{1}{2}n (n - 2)$

    (c) $\frac{1}{2}n (n + 1)$ (d) $\frac{1}{2}n (n - 3)$

75. A polygon has 54 diagonals. Number of sides of this polygon is:

    (a) 12   (b) 15   (c) 16   (d) 9

76. In how many ways can a cricket eleven be selected from 17 players, in which 5 players can bowl, each cricket team must include 2 bowlers?

    (a) 550   (b) 1100   (c) 1650   (d) 2200

77. How many triangles can be drawn through n given points on a circle?

    (a) $^nC_3$ (b) $(^nC_3 - n)$ (c) n   (d) None

78. If (k + 1), 3k and (4k + 2) be any three consecutive terms of an A.P., then the value of k is –

    (a) 3   (b) 0   (c) 1   (d) 2

79. The 5th and 13th term of an A.P. are 5 and –13 respectively. The first term of the A.P. is

    (a) 3   (b) 14   (c) –15   (d) 9

80. Which term of the A.P. 64, 60, 56, 52, …..is zero ?

    (a) 16th   (b) 17th   (c) 15th   (d) 14th

81. If the mth term of an A.P. is $(1/n)$ and the nth term is $(1/m)$, then its $(mn)^{th}$ term is –

    (a) – mn   (b) – 1   (c) 1   (d) $\frac{1}{mn}$.

82. Insert 4 arithmetic means between 4 and 324.

    (a) 68, 136, 196, 260   (b) 68, 132, 196, 260

    (c) 68, 132, 169, 260   (d) N.O.T

83. Find the sum of the series 1 + 3 + 5 + 7 + ….. +61

    (a) 961   (b) 916   (c) 691   (d) 619

84. If 1 + 6 + 11 + 16 + …. + x = 148, then the value of x is –

    (a) 8   (b) 36   (c) 42   (d) 48

85. The sum of all two-digit numbers is –

    (a) 4750   (b) 4895   (c) 4905   (d) None

86. Find the sum to n terms of the series: $\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+\dfrac{1}{4.5}+\text{.......}$

    (a) $\dfrac{1}{n+1}$ (b) $\dfrac{1}{n-1}$ (c) $\dfrac{n}{n+1}$ (d) $\dfrac{n}{n-1}$

87. Find the nth term of the series whose sum to n terms is $5n^2 + 2n$.

    (a) 10n — 3   (b) 10 — 3n   (c) 3n —10   (d) none

88. If a, b, c be the sums of p, q, r terms respectively of an A.P. the value of
    $\dfrac{a}{p}(q-r)+\dfrac{b}{q}(r-p)+\dfrac{c}{r}(p-q)$ is-

    (A) 0   (B) 1   (C)-1   (D) None

89. The sum of n terms of two A.Ps are in the ratio of (7n —5) /(5n + 17) . Then the _____ term of the two series are equal.

    (A) 12   (B) 6   (C) 3   (D) None

90. The derivatives of the function $\sqrt{x+\sqrt{x}}$ are-

    a) $\dfrac{1}{2\sqrt{x+\sqrt{x}}}$ b) $1+\dfrac{1}{2\sqrt{x}}$

c) $\dfrac{1}{2(x+\sqrt{x})^{1/2}}\left(1+\dfrac{1}{2\sqrt{x}}\right)$ $\qquad$ d) None

91. If $y=\sqrt{x}^{\sqrt{x}^{\cdots\cdots\infty}}$, then $\dfrac{dy}{dx}$ is equal to- $\qquad$ **[NOV-2007]**

a) $\dfrac{y^2}{2-y\log x}$ $\qquad$ b) $\dfrac{y^2}{x(2-y\log x)}$ $\qquad$ c) $\dfrac{y^2}{\log x}$ $\qquad$ d) none

92. If $x^y.y^x=m$, where m is constant, then $\dfrac{dy}{dx}$ is equal to-

a) $\dfrac{-y}{x}$ $\quad$ b) $\dfrac{-y(y+x\log y)}{x(y\log x+x)}$ $\qquad$ c) $\dfrac{y+x\log y}{y\log x+x}$ $\qquad$ d) None

93. If $y = x^{\log(\log x)}$ then the value of $\left(\dfrac{dy}{dx}\right)/y$ is given by-

(A) $x^{-1}(1+\log(\log x))$ $\qquad\qquad$ (B) $x^{-1}[1-\log(\log x)]$
(C) $x[1+\log(\log x)]$ $\qquad\qquad$ (D) $x[1-\log(\log x)]$

94. $\lim\limits_{x\to 1}\dfrac{x^2-\sqrt{x}}{\sqrt{x}-1}$ is equal to

(a) -3 $\qquad$ (b) $\frac{1}{3}$ $\qquad$ (c) 3 $\qquad$ (d) None of these

95. $\lim\limits_{x\to p}\dfrac{(x+2)^{5/3}-(p+2)^{5/3}}{x-p}$ is equal to

(a) p $\qquad$ (b) $\frac{1}{p}$ $\qquad$ (c) 0 $\qquad$ (d) None of these

96. $\lim\limits_{x\to\infty}\left[\dfrac{1^3+2^3+3^3+\cdots\cdots+x^3}{x^4}\right]$ is equal to

(a) $\frac{1}{4}$ $\qquad$ (b) $\frac{1}{2}$ $\qquad$ (c) $-\frac{1}{4}$ $\qquad$ (d) None of these

97. $\lim\limits_{x\to\infty}\left(\dfrac{1}{3}+\dfrac{1}{3^2}+\dfrac{1}{3^3}+\cdots\cdots\cdots+\dfrac{1}{3^n}\right)$ is

(a) $\frac{1}{2}$ $\quad$ (b) $\frac{1}{3}$ $\qquad$ (c) $-\frac{1}{2}$ $\qquad$ (d) 1

98. The value of $\lim\limits_{x\to 0}\dfrac{u^x+v^x+w^x-3}{x}$ is

(a) uvw $\qquad$ (b) log uvw $\qquad$ (c) log(1/uvw) $\qquad$ (d) None

99. Using integration by parts integrates $\int x^3\log x$ and the integral is:

a) $x^4/16+k$ $\qquad\qquad\qquad$ b) $x^4/16(4\log x-1)+k$

c) $4\log x-1+k$ $\qquad\qquad\qquad$ d) None of these.

100. The integral of $1/[x(\log x^2]$ w.r.t x, is:

a) $1/x\log + k$

b) $x^4/16(4\log x - 1) + k$

c) $4\log x - 1 + k$

d) none of these.

102. Integral of $(e^{3x} + e^{-3x})/e^x$ is:

a) $(e^{2x}/2) - (e^{-4x}/4) + k$

b) $e^{2x} - e^{-4x} + k$

c) $(e^{2x}/2) + (e^{-4x}/4) + k$

d) None of these.

103. $\int \dfrac{x^2 dx}{(x+1)}$ is:

a) $(x^2/2) - x + \log|x+1| + k$

b) $(x^2 - 1) + \log|x| + k$

c) $(x^2/2) - x + \log|x+1| + k$

d) none of these

104. Evaluate $\int \dfrac{(2-x)e^x}{(1-x)^2} dx\ dx$ and the value is:

a) $\dfrac{e^x}{1-x} + k$

b) $e^x + k$ c) $1/1 - x + k$

d) none of these.

105. Evaluate $\int \left(\dfrac{e^x - e^{-x}}{e^x + e^x}\right) dx\ dx$ and the value is:

a) $2\log|e^x + e^{-x}| + k$

b) $\log|e^x + e^{-x}| + k$

c) $\log|e^x - e^{-x}| + k$

d) none of these.

106. $\int \dfrac{x-1}{\sqrt{x+4}} dx. =$

a) $(2/3)(x+4)^{3/2} - \sqrt{(x+4)} + k$

b) $(2/3)(x+4)^{3/2} - 10\sqrt{(x+4)} + k$

c) $(2/3)(x+4)^{3/2} - 5\sqrt{(x+4)} + k$

d) None of these.

107. $\int \dfrac{e^x\, dx}{e^{2x} + 5e^x + 6} =$

a) $l\log\left|\dfrac{e^x+2}{e^x+3}\right| + c$

b) $2\,l\log\left|\dfrac{e^x+3}{e^x+3}\right| + c$ c) $\log\left|\dfrac{e^x+3}{e^x+2}\right| + c$

d) none of these.

108. $\int \dfrac{dx}{x(x^4+1)} =$

a) $\dfrac{1}{4}\log\left|\dfrac{x^4}{x^4+1}\right| + c$

b) $\log\left|\dfrac{x^4}{x^4+1}\right| + c$ c) $\dfrac{1}{4}\log\left|\dfrac{x^4+1}{x^4}\right| + c$

d) none of these

109. $\int \dfrac{dx}{1-e^x} =$

a) $\log\left|\dfrac{e^x}{1-e^x}\right| + c$ b) $2\log\left|\dfrac{1-e^x}{e^x}\right| + c$ c) $\log\left|\dfrac{1-e^x}{e^x}\right| + c$ d) none of these

110. The set {0} is called a

(a) null set   (b) finite set   (c) singleton set   (d) both (b) and (c)

111. (The set {x ; 0 < x < 5} represents the set when x may take integral values only

   (a) {0, 1, 2, 3, 4, 5}   (b) {1, 2, 3, 4}

   (c) (1, 2, 3, 4, 5)   (d) None of these,

112. If A= {1, 3, 7, 8) and B = (2, 4, 7, 8), then

   (a) $A \subset B$ (b) $B \subset A$

   (c) A and B are disjoint   (d) A and B are not disjoint

113. If E = {1,2,3,4,5,6,7,8,9} The subset of E satisfying 5 < x < 10 is

   (a) {5, 6, 7, 8, 9} (b) {6,7,8,9}   (c) {7,8,9}   (d) None of these

114. If A = { 1, 2, 3, 5, 7} and B = {1, 3, 6,10,15}. Cardinal number of A-B is

   (a) 3   (b) 4   (c) 6   (d) none of these

115. On a survey of 100 boys it was found that 50 used white shirt 40 red and 30 blue. 20 were habituated in using both white and red shirts 15 both red and blue shirts and 10 blue and white shirts. Find the number of boys using all the colours.

   (A) 20   (B) 25   (C) 30   (D) None

116. Complaints about works canteen had been about Mess (M) Food (F) and Service (S). Total complaints 173 were received as follows: -

   (M) = 110, n(F) = 55, n(S) = 67, n(M $\cap$ F$\cap$ S') = 20, n(M $\cap$S$\cap$ F) = 11 and

   n(F $\cap$S $\cap$ M') = 16. Determine the complaints about all the three.

   (A) 6   (B)53   (C)35   (D) None

117. The solution for the pair of equations $\dfrac{1}{16x} + \dfrac{1}{15y} = \dfrac{9}{20}$, $\dfrac{1}{20x} - \dfrac{1}{27y} = \dfrac{4}{45}$ is given by

   (a)$\left(\dfrac{1}{4},\dfrac{1}{3}\right)$ (b) $\left(\dfrac{1}{3},\dfrac{1}{4}\right)$ (c) (3, 4)   (d) (4, 3)

118. Solve for x and y: $\dfrac{4}{x} - \dfrac{5}{y} = \dfrac{x+y}{xy} + \dfrac{3}{10}$ and 3xy= 10 (y −x). The values of x and y are given by the pair.

   (a)(5, 2)   (b) (−2, −5)   (c) (2, − 5)   (d) (2, 5)

119. On deduction of 1 from the numerator of a fraction it becomes equal to 2/3, however if 2 is deducted from the denominator it becomes equal to 1. The number is

(a) 5/9   (b) 7/9   (c) 7/8   (d) 3/5

120. Two numbers are such that if the smaller is doubted it is short by 1.8 from the double of another number. If 1/5 of the smaller is added to 1/8 of the greater it added up to 19. The numbers are .....

(a) (55,64)   (b) (76,57)   (c) (55,44)   (d) (65,87)

121. 10 years ago , X is older than Y by 5 years, how much older X will be than Y after 15 years

(a) 10 years   (b) 15 years   (C) 5 years   (d) 20 years

122. The roots of the equation $4^x - 3.2^{x+2} + 32 = 0$ are

(a) 1, 2   (b) 1, 3   (c) 2, 3   (d) 0, 2

123. If α, β are the roots of $2x^2 - 4x - 1 = 0$, find value of $\dfrac{\alpha^2}{\beta} + \dfrac{\beta^2}{\alpha}$

(a) -22   (b) 22   (c) 11   (d) None of these

124. If α, β are the roots of $x^2 + 2x + 1 = 0$, then the equation whose roots are $\dfrac{1}{\alpha}$ and $\dfrac{1}{\beta}$, is

(a) $x^2 + \dfrac{1}{2}x + \dfrac{1}{2} = 0$ (b) $x^2 + x + \dfrac{1}{2} = 0$ (c) $x^2 + \dfrac{1}{2}x + 1 = 0$ (d) $x^2 + 2x + 1 = 0$

125. Solution of real x of $\sqrt{6x - x^2} \geq 0$ is

(a) $x \geq 6$ (b) $0 < x < 6$

(c) $0 \leq x \leq 6$ (d) $x > 6$

126. Solution of $-x^2 - 13x - 36 > 0$ is

(a) $x > 4$ (b) $x > 9$

(c) $4 < x < 9$ (d) (a) or (b)

127. The shaded region represents:
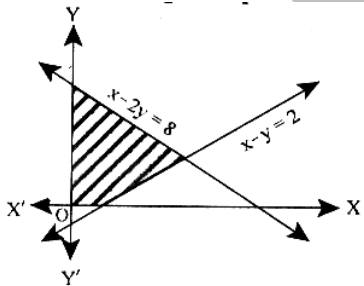
(a) $x - y \leq 2$, $x + 2y \leq 8$, $x, y \geq 0$ (b) $x - y \geq 2$, $x + 2y \leq 8$, $x, y \geq 0$

(c) $x - y \leq 2$, $x + 2y \geq 8$, $x, y \geq 0$ (d) none of these.